
**STATE WATER PROJECT WATER SUPPLY CONTRACT
AMENDMENTS FOR WATER MANAGEMENT AND
CALIFORNIA WATERFIX**



DRAFT ENVIRONMENTAL IMPACT REPORT



**State of California
Natural Resources Agency
Department of Water Resources**

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State of California
The Resources Agency
Department of Water Resources

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CONTRACT AMENDMENTS FOR WATER
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OCTOBER 2018

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State of California

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Table of Contents



TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
ACRONYMS AND ABBREVIATIONS	vii
EXECUTIVE SUMMARY	ES-1
ES.1 Introduction.....	ES-1
ES.2 Potential Areas of Controversy and Concern	ES-2
ES.3 Project Objectives	ES-3
ES.4 Proposed Project Summary	ES-3
ES.5 Alternatives Analysis	ES-4
ES.6 Summary of Impacts	ES-10
1 INTRODUCTION.....	1-1
1.1 Introduction.....	1-1
1.2 Purpose of the DEIR	1-3
1.3 Environmental Review and Approval Process	1-4
1.3.1 Notice of Preparation.....	1-4
1.3.2 DEIR	1-4
1.3.3 Final EIR.....	1-5
1.3.4 Approval Process	1-5
1.4 Scope of this EIR.....	1-6
1.5 Organization of the DEIR	1-6
2 STATE WATER PROJECT	2-1
2.1 History and Background	2-1
2.2 Components of the SWP	2-2
2.2.1 Cross Drainage Facilities.....	2-8
2.2.2 Proposed Facilities	2-10
2.3 SWP Operations.....	2-12
2.3.1 SWP Deliveries.....	2-13
2.3.2 Recent SWP Supply Allocation Amendments	2-15
2.4 Water Service Provisions	2-16
2.4.1 Annual Table A Amounts.....	2-18
2.4.2 Article 21 Water	2-18
2.4.3 Water Management Practices	2-21
2.4.4 Water Transfers and Exchanges	2-21
2.5 Background on Previous Contract Amendments and Settlement Agreements.....	2-28
2.5.1 Monterey Amendment and Settlement Agreement	2-28
2.5.2 Water Supply Contract Extension Amendment	2-30
2.6 References	2-31
3 STATE WATER PROJECT FINANCING AND WATER SUPPLY CONTRACT FINANCIAL PROVISIONS	3-1
3.1 Introduction.....	3-1
3.2 Capital Financing and Operations and Maintenance Expenditures	3-1
3.2.1 The Burns-Porter Act.....	3-1
3.2.2 Central Valley Project Act.....	3-2

<u>Chapter</u>	<u>Page</u>
3.2.3 Capital Resources Financing.....	3-2
3.3 Annual Revenues.....	3-3
3.3.1 Water Supply Contract Cost Recovery.....	3-4
3.3.2 Timing and Method of Payment.....	3-7
3.4 Monterey Amendment Financial Provisions.....	3-7
4 PROJECT DESCRIPTION.....	4-1
4.1 Introduction.....	4-1
4.2 Study Area.....	4-1
4.3 Project Objectives.....	4-1
4.4 Project Description.....	4-2
4.4.1 Water Transfers and Exchanges.....	4-6
4.4.2 California WaterFix Cost Allocation.....	4-8
4.5 Required Permits and Approvals.....	4-8
5 ENVIRONMENTAL ANALYSIS.....	5.1-1
5.1 Method of Analysis.....	5.1-1
5.1.1 Method of Analysis.....	5.1-3
5.1.2 Section Format.....	5.1-8
5.1.3 Impacts and Mitigation Measures.....	5.1-9
5.1.4 Impact Discussion Format.....	5.1-9
5.1.5 Terminology.....	5.1-9
5.2 Aesthetics.....	5.2-1
5.2.1 Introduction.....	5.2-1
5.2.2 Environmental Setting.....	5.2-1
5.2.3 Regulatory Setting.....	5.2-2
5.2.4 Impact Analysis.....	5.2-3
5.2.5 References.....	5.2-6
5.3 Agricultural and Forest Resources.....	5.3-1
5.3.1 Introduction.....	5.3-1
5.3.2 Environmental Setting.....	5.3-1
5.3.3 Regulatory Setting.....	5.3-3
5.3.4 Impacts Analysis.....	5.3-5
5.3.5 References.....	5.3-9
5.4 Air Quality.....	5.4-1
5.4.1 Introduction.....	5.4-1
5.4.2 Environmental Setting.....	5.4-1
5.4.3 Regulatory Setting.....	5.4-3
5.4.4 Impacts Analysis.....	5.4-6
5.4.5 References.....	5.4-10
5.5 Biological Resources.....	5.5-1
5.5.1 Introduction.....	5.5-1
5.5.2 Environmental Setting.....	5.5-1
5.5.3 Regulatory Setting.....	5.5-3
5.5.4 Impact Analysis.....	5.5-7
5.5.5 References.....	5.5-13
5.6 Cultural Resources.....	5.6-1
5.6.1 Introduction.....	5.6-1

<u>Chapter</u>	<u>Page</u>
5.6.2 Environmental Setting	5.6-1
5.6.3 Regulatory Setting	5.6-11
5.6.4 Impacts Analysis	5.6-15
5.6.5 References	5.6-20
5.7 Energy	5.7-1
5.7.1 Introduction	5.7-1
5.7.2 Environmental Setting	5.7-1
5.7.3 Regulatory Setting	5.7-2
5.7.4 Impact Analysis	5.7-5
5.7.5 References	5.7-12
5.8 Geology, Soils, and Mineral Resources	5.8-1
5.8.1 Introduction	5.8-1
5.8.2 Environmental Setting	5.8-1
5.8.3 Regulatory Setting	5.8-3
5.8.4 Impact Analysis	5.8-6
5.8.5 References	5.8-10
5.9 Greenhouse Gas Emissions	5.9-1
5.9.1 Introduction	5.9-1
5.9.2 Environmental Setting	5.9-1
5.9.3 Regulatory Setting	5.9-3
5.9.4 Impact Analysis	5.9-8
5.9.5 References	5.9-12
5.10 Groundwater Hydrology and Water Quality	5.10-1
5.10.1 Introduction	5.10-1
5.10.2 Environmental Setting	5.10-1
5.10.3 Regulatory Setting	5.10-11
5.10.4 Impact Analysis	5.10-15
5.10.5 References	5.10-25
5.11 Hazards and Hazardous Materials	5.11-1
5.11.1 Introduction	5.11-1
5.11.2 Environmental Setting	5.11-1
5.11.3 Regulatory Setting	5.11-3
5.11.4 Impact Analysis	5.11-4
5.11.5 References	5.11-7
5.12 Land Use and Planning	5.12-1
5.12.1 Introduction	5.12-1
5.12.2 Environmental Setting	5.12-1
5.12.3 Regulatory Setting	5.12-1
5.12.4 Impact Analysis	5.12-3
5.12.5 References	5.12-7
5.13 Noise	5.13-1
5.13.1 Introduction	5.13-1
5.13.2 Environmental Setting	5.13-1
5.13.3 Regulatory Setting	5.13-5
5.13.4 Impact Analysis	5.13-8
5.13.5 References	5.13-11
5.14 Population, Employment, and Housing	5.14-1
5.14.1 Introduction	5.14-1

<u>Chapter</u>	<u>Page</u>
5.14.2 Environmental Setting	5.14-1
5.14.3 Regulatory Setting	5.14-1
5.14.4 Impact Analysis	5.14-2
5.14.5 References	5.14-5
5.15 Public Services and Recreation	5.15-1
5.15.1 Introduction	5.15-1
5.15.2 Environmental Setting	5.15-1
5.15.3 Regulatory Setting	5.15-2
5.15.4 Impact Analysis	5.15-4
5.15.5 References	5.15-7
5.16 Surface Water Hydrology and Water Quality	5.16-1
5.16.1 Introduction	5.16-1
5.16.2 Environmental Setting	5.16-1
5.16.3 Regulatory Setting	5.16-12
5.16.4 Impact Analysis	5.16-15
5.16.5 References	5.16-17
5.17 Tribal Cultural Resources	5.17-1
5.17.1 Introduction	5.17-1
5.17.2 Environmental Setting	5.17-1
5.17.3 Regulatory Setting	5.17-2
5.17.4 Impact Analysis	5.17-5
5.17.5 References	5.17-10
5.18 Transportation	5.18-1
5.18.1 Introduction	5.18-1
5.18.2 Environmental Setting	5.18-1
5.18.3 Regulatory Setting	5.18-2
5.18.4 Impact Analysis	5.18-3
5.18.5 References	5.18-6
5.19 Utilities and Service Systems	5.19-1
5.19.1 Introduction	5.19-1
5.19.2 Environmental Setting	5.19-1
5.19.3 Regulatory Setting	5.19-1
5.19.4 Impact Analysis	5.19-4
5.20 Water Supply	5.20-1
5.20.1 Introduction	5.20-1
5.20.2 Environmental Setting	5.20-1
5.20.3 Regulatory Setting	5.20-6
5.20.4 Impact Analysis	5.20-12
5.20.5 References	5.20-19
6 OTHER CEQA CONSIDERATIONS.....	6-1
6.1 Cumulative Impacts	6-1
6.1.1 Cumulative Projects	6-2
6.1.2 Cumulative Impact Methodology and Analysis	6-5
6.1.3 Cumulative Impact Analysis	6-7
6.2 Significant Unavoidable Impacts	6-13
6.3 Significant Irreversible Environmental Changes	6-14
6.4 Growth-Inducing Impacts	6-14

<u>Chapter</u>	<u>Page</u>
6.4.1 Growth Inducement Potential	6-16
7 ALTERNATIVES.....	7-1
7.1 Introduction.....	7-1
7.2 Project Objectives	7-2
7.3 Alternatives Considered but Rejected	7-2
7.3.1 Implement New Water Conservation Provisions in the Contracts	7-2
7.3.2 Alternative Cost Recovery Mechanisms	7-3
7.4 Project Alternatives	7-4
7.4.1 Alternative 1: No Project	7-4
7.4.2 Alternative 2: Amending Contract to Reduce Table A Deliveries	7-8
7.4.3 Alternative 3: Less Flexibility in Water Transfers/Exchanges	7-14
7.4.4 Alternative 4: More Flexibility in Water Transfers/Exchanges	7-16
7.4.5 Alternative 5: Greater Water Management - Only Agriculture to M&I Transfers Allowed	7-19
7.4.6 Alternative 6: Transfers/Exchanges Only after Operation of the California WaterFix Facilities	7-22
7.5 Environmentally Superior Alternative	7-24
7.6 References	7-25
8 CLIMATE CHANGE AND RESILIENCY	8-1
8.1 Introduction.....	8-1
8.2 Background and Environmental Setting	8-3
8.2.1 Background on Climate Change.....	8-3
8.2.2 Global Climate Trends and Associated Effects	8-4
8.2.3 California Climate Trends and Associated Effects	8-8
8.3 Regulatory Setting.....	8-12
8.3.1 Federal	8-12
8.3.2 State	8-12
8.3.3 Local.....	8-14
8.4 Resiliency and Adaptation Analysis	8-15
8.5 References	8-15
9. CONTRIBUTORS AND REVIEWERS.....	9-1

APPENDICES

- A. Agreement in Principle Concerning the State Water Project Water Supply Contract
Amendments for Water Management and California WaterFix
- B. Notice of Preparation and Comment Letters Received
- C. Example of Water Supply Contract

FIGURES

Figure 2-1	Public Water Agency's Service Areas	2-3
Figure 2-2	Primary State Water Project Water Delivery Facilities	2-4
Figure 2-3	Water Offered to the Turn-Back Pool	2-23
Figure 2-4	Multi-Year Water Pool Program - PWAs Selling Water	2-24
Figure 2-5	Occurrences of Select PWAs Providing and Requesting Water through Exchanges.....	2-27
Figure 5.6-1	Distribution of Rock Formations	5.6-10
Figure 7-1	Relative Delivery Capability of the SWP	7-11
Figure 7-2	Relative Deliveries with Reduced Table A	7-11

TABLES

Table ES-1	Comparison of Alternatives to Proposed Project.....	ES-6
Table ES-2	Summary of Impacts and Mitigation Measures	ES-12
Table 2-1	Physical Characteristics of Primary Storage Facilities	2-9
Table 2-2	Total Miles of Aqueducts	2-10
Table 2-3	Historical Table A Requests & Deliveries to SWP PWAs.....	2-14
Table 2-4	Water Supply Contract Execution and Current Expiration Dates	2-17
Table 2-5	Maximum Annual Table A Amounts	2-19
Table 2-6	Annual Table A Amounts 1970–2017.....	2-20
Table 4-1	Summary of Existing PWA Contracts and Proposed Amendments for Water Transfers and Exchanges	4-3
Table 5.2-1	Summary of Impacts Conclusions – Aesthetics	5.2-5
Table 5.3-1	Summary of Impacts Conclusions – Agriculture and Forestry Resources	5.3-7
Table 5.4-1	State and National Criteria Air Pollutant Standards, Effects, and Sources	5.4-4
Table 5.4-2	Summary of Impacts Conclusions – Air Quality	5.4-7
Table 5.5-1	Summary of Impacts Conclusions – Biological Resources	5.5-9
Table 5.6-1	Summary of Impacts Conclusions – Cultural Resources	5.6-17
Table 5.7-1	Summary of Impacts Conclusions – Energy	5.7-7
Table 5.8-1	Summary of Impacts Conclusions – Geology, Soils, and Seismicity.....	5.8-8
Table 5.9-1	Global, National, State, and Local GHG Emissions Inventories.....	5.9-3
Table 5.9-2	Summary of Impacts Conclusions – Greenhouse Gas Emissions	5.9-10
Table 5.10-1	Summary of Impacts Conclusions – Groundwater and Water Quality.....	5.10-17
Table 5.12-1	Summary of Impacts Conclusions – Land Use and Planning.....	5.12-5
Table 5.13-1	Representative Environmental Noise Levels	5.13-2
Table 5.13-2	Human Response to Different Levels of Groundborne Vibration.....	5.13-4
Table 5.13-3	Typical Ambient Noise Levels in a Suburban and Urban Environment	5.13-5
Table 5.13-4	Land Use Compatibility for Community Noise Environment	5.13-7
Table 5.17-1	Summary of Impacts Conclusions – Tribal Cultural Resources.....	5.17-7
Table 5.20-1	Summary of Impacts Conclusions – Surface Water Hydrology and Water Quality	5.20-15
Table 7-1	Comparison of Alternatives to Proposed Project.....	7-5

ACRONYMS AND ABBREVIATIONS

°C	Celsius
°F	Fahrenheit
µg/L	micrograms per liter
AB	Assembly Bill
af	acre-feet
AIP	Agreement in Principle
APCD	Air Pollution Control District
AQMD	Air Quality Management District
AR	atmospheric rivers
Banks	Harvey O. Banks Delta
B.C.E.	Before Common Era
BDCP	Bay Delta Conservation Plan
BiOp	Biological Opinion
CAA	Federal Clean Air Act
CalEMA	California Emergency Management Agency
CAL FIRE	California Department of Forestry and Fire Protection
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CAISO	California Independent System Operator
CBC	California Building Standards Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
C.E.	Common Era
CEC	California Energy Commission
CEPA	California Environmental Protection Agency
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFCP	California Farmland Conservancy Program
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH ₄	methane
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	CO ₂ equivalents

COA	Coordinated Operating Agreement
COGs	Council of Governments
Contracts	Water Supply Contracts
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Places
CTC	California Transportation Commission
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel scale
DEIR	Draft Environmental Impact Report
Delta	Sacramento-San Joaquin Delta
DOC	California Department of Conservation
DPR	Department of Pesticide Regulation
DSC	Delta Stewardship Council
DWR	California Department of Water Resources
E-Clay	Corcoran Clay
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FC&WCD	Flood Control and Water Conservation District
FCAA	Federal Clean Air Act
FCAAA	Federal Clean Air Act Amendments
FCD	Flood Control District
FEIR	Final EIR
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIP	Federal Implementation Plan
FMMP	Farmland Mapping and Monitoring Program
FSZ	Farmland Security Zone
GAMA	Groundwater Ambient Monitoring and Assessment
GGERP	Greenhouse Gas Emissions Reduction Plan
GHG	greenhouse gas
GMP	Groundwater Management Plan
GOA	General Operating Account
GSA	Groundwater Sustainability Agency

GSP	Groundwater Sustainability Plan
GWh	gigawatt hours
HAP	hazardous air pollutant
HCP	Habitat Conservation Plan
HFC	hydrofluorocarbons
HHWE	household hazardous waste element
I	Interstate
ID	Irrigation District
IPCC	Intergovernmental Panel on Climate Change
IRWMP	Integrated Regional Water Management Plan
ITP	incidental take permit
JPOD	Joint Point of Diversion
KFE	Kern Fan Element
kV	kilovolts
KWBA	Kern Water Bank Authority
L ₅₀	a statistical noise level, is the noise level which is exceeded 50 percent of the time during which the noise is measured
LADWP	Los Angeles Department of Water and Power
L _{dn}	day-night average noise level
L _{eq}	equivalent energy noise level
M&I	municipal and industrial
MAF	million acre feet
MCL	maximum contaminant level
MMRP	Mitigation Monitoring and Reporting Plan
mm/yr	millimeters per year
MOU	Memorandum of Understanding
MRZ	mineral resource zone
MW	megawatt
MWD	Municipal Water District
mt	metric tons
MWh/yr	megawatt-hours per year
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NBA	North Bay Aqueduct
NBA AIP	North Bay Aqueduct Alternate Intake Project
NCCP	Natural Community Conservation Planning
NEHRPA	National Earthquake Hazards Reduction Program Act
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NGO	non-government organization

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO ₂	nitrogen dioxide
NOx	nitrogen oxides
NOD	Notice of Determination
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NRHP	National Register of Historic Places
O&M	Operation and Maintenance
OPR	Office of Planning and Research
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PFC	perfluorocarbons
PFMC	Pacific Fishery Management Council
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PRC	California Public Resources Code
PWAs	Public Water Agencies
RAS	replacement accounting system
RCP	Representative Concentration Pathways
RDEIR	Recirculated Draft Environmental Impact Report
Reclamation	U.S. Bureau of Reclamation
Resources	California Natural Resources Agency Regional Water
Board	Regional Water Quality Control Board
ROD	Record of Decision
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
SB	Senate Bill
SDWA	Safe Drinking Water Act
SF ₆	sulfur hexafluoride
SFPUC	San Francisco Public Utility Commission
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMARA	Surface Mining and Reclamation Act
SO ₂	sulfur dioxide
SR	State Route
SRA	State Water Resources Development System Reinvestment Account
SRRE	source reduction and recycling element

SSA	State Water Resources Development System Support Account
State Water Board	State Water Resources Control Board
SVP	Society of Vertebrate Paleontology
SWC	State Water Contractors
SWP	State Water Project
SWPAO	State Water Project Analysis Office
SWRDS	State Water Resources Development System
TAC	toxic air contaminant
taf	thousand acre-feet
TBM	tunnel boring machine
TCE	trichloroethylene
TCP	Traditional Cultural Properties
TDS	total dissolved solids
TMDL	total maximum daily load
TPZ	Timber Production Zones
UAIC	United Auburn Indian Community of the Auburn Rancheria
UPRR	Union Pacific Railroad
US 101	U.S. Highway 101
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	urban water management plan
VdB	vibration decibels
WA	Water Agency
WD	Water District
WDSC	Water District of Southern California
WECC	Western Electricity Coordinating Council
WQCP	Water Quality Control Plan
WSD	Water Storage District
WSRA	Wild and Scenic Rivers Act

Executive Summary



EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The Department of Water Resources (DWR) is proposing to implement the State Water Project (SWP) Water Supply Contract Amendments for Water Management and California WaterFix (proposed project or proposed amendment). The proposed project includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (Contracts). SWRDS (defined in Water Code Section 12931), or more commonly referred to as the SWP, was enacted into law by the Burns-Porter Act, passed by the Legislature in 1959 and approved by the voters in 1960. DWR constructed and currently operates and maintains the SWP, a system of storage and conveyance facilities that provide water to 29 State Water Contractors known as the Public Water Agencies¹ (PWAs).

The SWP is a complex system of reservoirs, dams, power plants, pumping plants, pipelines, and aqueducts. Precipitation and watershed runoff are stored in Lake Oroville, a reservoir behind Oroville Dam in Butte County, and is delivered via natural stream channels to the Delta and pumped into the California Aqueduct system to water agencies and districts in Southern California, the Central Coast, the San Joaquin Valley, and portions of the San Francisco Bay Area. The PWAs receive water service from the SWP in exchange for paying all costs that are associated with constructing, operating, and maintaining the SWP facilities and are attributable to water supply.

The Contracts include water management provisions for actions such as the transfer or exchange of SWP water between PWAs, as well as financial provisions including the methods used by DWR to recover certain costs associated with the planning, construction, and operation and maintenance of SWP facilities. The Contracts are substantially uniform, and the provisions reflected DWR's expectations at that time (1960s) with respect to future water demand and the planned construction of SWP components. DWR and the PWAs have made many amendments to the Contracts to

¹ The State Water Project Public Water Agencies include Alameda County Flood Control and Water Conservation District (Zone 7), Alameda County Water District, Antelope Valley-East Kern Water Agency, City of Yuba City, Coachella Valley Water District, County of Butte, County of Kings, Crestline-Lake Arrowhead Water Agency, Desert Water Agency, Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency, Littlerock Creek Irrigation District, The Metropolitan Water District of Southern California, Mojave Water Agency, Napa County Flood Control and Water Conservation District, Oak Flat Water District, Palmdale Water District, Plumas County Flood Control and Water Conservation District, San Bernardino Valley Municipal Water District, San Gabriel Valley Municipal Water District, San Geronio Pass Water Agency, San Luis Obispo County Flood Control and Water Conservation District, Santa Barbara County Flood Control and Water Conservation District, Santa Clara Valley Water District, Santa Clarita WA (formerly Castaic Lake WA), Solano County Water Agency, Tulare Lake Basin Water Storage District, and Ventura County Flood Control District.

address matters that have arisen over the past 55 years, including amendments in 1995 known as the Monterey Amendments.

Recently DWR and the PWAs have agreed to enter into the process for amending the Contracts to confirm and supplement certain provisions for several water management actions, including transfers and exchanges, and to address changes in financial provisions related to the costs of California WaterFix. In February 2018, DWR and the PWAs resumed the public process to negotiate the proposed amendments. This public process was initially noticed in November 2014 for cost allocation of the proposed Bay Delta Conservation Plan (BDCP). Later, DWR proposed additional alternatives to BDCP including Alternative 4A also known as California WaterFix which also became the proposed project under the California Environmental Quality Act (CEQA). In July 2017, DWR certified its Final Environmental Impact Report (EIR) for the California WaterFix, adopted Findings of Fact, a Statement of Overriding Considerations, a Mitigation Monitoring and Reporting Plan (MMRP), and issued its Notice of Determination (NOD) approving the California WaterFix. The purpose of the resumed negotiations was to address terms and conditions of water management actions related to water transfers and exchanges, and to develop terms and conditions for allocation of costs of California WaterFix for PWAs that directly benefit from California WaterFix. The negotiations led to development of a non-binding agreement in principle known as the “Draft Agreement in Principle for the SWP Water Supply Contract Amendment for Water Management and California WaterFix” (AIP) that describes the proposed project. The AIP is included as Appendix A of the Draft EIR (DEIR).

DWR determined that an EIR was the appropriate CEQA document due to the statewide importance of any proposed amendments to the Contracts, such as the proposed project. Further, as an informational document, this DEIR discloses for public and lead agency consideration potential environmental effects attributed to the proposed amendments. It is also intended to provide sufficient information to foster informed decision making by DWR.

ES.2 POTENTIAL AREAS OF CONTROVERSY AND CONCERN

In accordance with Section 15082 of the CEQA Guidelines, DWR prepared a Notice of Preparation (NOP) of an EIR and published it on July 13, 2018. DWR provided the NOP to: (1) local, State, and federal agencies; (2) local libraries; (3) city and county clerk offices; and (4) other interested parties. The NOP was circulated for comment for 30 days, ending on August 13, 2018. Responses to the NOP identified potential areas of controversy and concern to local and non-governmental interests.

During the public scoping meeting held on August 2, 2018, no participants commented on the proposed project. Two written comment letters were received during the NOP comment period: (1) Plumas County Flood Control and Water Conservation District; and (2) Natural Resources Defense Council (NRDC), Defenders of Wildlife, Institute for Fisheries Resources, and Pacific Coast Federation of Fishermen' Associations. Both letters, along with the NOP are included in Appendix B of this DEIR. General topics raised included: project segmentation issues; description of the project evaluated in the DEIR; consideration and analysis of reasonably foreseeable impacts of the project; the range of alternatives to be evaluated in the DEIR. Issues raised in response to the NOP are addressed in this EIR, as appropriate, for compliance with CEQA.

ES.3 PROJECT OBJECTIVES

DWR and the PWAs have a common interest to ensure the efficient delivery of SWP water supplies and to ensure the SWP's financial integrity. In order to address water management flexibility and to allocate costs for California WaterFix, DWR and the PWAs agreed to the following objectives:

1. Supplement and clarify terms of the SWP water supply contract that will provide greater water management regarding transfers and exchanges of SWP water supply within the SWP service area.
2. Provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity.

ES.4 PROPOSED PROJECT SUMMARY

The proposed project would add, delete, and modify provisions of the Contracts and clarify certain terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water within the service area; and provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity. The proposed project would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts.² The proposed project would not change the water supply delivered by the SWP as SWP water would continue to be delivered to the PWAs consistent with current Contract terms, and all regulatory requirements. More specifically, the proposed project would amend the Contracts to:

- Add, delete, modify, and clarify conditions and terms to the agreements for transfers and exchanges of SWP water among the PWAs.

² The maximum amount of SWP water that the PWAs can request pursuant to their individual water supply contract. Annual Table A amounts also serve as a basis for allocation of some SWP costs among the contractors.

- Allow multi-year transfers of SWP water between PWAs that include terms developed by the PWAs to the agreements, including quantity, duration, and compensation, and that such transfers may be packaged in two or more transfer agreements between the same PWAs.
- Clarify provisions related to the exchanges of SWP water between PWAs.
- Establish reporting requirements for transfers and exchanges of SWP water by PWAs.
- Establish terms for transfer and exchange of stored SWP water/carryover water.
- Establish California WaterFix facilities allocation factors based on PWA participation percentages to be used for repayment of planning, construction, operation and maintenance costs associated with California WaterFix.
- Identify the methods of calculating costs and repayment of costs for California WaterFix.

The proposed project is described in more detail in Chapter 4 of this DEIR.

ES.5 ALTERNATIVES ANALYSIS

As described in Chapter 7 of this DEIR, Alternatives, the focus and definition of the alternatives evaluated in the DEIR were governed by the “rule of reason” in accordance with Section 15126.6(f) of the CEQA Guidelines requiring evaluation of only those alternatives “necessary to permit a reasoned choice.” Further, an EIR “need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.” (CEQA Guidelines section 15126.6(f)(3).) CEQA Guidelines section 15126.6(a) requires every EIR to describe and analyze a “range of reasonable alternatives” that “would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.” Alternatives to the proposed project were developed and analyzed for their ability to meet the basic objectives of the proposed project. Where alternatives were found to attain most of the basic objectives, they were included as part of the detailed analysis presented in this chapter. Where alternatives were not found to attain most of the basic project objectives or not to be within a feasible means to achieve basic project objectives, they were eliminated from further detailed consideration.

The selection and discussion of alternatives is intended to foster meaningful public participation and informed decision making. The scoping process and the Contracts negotiation process were some of the methods used to identify a range of potential alternatives that are evaluated in this DEIR.

The alternatives that were considered but rejected include:

1. Implement new water conservation management provisions in the Contracts
2. Alternative Cost Recovery Mechanisms

The following alternatives were identified for analysis in this DEIR:

- Alternative 1: No Project
- Alternative 2: Reduce Table A Deliveries
- Alternative 3: Reduced Flexibility in Water Transfers/Exchanges
- Alternative 4: More Flexibility in Water Transfers/Exchanges
- Alternative 5: Only Agriculture to M&I Transfers Allowed
- Alternative 6: Transfers and Exchanges Only after Implementation of California WaterFix

Table ES-1 presents a summary of how each alternative compares to the proposed project with respect to the impacts and the ability to meet project objectives, along with the environmentally superior alternative. A more detailed analysis is presented in Chapter 7 of this DEIR.

Alternative 1: No Project

Under the No Project Alternative (Alternative 1), DWR takes no action, and DWR and the PWAs would continue to operate and finance the SWP under the current Contracts, some of which are set to expire as early as 2035. The PWA's expiration date could be extended beyond the existing terms of the contracts (either by PWAs submitting their Article 4 letters or through the Contract extension process), enabling DWR to finance SWP expenditures beyond 2035 and continue to receive a reliable stream of revenues from PWAs for the construction, operation, and maintenance of the SWP. DWR and the PWAs would transfer and exchange water consistent with the existing water management and existing financial provisions in the Contracts.

In addition, under Alternative 1, the Contracts would not be amended to include provisions that establish the allocation of costs to south of Delta PWAs for California WaterFix. Therefore, DWR would begin including California WaterFix costs in all PWA's statements of charges under the existing Contract.

Similar to the proposed project, Alternative 1 would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts or the water supply delivered by the SWP, as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, and all regulatory requirements.

**TABLE ES-1
COMPARISON OF ALTERNATIVES TO PROPOSED PROJECT**

	Proposed Project	Alternative 1 No Project	Alternative 2 Amending Contract to Reduce Table A Deliveries	Alternative 3 Less Flexibility in Water Transfers/ Exchanges	Alternative 4 More Flexibility in Water Transfers/ Exchanges	Alternative 5 Greater Water Management Only Agriculture to M&I Transfers Allowed	Alternative 6 Transfers/ Exchanges Only after Operation of California WaterFix
Environmental Impacts							
	No impact or LTS for all resource areas other than Groundwater Resources which is SU	Similar to or Greater	Similar to or Greater	Similar to or Greater	Similar	Similar to or Greater	Similar to or Greater
Meets Project Objectives:							
Objective 1	Yes	No	No	Yes, but to a lesser degree	Yes	Yes, but to a lesser degree	Yes, but to a lesser degree
Objective 2	Yes	No	Yes	Yes	Yes	Yes	Yes

NOTES:

LTS – Less than Significant
 SU – Significant and Unavoidable

Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

Alternative 2: Amending Contracts to Reduce Table A Deliveries

Under Alternative 2, DWR and the PWAs would agree to amend the Contracts to provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. However, unlike the proposed project, the Contracts would be amended to reduce Annual Table A amounts proportionately for all the PWAs. Due to a reduction in Table A water and without the increased flexibility to transfer and exchange Table A water, PWAs may seek alternative sources of surface water (e.g. acquisition of non-project water) to meet their water needs. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

Alternative 3: Less Flexibility in Water Transfers/Exchanges

Under Alternative 3, DWR and the PWAs would agree to amend the Contracts. Similar to the proposed project, Alternative 3 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. However, unlike the proposed project, the Contracts would not be amended to modify provisions of the Contracts and clarify certain terms of the Contracts to provide greater water management regarding transfers and exchanges of SWP water supply within the SWP service area. Some increase in flexibility of exchanges and transfers would be agreed to, but not all. In addition, unlike the proposed project, PWAs would transfer water based on cost compensation established by DWR. Also, under Alternative 3, the Contracts would not amend the text in Article 56(f) regarding water exchanges to add provisions, such as conducting water exchanges as buyers and sellers in the same year and increasing the compensation allowed to facilitate the exchanges.

Similar to the proposed project, Alternative 3 would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts. Also similar to the proposed project, Alternative 3 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, and all regulatory requirements. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

Alternative 4: More Flexibility in Water Transfers/Exchanges

Under Alternative 4, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 4 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. However, unlike the proposed project, the Contracts would be amended to allow PWAs more flexibility in water transfers and exchanges. Similar to the proposed project, PWAs would be able to transfer carryover water in San Luis Reservoir, transfer water for multiple years without permanently relinquishing that portion of their Table A amounts, and transfer water in Transfer Packages. Similar to the proposed project, PWA would be able to transfer water based on terms they establish for cost compensation and duration, and store and transfer water in the same year. Unlike the proposed project that only allows for a single-year transfers associated with carryover water, Alternative 4 would allow transfers and exchanges to include up to 100 percent of a PWA's carryover in San Luis Reservoir and allow multi-year use of its carryover water in both transfers and exchanges. Similar to the proposed project, the proposed exchange provisions of the AIP would establish a larger range of return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges and allow PWAs to conduct additional water exchanges as buyers and sellers in the same year.

Similar to the proposed project, Alternative 4 would not build new or modify existing SWP facilities nor change any of the PWA's contractual maximum Table A amounts. Also similar to the proposed project, Alternative 4 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, including Table A water and Article 21 water. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

Alternative 5: Greater Water Management - Only Agriculture to M&I Transfers Allowed

Under Alternative 5, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 5 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP.

Unlike the proposed project, DWR and PWAs would amend Contract provisions to allow the transfer of Table A water only from agricultural PWAs to M&I PWAs and not change any current Contract provisions for exchanges. Transfers from Municipal and Industrial (M&I) PWAs to M&I PWAs, M&I PWAs to agricultural PWAs, and agricultural PWAs to

agricultural PWAs would not be allowed. Similar to the proposed project, PWAs could transfer carryover water in San Luis Reservoir to PWAs, transfer water for multiple years without permanently relinquishing that portion of their Table A amounts and request DWR's approval of Transfer Package; however, unlike the proposed project, these transfers would only be from agricultural PWAs to M&I PWAs. Similar to the proposed project, Alternative 5 would revise the Contract to allow the PWAs to transfer water based on terms they establish for cost compensation and duration. An agricultural PWA would be able to store and transfer water in the same year to M&I PWAs, and transfer up to 50 percent of its carryover water, but only for a single-year transfer to an M&I PWA (i.e. a future or multi-year commitment of transferring carryover water is not allowed). Under Alternative 5, the Contracts would not be amended to modify the text in Article 56(f) regarding water exchanges to include additional provisions, such as conducting water exchanges as buyers and sellers in the same year.

Similar to the proposed project, Alternative 5 would not build new or modify existing SWP facilities nor change any of the PWA's contractual maximum Table A amounts. Also similar to the proposed project, Alternative 5 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, including Table A and Article 21 deliveries. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

Alternative 6: Transfers/Exchanges Only after Operation of the California WaterFix Facilities

Under Alternative 6, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 6 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP.

Also, similar to the proposed project, DWR and PWAs would amend Contract provisions to allow the PWAs to transfer carryover water in San Luis Reservoir, transfer water for multiple years without permanently relinquishing that portion of their Annual Table A amounts, request DWR approval of Transfer Packages. Also similar to the proposed project, Alternative 6 would revise the Contract to allow the PWAs to transfer water based on terms they establish for cost compensation and duration. A PWA would be able to store and transfer water in the same year, and transfer up to 50 percent of its carryover water, but only for a single-year transfer (i.e. a future or multi-year commitment of transferring carryover water is not allowed). Also similar to the proposed

project, PWAs would transfer water based on cost compensation established by PWAs and the Contracts would amend the text in Article 56(f) regarding water exchanges to include additional provisions, such as conducting water exchanges as buyers and sellers in the same year.

However, unlike the proposed project, Alternative 6 would amend the PWA Contracts to allow the above changes in water transfers and exchanges but they would come into effect after the commencement of operation of California WaterFix and deliveries of water using these facilities.

Similar to the proposed project, Alternative 6 would not build new or modify existing SWP facilities nor change any of the PWA's contractual maximum Table A amounts. Also similar to the proposed project, Alternative 6 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, including Table A and Article 21 deliveries. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

Environmentally Superior Alternative

Alternative 4 would result in similar impacts as the proposed project (e.g. net deficit in aquifer volume, lowering of the local groundwater table, or subsidence in some areas of the study area). Alternatives 1, 2, 3, 5 and 6 could result in impacts similar or greater (new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project) than the proposed project. Therefore, because the proposed project and Alternative 4 would result in similar impacts and the other alternatives may result in similar or greater impacts, Alternative 4 would be the environmentally superior alternative.

ES.6 SUMMARY OF IMPACTS

The complete impact analysis is presented in Chapter 5 of this DEIR. The level of significance for each impact was determined using standards of significance presented in the technical sections of Chapter 5. Some resource topics found that the proposed project would result in no impact: hazards and hazardous materials; noise; population, employment and housing; public services and recreation; transportation; surface water hydrology and water quality; and utilities and service systems. Other resource topics found that the proposed project would result in potential impacts. Significant impacts were determined to be those adverse environmental impacts that meet or exceed the

standards of significance; and less-than-significant impacts were determined to be those that would not exceed the established standards of significance.

Table ES-2 presents a summary of the impacts identified for the proposed project and includes: (1) statement of the impact; (2) level of significance; (3) if any mitigation measures were required or available; and (4) level of significance after mitigation (if required or available).

Cumulative Impacts

As noted above, implementation of the proposed project would not result in physical environmental impacts on the following resource areas: hazards and hazardous materials; noise; population, employment and housing; public services and recreation; surface water hydrology and water quality; transportation; and utilities and service systems. Therefore, these resource areas would not contribute to a cumulative effect. Impacts associated with the remaining resource areas (aesthetics, agriculture and forest resources, air quality, biological resources, cultural resources, energy, geology and soils, GHG, groundwater hydrology and water quality, land use and planning, and water supply) focus on four types of impacts that were identified as less than significant or potential impacts of the proposed project that could contribute to cumulative impacts with the other projects identified above. The four types of impacts are impacts to groundwater supplies, subsidence, fallowing and changes in crop patterns, energy and GHG, reservoir storage, and surface water flow above or below diversions. A summary of the cumulative impact analysis is presented below and presented in detail in Chapter 6 of this DEIR.

Groundwater Supplies

The incremental contribution of the proposed project's effect on groundwater supplies would be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects (as full implementation of the Sustainable Groundwater Management Act (SGMA) is not anticipated until 2040 or 2042). This cumulative impact would be significant.

Because SGMA is in the process of being implemented and because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, assumptions related to the ability of SGMA to mitigate any changes in groundwater levels are speculative. Therefore, because DWR has no information on specific implementation of the transfers and exchanges from the proposed project and it has no authority to implement mitigation measures in the PWA service area, the cumulative impact would remain significant and unavoidable.

**TABLE ES-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
5.2 Aesthetics			
5.2-1: The following of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in degradation of the visual character or adversely affect scenic vistas and scenic resources in the study area.	LTS	None Required.	NA
5.3 Agriculture and Forest Resources			
5.3-1: The following of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in the conversion of agricultural land to non-agricultural uses.	LTS	None Required.	NA
5.4 Air Quality			
5.4-1: The following of agricultural land or changes in cropping patterns associated with increased transfers and exchanges by PWAs could result in changes in existing land use practices that could increase the amount of criteria air emissions.	LTS	None Required.	NA
5.5 Biological Resources			
5.5-1: The following of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could change the frequency, duration, and timing of water to sensitive habitats in the study area.	LTS	None Required.	NA
5.5-2: Changes in San Luis Reservoir water levels or flows in the Feather, Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges or carryover water implemented by PWAs could change the frequency, duration, and timing of water to sensitive habitats.	LTS	None Required.	NA
5.6 Cultural Resources			
5.6-1: Changes in San Luis Reservoir water levels or flows in Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges or carryover water implemented by PWAs could result in damage or destruction of cultural resources.	LTS	None Required.	NA
5.7 Energy			
5.7-1: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in inefficient, wasteful, or unnecessary long-term consumption of energy or changes to hydropower generation in the study area.	LTS	None Required.	NA
5.7-2: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in increased energy consumption due to growth inducement that conflicts with applicable plans, policies, or regulations of local county and/or State energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels in the study area.	LTS	None Required.	NA

LTS = less than significant; NA = Not applicable; PS = potentially significant; SU = significant and unavoidable.

**TABLE ES-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
5.7-3: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could conflict with applicable plans, policies, or regulations of local county and/or State energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels in the study area.	LTS	None Required.	NA
5.8 Geology, Soils, and Mineral Resources			
5.8-1: The following of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in substantial soil erosion or loss of topsoil in the study area.	LTS	None Required.	NA
5.9 Greenhouse Gas Emissions			
5.9-1: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in an increase in GHG emissions.	LTS	None Required.	NA
5.10 Groundwater Hydrology and Water Quality			
5.10-1: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could substantially deplete groundwater supplies in some areas of the study area.	PS	None Feasible.	SU
5.10-2: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could result in subsidence in some of the study area.	PS	None Feasible.	SU
5.12 Land Use and Planning			
5.12-1: The following of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in changes in existing land use practices that could conflict with applicable land use plans, policies, or regulations.	LTS	None Required.	NA
5.17 Tribal Cultural Resources			
5.17-1: Changes in San Luis Reservoir water levels or flows in the Feather, Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges or carryover water implemented by PWAs could result in a substantial adverse change in the significance of a tribal cultural resource.	LTS	None Required.	NA
5.20 Water Supply			
5.20-1: Changes in San Luis Reservoir water levels due to transfers/exchanges of carryover water implemented by PWAs may impact reservoir storage levels.	LTS	None Required.	NA
5.20-2: Changes in transfers or exchanges implemented by PWAs could impact rate and timing of flows in the Feather, Sacramento, American, and San Joaquin rivers.	LTS	None Required.	NA

LTS = less than significant; NA = Not applicable; PS = potentially significant; SU = significant and unavoidable.

Subsidence

The incremental contribution of the proposed project's effect on subsidence would be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects (as full implementation of SGMA is not anticipated until 2040 or 2042). This cumulative impact would be significant.

Because SGMA is in the process of being implemented and because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, assumptions related to the ability of SGMA to mitigate any changes in groundwater levels or related subsidence are speculative. Therefore, because DWR has no information on specific implementation of the transfers and exchanges from the proposed project and it has no authority to implement mitigation measures in the PWA service area, the cumulative impact would remain significant and unavoidable.

Fallowing and Changes in Cropping Patterns

The incremental contribution of the proposed project's effects on aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use as a result of fallowing and changes in cropping patterns would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be less than significant and no mitigation is required.

Energy and GHG

The incremental contribution of the proposed project's effects on energy and GHG would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be less than significant and no mitigation is required.

San Luis Reservoir Storage

The incremental contribution of the proposed project's effect on water supply, cultural or tribal resources, or special-status fish or terrestrial species as a result of changes in San Luis Reservoir storage would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be less than significant and no mitigation is required.

Flows above or below Point of Diversions

The incremental contribution of the proposed project's effect on water supply, cultural or tribal resources, or special-status fish or terrestrial species as a result of changes in flows above or below point of diversions would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be less than significant and no mitigation is required.

Growth Inducement

Direct Growth Inducement Potential

Because the proposed project would not build new facilities or modify existing facilities, no housing is proposed as part of the project or required as a result of it, nor would the project provide substantial new permanent employment opportunities. Therefore, the proposed project would not result in direct growth inducement.

Indirect Growth Inducement Potential

Because the proposed project would not result in the construction of new or modification of existing water supply storage, treatment or conveyance facilities it would not remove an obstacle to growth associated with water supply.

Proposed transfer and exchange provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. More frequent transfer and exchange of Table A and Article 21 water would increase the reliability of SWP supplies for M&I PWAs that could support additional population in jurisdictions within the M&I PWA service areas. However, while with the proposed amendments transfers and exchanges could be more frequent and longer in duration, they would not be a permanent transfer of a PWAs Annual Table A amounts; therefore, it would not represent a viable long-term source of urban water supply to support additional unplanned growth. Therefore, the proposed amendments would not result in additional water supply that could support growth over what is currently planned for in those jurisdictions and the proposed project would not result in indirect growth inducement.

Cities and counties have primary authority over land use decisions, and water suppliers (such as the PWAs) are expected and usually required to provide water service if water supply is available. Approval or denial of development proposals is the responsibility of the cities and counties in the study area and not DWR. Availability of water is only one of the many factors that land use planning agencies consider when making decisions about growth.

Furthermore, cities and counties are responsible for considering the environmental effects of their growth and land use planning decisions (including, but not limited to, conversion of agricultural land to urban uses, loss of sensitive habitats, and increases in criteria air emissions). As new developments are proposed, or general plans adopted, local jurisdictions prepare environmental compliance documents to analyze the impacts associated with development in their jurisdiction pursuant to CEQA. The impacts of growth would be analyzed in detail in general plan EIRs and in project-level CEQA compliance documents. Mitigation measures for identified significant impacts would be the responsibility of the local jurisdictions in which the growth would occur. If identified impacts could not be mitigated to a level below the established thresholds, then the local jurisdiction would need to adopt overriding considerations.

Chapter 1

Introduction



1 INTRODUCTION

1.1 INTRODUCTION

The Department of Water Resources (DWR) is proposing to implement the State Water Project (SWP) Water Supply Contract Amendments for Water Management and California WaterFix (proposed project or proposed amendment). As more fully discussed in Chapter 4, Project Description, the proposed project includes amending certain provisions of the State Water Resources Development System (SWRDS) Water Supply Contracts (Contracts). SWRDS (defined in Water Code Section 12931), or more commonly referred to as the SWP, was enacted into law by the Burns-Porter Act, passed by the Legislature in 1959 and approved by the voters in 1960. DWR constructed and currently operates and maintains the SWP, a system of storage and conveyance facilities that provide water to 29 State Water Contractors known as the Public Water Agencies¹ (PWAs). The PWAs receive water service from the SWP in exchange for paying all costs that are associated with constructing, operating, and maintaining the SWP facilities and are attributable to water supply.

The Contracts include water management provisions for actions such as the transfer or exchange of SWP water between PWAs, as well as financial provisions including the methods used by DWR to recover certain costs associated with the planning, construction, and operation and maintenance of SWP facilities. The Contracts are substantially uniform, and the provisions reflected DWR's expectations at that time (1960s) with respect to future water demand and the planned construction of SWP components. DWR and the PWAs have made many amendments to the Contracts to address matters that have arisen over the past 55 years, including amendments in 1995 known as the Monterey Amendments.

Recently DWR and the PWAs have agreed to enter into the process for amending the Contracts to confirm and supplement certain provisions for several water management actions, including transfers and exchanges, and to address changes in financial provisions related to the costs of California WaterFix. In February 2018, DWR and the

¹ The State Water Project Public Water Agencies include Alameda County Flood Control and Water Conservation District (Zone 7), Alameda County Water District, Antelope Valley-East Kern Water Agency, City of Yuba City, Coachella Valley Water District, County of Butte, County of Kings, Crestline-Lake Arrowhead Water Agency, Desert Water Agency, Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency, Littlerock Creek Irrigation District, The Metropolitan Water District of Southern California, Mojave Water Agency, Napa County Flood Control and Water Conservation District, Oak Flat Water District, Palmdale Water District, Plumas County Flood Control and Water Conservation District, San Bernardino Valley Municipal Water District, San Gabriel Valley Municipal Water District, San Geronio Pass Water Agency, San Luis Obispo County Flood Control and Water Conservation District, Santa Barbara County Flood Control and Water Conservation District, Santa Clara Valley Water District, Santa Clarita WA (formerly Castaic Lake WA), Solano County Water Agency, Tulare Lake Basin Water Storage District, and Ventura County Flood Control District.

PWAs resumed the public process to negotiate the proposed amendments. This public process was initially noticed in November 2014 for cost allocation of the proposed Bay Delta Conservation Plan (BDCP). Later, DWR proposed additional alternatives to BDCP including Alternative 4A also known as California WaterFix which also became the proposed project under the California Environmental Quality Act (CEQA). In July 2017, DWR certified its Final Environmental Impact Report (EIR) for the California WaterFix, adopted Findings of Fact, a Statement of Overriding Considerations, a Mitigation Monitoring and Reporting Plan (MMRP), and issued its Notice of Determination (NOD) approving the California WaterFix. The purpose of the resumed negotiations was to address terms and conditions of water management actions related to water transfers and exchanges, and to develop terms and conditions for allocation of costs of California WaterFix for PWAs that directly benefit from California WaterFix. The negotiations led to development of a non-binding agreement in principle known as the “Draft Agreement in Principle for the SWP Water Supply Contract Amendment for Water Management and California WaterFix” (AIP) that describes the proposed project (see **Appendix A**).

The proposed project addresses proposed terms and conditions of water management actions related to water transfers and exchanges, and establishes terms and conditions for allocation of costs of California WaterFix based on the AIP. The proposed project would not build or modify existing SWP facilities nor change any of the PWA’s Annual Table A amounts.

The proposed project is a separate and independent project from California WaterFix, although the proposed project cost allocation provisions are related in that they explain how costs would be billed to and collected from the State Water Project PWAs for the California WaterFix. In addition, the proposed project related to water management actions would need to occur regardless of the outcome of California WaterFix. Furthermore, the proposed project would not change SWP operations. All construction and operation impacts associated with California WaterFix were previously analyzed within the California WaterFix EIR/Environmental Impact Statement (EIS) certified under CEQA and approved by DWR on July 21, 2017.

DWR has determined that an EIR is the appropriate CEQA document due to the statewide importance of any proposed amendments to the Contracts, such as the proposed project. Further, as an informational document, this Draft EIR (DEIR) discloses for public and lead agency consideration potential environmental effects attributed to the outcome of the public negotiations to amend the Contracts to:

- Add, delete, modify, and clarify conditions and terms to the agreements for transfers and exchanges of SWP water among the PWAs.

- Allow multi-year transfers of SWP water between PWAs that include terms developed by the PWAs to the agreements, including quantity, duration, and compensation, and that such transfers may be packaged in two or more transfer agreements between the same PWAs.
- Clarify provisions related to the exchanges of SWP water between PWAs.
- Establish reporting requirements for transfers and exchanges of SWP water by PWAs.
- Establish terms for transfer and exchange of stored SWP water/carryover water.
- Establish California WaterFix facilities allocation factors based on PWA participation percentages to be used for repayment of planning, construction, operation and maintenance costs associated with California WaterFix.
- Identify the methods of calculating costs and repayment of costs for California WaterFix.

This EIR is also intended to provide sufficient information to foster informed decision-making by DWR.

1.2 PURPOSE OF THE DEIR

This DEIR has been prepared in conformance with CEQA (Public Resources Code, Sections 21000, et seq.) and the CEQA 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 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, DWR 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. This EIR may also be used by the PWAs, as responsible agencies under CEQA, in their discretionary approval processes within their jurisdictions to meet their CEQA requirements.

1.3 ENVIRONMENTAL REVIEW AND APPROVAL PROCESS

The preparation of an EIR involves multiple steps in which the public is provided the opportunity to review and comment on the scope of the analysis, content of the EIR, results and conclusions presented, and overall adequacy of the document to meet the

substantive requirements of CEQA. The following describes the steps in the environmental review process for the proposed project.

1.3.1 Notice of Preparation

In accordance with Section 15082 of the CEQA Guidelines, DWR prepared a Notice of Preparation (NOP) of an EIR and published it on July 13, 2018. DWR provided the NOP to: (1) local, State, and federal agencies; (2) local libraries; (3) city and county clerk offices; and (4) other interested parties. The NOP was circulated for comment for 30 days, ending on August 13, 2018. The NOP included the project background, project objectives, description of the proposed project, and a summary of potential significant environmental impacts to be evaluated in the DEIR. The NOP and list of agencies and persons that received the NOP is included in **Appendix B**.

Comment letters received in response to the NOP were considered during preparation of this DEIR and are also included in Appendix B. One public scoping meeting was held in Sacramento on August 2, 2018. The purpose of the public scoping meeting was to provide a forum for the public to learn about the proposed project and to provide comments on the proposed scope of the EIR analysis. The NOP is posted at: <https://www.water.ca.gov/Programs/State-Water-Project/Management/Water-Supply-Contract-Amendment>.

1.3.2 DEIR

This DEIR will be published and made available to local, State, and federal agencies and to interested organizations and individuals who may want to review and comment on the adequacy of the analysis included in this DEIR. Notice of this DEIR will be sent directly to persons and agencies that commented on the NOP. The 45-day public review period for this DEIR is October 26, 2018 through December 10, 2018. During the public review period, written comments should be mailed or emailed to:

Cassandra Enos-Nobriga
Executive Advisor, State Water Project
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001
Email: ContractAmendment_comments@water.ca.gov

The DEIR is available for review at DWR's State Water Project Analysis Office during normal business hours located at 1416 Ninth Street Room 1620, Sacramento, California, 95814. The DEIR is also available at the locations included in Appendix B,

as well as on the DWR project website at: <https://www.water.ca.gov/Programs/State-Water-Project/Management/Water-Supply-Contract-Amendment>.

During the 45-day review period one public meetings will be held on Friday November 16, 2018 from 11 a.m. to 1:00 p.m. in Resources Building Auditorium located at 1416 Ninth Street, Sacramento, California 95814.

Comments are due no later than 5:00 p.m. Pacific Daylight Time on December 10, 2018 which is 45 days after publication of the DEIR.

Before including your name, address, telephone number, email or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – is a matter of public record and may be made publicly available at any time. You can request in your comment to withhold this information from public review; however, there is no guarantee it will be possible.

1.3.3 Final EIR

Written and oral comments received on the DEIR during the public review period will be addressed in a Response to Comments document which, together with the DEIR and any changes to the DEIR made in response to comments received, will constitute the Final EIR. The DEIR and Final EIR (FEIR) together will comprise the EIR for the proposed project.

1.3.4 Approval Process

Before DWR makes a decision with regard to the proposed project, CEQA Guidelines Section 15090(a) requires that DWR first certify that the EIR has been completed in compliance with CEQA, that DWR has reviewed and considered the information in the EIR, and that the EIR reflects the independent judgment and analysis of DWR.

In the event DWR approves the proposed project, CEQA requires that it file a Notice of Determination and adopt appropriate findings as set forth in CEQA Guidelines Section 15091. Under CEQA Guidelines Section 15092, a lead agency may only approve or carry out a project subject to an EIR if it determines that: (1) that project will not have a significant effect, or (2) that 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. As described above, this EIR may also be used by the PWAs, as responsible agencies under CEQA, in their discretionary approval processes within their jurisdictions to meet their CEQA requirements.

1.4 SCOPE OF THIS EIR

DWR identified in the NOP for this EIR impacts that could result from implementation of the proposed project. Based on the NOP (provided in Appendix B), DWR determined that this EIR will address the following technical issue areas:

- Aesthetics
- Agricultural and Forest Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology, Soils, and Mineral Resources
- Greenhouse Gas Emissions
- Groundwater Hydrology and Water Quality
- Hazardous Materials and Public Safety
- Land Use and Planning
- Noise
- Population, Employment, and Housing
- Public Services & Recreation
- Surface Water Hydrology and Water Quality
- Tribal Cultural Resources
- Transportation
- Utilities and Service Systems
- Water Supply

1.5 ORGANIZATION OF THE DEIR

This DEIR is organized with references provided in each of the chapters listed below:

Executive Summary. The Executive Summary presents a summary of the project description, a description of issues to be resolved, and a summary table listing the level of significance of effects of the proposed project on resource areas to be addressed.

Chapter 1, Introduction. Chapter 1 describes the intended uses of this EIR, the environmental review and approval process, and document organization.

Chapter 2, State Water Project. Chapter 2 provides the history and background of the SWP, the regulatory and policy framework for operating the SWP, and a summary of certain non-financial Contract provisions.

Chapter 3, State Water Project Financing and Water Supply Contract Financial Provisions. Chapter 3 presents an overview of the current status of SWP financing and the description of the financial provisions of the Contract.

Chapter 4, Project Description. Chapter 4 presents an overview of the proposed project, outlines the project objectives, and describes the elements of the proposed project.

Chapter 5, Environmental Analysis. Chapter 5 presents an introduction to how resource topics were evaluated and the analysis of the potential environmental impacts of the proposed project.

Chapter 6, Other CEQA Considerations. Chapter 6 discusses other CEQA issues, including growth-inducing impacts, cumulative impacts, significant unavoidable impacts on the environment, and significant irreversible environmental changes.

Chapter 7, Alternatives. Chapter 7 describes potential alternatives to the proposed project, including the No Project Alternative, along with an analysis of ability to meet proposed project objectives and differences in level of environmental impact.

Chapter 8, Climate Change and Resiliency. Chapter 8 provides background information on climate change and resiliency, and associated regulatory framework, and discusses how the proposed amendments affect the study areas resiliency and adaptability to climate change.

Chapter 9, Contributors and Reviewers. Chapter 9 provides the names of the DEIR authors and consultants.

Appendices. The appendices include materials that support the findings and conclusions presented in the text of the DEIR.

Chapter 2

State Water Project



2 STATE WATER PROJECT

DWR is responsible for managing and protecting California’s water resources. DWR works with federal, state, and local partners to benefit the State’s people and to protect, restore, and enhance the natural and human environments. DWR’s responsibilities include:¹

- Overseeing the statewide process of developing and updating the California Water Plan (Bulletin 160 series)
- Planning, designing, constructing, operating, and maintaining the SWP
- Protecting and restoring the Sacramento-San Joaquin Delta (Delta)
- Regulating dams, providing flood protection, and assisting in emergency management
- Working to preserve the natural environment and wildlife
- Educating the public about the importance of water, water conservation, and water safety
- Providing grants and technical assistance to service local water needs
- Collecting, analyzing, and reporting data in support of our mission to manage and protect California’s water resources.

2.1 HISTORY AND BACKGROUND

This chapter summarizes the history and background of the SWP and presents the regulatory and policy framework for operating the SWP. A summary of current Contracts water service provisions is also provided (see also **Appendix C** which contains an example of a current Contract (Metropolitan Water District of Southern California) for reference). The primary source of information used in writing this chapter comes from DWR’s Bulletin 132 series, Management of the State Water Project, with supplemental up-to-date information provided by DWR’s State Water Project Analysis Office (SWPAO).

Authorization and initial financing for SWRDS, commonly referred to as the SWP, was enacted into law in the Burns-Porter Act (Water Code Section 12930 et seq.), which was passed by the California Legislature in 1959 and approved by the voters in 1960. The Burns-Porter Act expressly authorized the State of California to issue up to \$1.75 billion in bonds for the construction of the SWP and enter into Contracts for the sale, delivery, or use of water or power made available by the SWP. In return for the

¹ California Department of Water Resources. 2005. Mission and Goals. Available: <http://www.water.ca.gov/about/mission.cfm>. Accessed May 2016.

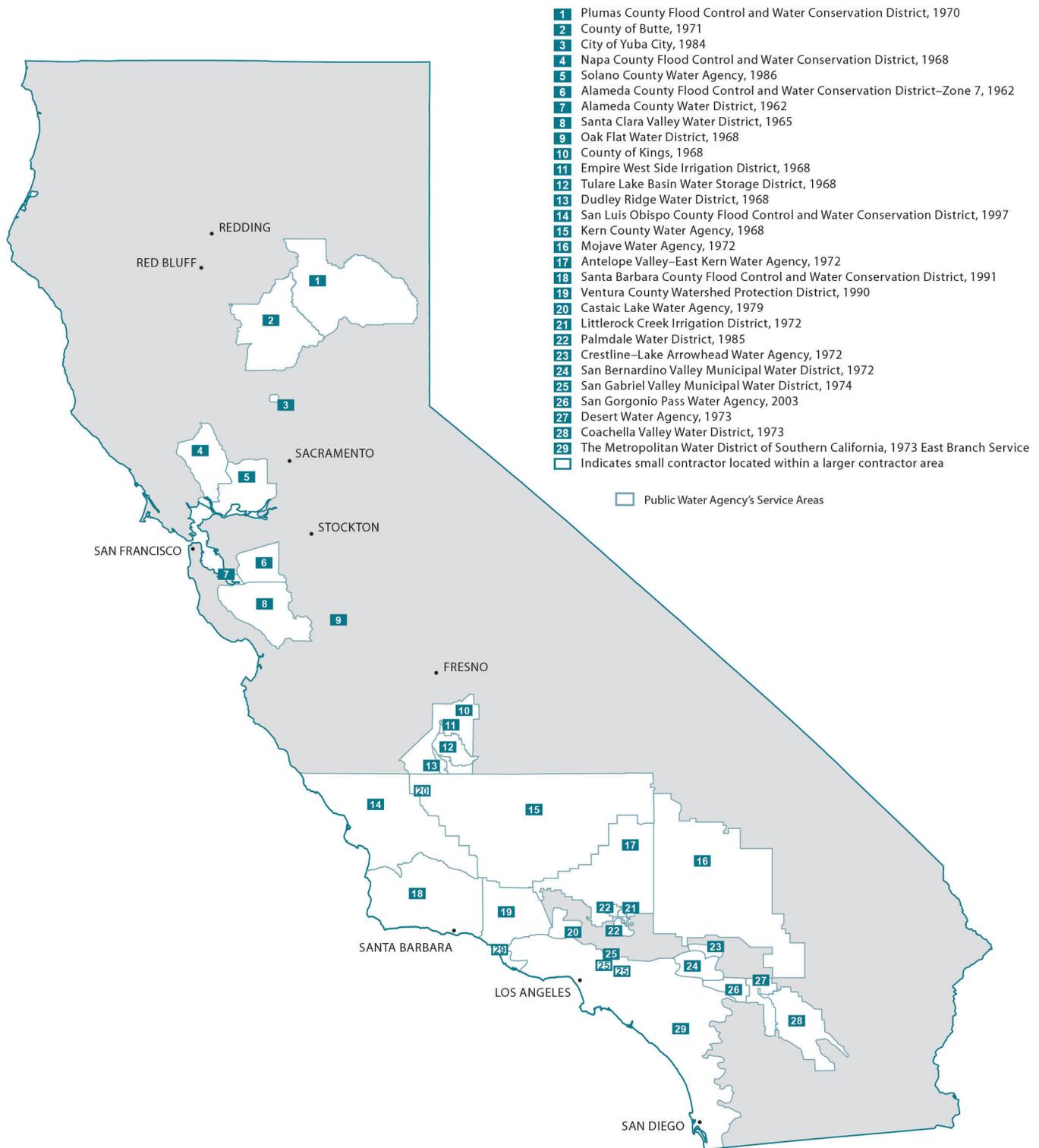
State financing, constructing, operating, and maintaining facilities needed to provide water service, 29 PWAs contractually agreed to repay all SWP capital and operating costs allocable to water supply, including the portion allocable to water supply of the Burns-Porter bonds used to construct the SWP facilities. Construction of the SWP commenced in the 1960s and water was first delivered in 1962 through a portion of the South Bay Aqueduct to Alameda and Santa Clara Counties. Large-scale water deliveries began in the late 1960s.

Managed by DWR, the SWP is the largest state-owned, multi-purpose, user-financed water storage and delivery system in the United States. The multi-purpose SWP facilities deliver water through contracts between DWR and 29 PWAs throughout California. The PWAs receive water service from the SWP in exchange for paying all costs that are associated with the planning, constructing, operating, and maintaining the SWP facilities and that are attributable to water supply. The PWAs include local water agencies and districts legislatively enabled to serve irrigation, municipal, and industrial water supply customers or retail water supply agencies throughout Northern California, San Joaquin Valley, San Francisco Bay Area, Central Coast Area, and Southern California. **Figure 2-1** depicts the SWP service area, including the name, location, and first year of service for each PWA. More than 26 million Californians receive a portion of their drinking water supply from the SWP, and about 750,000 acres of agricultural land, primarily in the San Joaquin Valley, are irrigated with SWP water. For all the PWAs, SWP water supplements supplies from other sources within their service areas, including groundwater, local surface water, other imported water supplies, recycled water, and desalinated water.

2.2 COMPONENTS OF THE SWP

The SWP is a complex system of reservoirs, dams, power plants, pumping plants, pipelines, and aqueducts. Precipitation and watershed runoff are stored in Lake Oroville, a reservoir behind Oroville Dam in Butte County, and is delivered via natural stream channels to the Delta and pumped into the California Aqueduct system to water agencies and districts in Southern California, the Central Coast, the San Joaquin Valley, and portions of the San Francisco Bay Area. The principal components of the SWP are shown in **Figure 2-2**.

Three small reservoirs—Lake Davis, Frenchman Lake, and Antelope Lake—are the northernmost SWP facilities. Situated on Feather River tributaries in Plumas County, these lakes are used primarily for recreation. Lake Davis also provides SWP water to Plumas County Flood Control and Water Conservation District (FC&WCD), a PWA, and local agencies that have water rights agreements with DWR.



SOURCE: California Department of Water Resources, Bulletin 132-16, June 2017

Figure 2-1
Public Water Agency's Service Areas



SOURCE: California Department of Water Resources, Bulletin 132-16, June 2017

Figure 2-2

Primary State Water Project Water Delivery Facilities

Downstream from these three lakes is the SWP's primary storage facility; the Oroville-Thermalito Complex. The Oroville-Thermalito Complex includes: Lake Oroville and Oroville Dam; Hyatt Powerplant; Thermalito Diversion Dam and Powerplant; the Feather River Fish Hatchery; Thermalito Power Canal; Thermalito Forebay; Ronald B. Robie Thermalito Pumping-Generating Plant; and Thermalito Afterbay. SWP water to Butte County, a PWA, is provided directly from the Oroville-Thermalito Complex.

The Oroville-Thermalito Complex was designed as an efficient water and power system. Lake Oroville has a storage capacity of approximately 3.5 million acre-feet (af) and it stores winter runoff and spring snowmelt from the Feather River watershed for later downstream release. Power is generated from releases made through the Hyatt Powerplant, the Thermalito Dam Powerplant, and Ronald B. Robie Thermalito Pumping-Generating Plant (currently out of operation for cleanup and repairs after a fire on November 22, 2012). Water stored in the Thermalito Forebay and Afterbay can also be pumped back into Lake Oroville during off-peak power periods when feasible for subsequent power generation during on-peak power periods. A special fish barrier dam was built to lead salmon and steelhead, returning to spawn, into the Feather River Fish Hatchery. Salmon and steelhead raised at the hatchery are transported and released in the Feather and Sacramento Rivers, or in the Delta near the San Francisco Bay Area. DWR is currently in the process of repairing the Oroville Dam spillways that were damaged by severe storms in early 2017.

Releases from Lake Oroville flow down the Feather River, then merge with the Sacramento River. The Sacramento River flows into the Delta, which comprises 738,000 acres of land interlaced with many channels that receive runoff from approximately 40 percent of the State's land area. DWR's Delta Facilities Program consists of projects that are designed to increase the efficiency of water transfers through the Delta to increase water supply, improve Delta water quality, and reduce or mitigate for fish losses caused by pumping. The projects proposed as part of this program include dredging, channel improvements, flow control structures, seismic studies, and environmental mitigation measures.

DWR completed the Barker Slough Pumping Plant in 1988 to divert water for delivery from the northern Delta through the North Bay Aqueduct (NBA) to the North Bay PWAs (Solano County WA and Napa County FC&WCD) service areas.

In the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. From Clifton Court Forebay, the Skinner Fish Facility diverts an average of 15 million fish each year away from the Delta pumps. Two miles downstream from Skinner Fish Facility, the Harvey O. Banks Delta (Banks) Pumping Plant lifts water

into the California Aqueduct. The California Aqueduct continues on to Bethany Reservoir. At mile 9 of the California Aqueduct is the joint state-federal Delta Mendota Canal - California Aqueduct Intertie, which connects the SWP and federal Central Valley Project (CVP) and provides operational flexibility to the systems.

From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct to supply portions of Alameda and Santa Clara Counties. The South Bay Aqueduct provided initial deliveries in 1962 and has been fully operational since 1965. South Bay Aqueduct facilities include Lake Del Valle, a regulatory, flood control, and water supply reservoir for the aqueduct. Recent improvements include enlarging the South Bay aqueduct for increased capacity and other associated modifications to the aqueduct and other facilities. These improvements were completed in 2014.

The remaining water delivered to Bethany Reservoir continues south in the California Aqueduct. This 444-mile-long main aqueduct, in addition to the 180 miles of California Aqueduct branches, conveys water to the primarily agricultural lands of the San Joaquin Valley and the main urban regions of Southern California. The first SWP deliveries to San Joaquin Valley PWAs began in 1968. The first SWP deliveries to Southern California began in 1972.

The California Aqueduct winds along the west side of the San Joaquin Valley. It transports water to O'Neill Forebay. Water in the forebay can be released to the San Luis Canal or pumped into San Luis Reservoir by the Gianelli Pumping-Generating Plant. San Luis Reservoir has a storage capacity of approximately 2 million af and is jointly owned and operated by DWR and the U.S. Bureau of Reclamation (Reclamation). The SWP's share of the reservoir's gross storage is about 1,062 thousand af. DWR generally pumps water through the Gianelli Pumping-Generating Plant into San Luis Reservoir during late fall through early spring for temporary storage until DWR releases the water back into the O'Neill Forebay and the California Aqueduct to meet the late spring and summer peak demands of the PWAs.

SWP water pumped directly from the Delta and water eventually released from San Luis Reservoir continues to flow south in the San Luis Canal, a portion of the California Aqueduct jointly owned by DWR and Reclamation. Reclamation's CVP joint ownership ends near Kettleman City, and the SWP portion of the California Aqueduct continues. As the water flows through the San Joaquin Valley, numerous turnouts convey water to farmlands and municipal and industrial water customers within the service areas of the SWP and CVP. Along its journey, four pumping plants—Dos Amigos, Buena Vista, Teerink, and Chrisman—lift the water more than 1,000 feet before it reaches the foot of the Tehachapi Mountains.

In the San Joaquin Valley near Kettleman City, Phase I of the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. Phase II of the Coastal Branch extended the conveyance facility to serve municipal and industrial water users in San Luis Obispo and Santa Barbara Counties. Phase II became operational in 1997.

The remaining water conveyed by the California Aqueduct is delivered to Southern California. Pumps at Edmonston Pumping Plant, situated at the foot of the Tehachapi Mountains, raise the water 1,926 feet; the highest single lift of any pumping plant in the world. From there, the water enters about 8 miles of tunnels and siphons as it flows into Antelope Valley, where the California Aqueduct divides into two branches, the East Branch and the West Branch.

The East Branch carries water through the Tehachapi East Afterbay, Alamo Powerplant, Pearblossom Pumping Plant, and Mojave Siphon Powerplant into Silverwood Lake in the San Bernardino Mountains. The Tehachapi East Afterbay provides additional storage to these pumping plants to reduce power costs by shifting on-peak power consumption to off-peak, increasing ancillary services capability and providing other benefits of increased operational flexibility. From Silverwood Lake, water flows through the San Bernardino Tunnel into the Devil Canyon Powerplant. Water continues down the East Branch to Lake Perris, the terminus of the East Branch. Lake Perris lies just east of Riverside, has a capacity of 131,500 af, and serves as a regulatory and emergency water supply facility for the East Branch. The Lake Perris Dam Remediation Program was initiated after investigations discovered seismic deficiencies in the dam's structure.

In November 2005 the Lake Perris Reservoir level was restricted 25 ft below full pool elevation, as a safety precaution. Environmental review, permits, and design were subsequently undertaken, and the remediation of the dam structure (construction) was complete in early 2018. Reservoir levels rose throughout the summer of 2018 so that boating capacity and speed limits returned to pre-restriction conditions. Minor construction continues on ancillary facilities that will be complete by October 2018. Full pool is anticipated by December 2018 pending conveyance capacity and water availability.

Phase I of the East Branch Extension of the California Aqueduct was completed in 2003 and provides conveyance facilities to deliver SWP water to San Geronio Pass Water Agency and to the eastern portion of the San Bernardino Valley Municipal Water District (WD), both of which deliver water to areas such as Yucaipa, Calimesa, Beaumont, Banning, and other communities. The East Branch Extension comprises a combination of existing San Bernardino WD facilities and newly constructed SWP facilities. While the

new pipelines were designed for the ultimate conveyance capacity, the installed Phase I pumping capacity is less than one-half the ultimate capacity, which is enough to meet the immediate foreseeable demand for SWP water. Completed in 2017, Phase II of the extension allowed for 100-percent pumping capacity and consists of new pipelines, pumping, and storage facilities.

At the bifurcation of the California Aqueduct in Antelope Valley, the West Branch carries water through Oso Pumping Plant, Quail Lake, Lower Quail Canal, and William E. Warne Powerplant into Pyramid Lake in Los Angeles County. From there, water flows through the Angeles Tunnel, Castaic Powerplant, Elderberry Forebay, and Castaic Lake, the terminus of the West Branch. Castaic Lake is located north of Santa Clarita, has a capacity of 323,700 af, and is a regulatory and emergency water supply facility for the West Branch. Castaic Powerplant is owned and operated by the Los Angeles Department of Water and Power (LADWP) through the Contract for Cooperative Development West Branch, California Aqueduct between the Department of Water Resources, State of California and the Department of Water and Power, City of Los Angeles, Los Angeles, California, as amended last on May 22, 2014.

The energy needed to operate the SWP, the single largest consumer of electrical power in California, comes from a combination of its own hydroelectric facilities and power purchased from other utilities. **Tables 2-1** and **2-2** show statistical information for the SWP's primary reservoirs and aqueducts.

2.2.1 Cross Drainage Facilities

In addition to the conveyance of water through the aqueducts, flood control facilities were constructed along the California Aqueduct where it crossed intermittent watercourses (some with significant flood flows) to address cross drainage. DWR established early that cross drainage would not be introduced into the canal because of water quality considerations, except in the San Luis Division. The cross drainage flow rate and relative elevations of the canal and the watercourse required that each drainage crossing be given individual study. Cross drainage was accomplished through a choice of: (1) overchutes; (2) culverts; (3) siphon undercrossings; or (4) drain inlets.

The San Luis Division contains the joint-use facilities of the CVP and the SWP, as described previously, which were designed and constructed by Reclamation. Reclamation established the criteria that cross drainage could be introduced into the canal. In these reaches, flood flows from intermittent watercourses are allowed to pond along the western embankment of the canal, where it may be retained and allowed to infiltrate, evaporate, or enter the canal via drain inlets, flumes/weirs, and portable pumps.

**TABLE 2-1
PHYSICAL CHARACTERISTICS OF PRIMARY STORAGE FACILITIES**

Facility	Gross Capacity (af)	Surface Area (Acres)	Shoreline (Miles)
Antelope Lake	22,600	930	15
Frenchman Lake	55,500	1,580	21
Lake Davis	84,400	4,030	32
Lake Oroville	3,537,600	15,810	167
Thermalito Forebay	11,800	630	10
Thermalito Afterbay	57,000	4,300	26
Thermalito Diversion Pool	13,400	320	10
Clifton Court Forebay	31,300	2,180	8
Bethany Reservoir	5,100	180	6
Lake Del Valle	77,100	1,060	16
San Luis Reservoir	2,027,800 (SWP storage 1,062,183)	12,520	65
O'Neill Forebay	56,400 (SWP storage 29,500)	2,700	12
Los Banos Reservoir	34,600	620	12
Little Panoche Reservoir	5,600	190	6
Quail Lake	7,600	290	3
Pyramid Lake	171,200	1,300	21
Elderberry Forebay	32,500	500	7
Castaic Lake	323,700	2,240	29
Silverwood Lake	75,000	980	13
Lake Perris	131,500	2,320	10

SOURCE: California Department of Water Resources, Bulletin 132-16, June 2017, page 7.

**TABLE 2-2
TOTAL MILES OF AQUEDUCTS**

Facility	Channel and Reservoir	Canal	Pipeline	Tunnel	Total
Grizzly Valley Pipeline	0.0	0.0	6.0	0.0	6.0
Thermalito Power Canal and Tail Channel	1.5	1.9	0.0	0.0	3.4
North Bay Aqueduct	0.0	0.0	27.6	0.0	27.6
South Bay Aqueduct (including Del Valle Branch)	0.3	10.7	31.9	1.7	44.6
Subtotal	1.8	12.6	65.5	1.7	81.6
California Aqueduct					
Clifton Court Forebay to O'Neill Forebay	4.5	61.9	0.3	0.0	66.7
O'Neill Forebay to Kettleman City	4.1	101.4	0.2	0.0	105.7
Kettleman City to Edmonston Pumping Plant	0.0	120.1	0.9	0.0	121.0
Edmonston Pumping Plant to Tehachapi Afterbay	0.0	0.2	1.9	7.9	10.0
Tehachapi Afterbay to Lake Perris	4.0	97.8	34.3	3.9	140.0
Subtotal	12.6	381.4	37.6	11.8	443.4
California Aqueduct Branches					
West Branch	9.7	9.3	5.8	7.1	31.9
Coastal Branch	0.0	14.1	98.7	2.7	115.5
East Branch Extension					
Devil Canyon Powerplant to Greenspot Pump Station	0.0	0.0	16.2	0.0	16.2
Greenspot Pump Station to Noble Creek Terminus	0.0	0.0	16.4	0.0	16.4
Subtotal	9.7	23.4	137.1	9.8	180.0
Total	24.1	417.4	240.2	23.3	705.0

SOURCE: California Department of Water Resources, Bulletin 132-16, June 2017, page 9.

2.2.2 Proposed Facilities

The following summarizes currently proposed new SWP facilities under consideration by DWR. These are presented for informational purposes and are not part of the proposed project evaluated in this EIR. These projects have or will undergo separate environmental clearance, as required as part of their approval process.

2.2.2.1 California WaterFix

California WaterFix involves upgrading the SWP infrastructure by constructing three new intakes in the northern Delta and two 30-mile-long tunnels to transport water to the existing pumping plants in the south Delta.

On July 21, 2017 DWR certified the FEIR, adopted Findings and a Statement of Overriding Considerations, adopted the MMRP, approved California WaterFix and filed

a NOD with the Governor's Office of Planning and Research (OPR). Reclamation has not yet adopted a Record of Decision (ROD) for the Final EIS.

As described in the July 2017 FEIR, water would primarily be conveyed from the north Delta to the south Delta through below ground tunnels. Water would be diverted from the Sacramento River through three fish-screened intakes on the east bank of the Sacramento River between Clarksburg and Courtland. Water would travel from the intakes to a sedimentation basin before reaching the tunnels. From the intakes, water would flow into an initial single-bore tunnel, which would lead to an intermediate forebay on Glanvale Tract. From the southern end of this forebay, water would pass through an outlet structure into a dual-bore tunnel, in which water would flow by gravity to the south Delta. Water would then reach pumping plants to the northeast of Clifton Court Forebay, where water would be pumped into the north cell of the expanded Clifton Court Forebay. The forebay would be dredged and redesigned to provide an area isolating water flowing from the new north Delta facilities. New siphon and canal connections would be constructed between the north cell of the expanded Clifton Court Forebay and the Banks and C.W. "Bill" Jones Pumping Plants, along with control structures to regulate the relative quantities of water flowing from the north Delta and the south Delta. The project would include the continued use of the SWP/CVP south Delta export facilities.

To further refine a facility element of California WaterFix following the July 21, 2017 NOD, DWR proposed the following modifications to the project that were evaluated in a Draft Supplemental EIR/EIS that was released on July 17, 2018 for public review and comment. CEQA public review and comment concluded on September 17, 2018; however, the National Environmental Policy Act (NEPA) public review and comment period is open until November 5, 2018:

- Changing the locations of reusable tunnel material storage sites near the intermediate forebay, on Zacharias Island, on Bouldin Island, and near the relocated Byron Tract Forebay.
- Relocating the tunnel boring machine (TBM) launch shaft and barge landing location on Bouldin Island.
- Creating a new Byron Tract Forebay (eliminating the extensive modifications to Clifton Court Forebay) and relocating the consolidated pumping plant.
- Realigning the 40-foot diameter tunnels slightly to accommodate the relocated Bouldin Island TBM launch shaft and Byron Tract Forebay consolidated pumping plant relocation.
- Relocating or eliminating appurtenant facilities such as barge landing sites, concrete batch plants, and construction access roads to improve facility design.

- Realigning the 40-foot diameter tunnels to avoid the town of Hood and municipal water wells.

2.2.2.2 North Bay Aqueduct Alternative Intake

Because of physical and water quality limitations, the diversions at Barker Slough cannot deliver the Annual Table A amount (discussed in Section 2.4.1) requested. In order to address these facility limitations and meet projected future water delivery needs of the North Bay PWAs, DWR is considering constructing a new intake and pumping plant facility in the Sacramento River and a new segment of NBA Conveyance pipeline that would be operated in conjunction with the existing Barker Slough Pumping Plant. If approved for construction, the NBA Alternate Intake Project (NBA AIP) would enable the NBA to deliver the Annual Table A amounts to the North Bay PWAs.

2.3 SWP OPERATIONS

DWR develops SWP operations plans which include varying hydrologies, water supply demand SWP storage conditions, and regulatory requirements set forth by State and federal agencies for flood control, instream requirements, and environmental requirements for the Delta. These plans are adjusted for real-time conditions and implemented accordingly for SWP operations.

Releases from the Oroville-Thermalito Complex are made for flood control, local water deliveries, flow and salinity obligations in the Delta, and deliveries to SWP PWAs north, west, and south of the Delta. A portion of the water released and other uncontrolled flows in the Delta can be diverted into the North Bay and California Aqueduct through the Barker Slough Pumping Plant and Banks Pumping Plant, respectively.

The CVP and SWP have historically shared their Delta export pumping facilities when it is advantageous to do so. Sharing of the pumping facilities can help both projects deliver water to their contractors when demand is high or when some facilities are out of service in emergencies or during maintenance. The sharing of facilities is referred to as the Joint Point of Diversion (JPOD). In 1978, DWR agreed to, and the State Water Resources Control Board (State Water Board) permitted, the CVP to use the SWP's Banks Pumping Plant capacity to divert and export up to 195,000 af annually from the Delta to replace pumping capacity lost at the CVP's Jones Pumping Plant. Pumping capacity was lost as a result of restrictions contained in the State Water Board's Decision 1485. In 1986, DWR and Reclamation formally agreed that "either party may make use of its facilities available to the other party for pumping and conveyance of water by written agreement." The State Water Board authorized the JPOD operations in Decision 1641 (March 15, 2000).

State and federal laws protect water rights, water quality, wetlands, anadromous and other native fish, migratory birds, and threatened and endangered species in the Feather River, Sacramento River, and the Delta, the latter of which is both an estuary and a navigable waterway. Because both the SWP and CVP divert large volumes of water from the Delta, the operations must be coordinated and comply with applicable State and federal environmental regulations. Coordinated operations help the two water projects meet consumptive and environmental water needs more efficiently. In 1986, the two agencies executed the Coordinated Operating Agreement (COA), which specifies how the two parties would operate their facilities to meet their customers' water demands and Sacramento in-basin demands and other environmental regulations without adversely affecting each other.

SWP exports from the Delta are dependent upon upstream releases from Lake Oroville, Sacramento Valley in basin uses, CVP operations, and governing State and federal regulations. Once SWP water is pumped from the Delta, it is conveyed south through the California Aqueduct, which is divided into a series of interconnected pools of water separated by gated check structures. This system of pools allows for control of water levels and flow in the aqueduct. Water from the Delta is either delivered directly to meet PWA demands or stored in San Luis Reservoir to be delivered later to meet PWA demands.

Each year by the first of October, PWAs submit monthly water requests to DWR for the subsequent calendar year. DWR incorporates these requests into the operations plans to estimate the amount of Table A water² available to the PWAs based on reservoir storages, hydrologic conditions and forecasts, and environmental requirements. Beginning in late December or January, PWAs may submit updated weekly or monthly requests. DWR uses these requests to make water deliveries and adjust SWP operational plans. As winter progresses, DWR relies on updated rainfall and snowpack actual conditions and forecasts, SWP storage conditions, exports, and delta conditions to refine its total water supply availability projections, and allocations of Table A water to PWAs are adjusted accordingly.

2.3.1 SWP Deliveries

Hydrologic conditions vary widely within California—from region to region, from season to season, and from year to year. The amount of water available to the SWP fluctuates because of this hydrologic variability, flood management requirements, capacity of SWP storage and conveyance facilities, and water quality and environmental requirements.

² For the purposes of this EIR, Table A water is the amount of SWP water that DWR has allocated to a PWA annually based on a proration of the Annual Table A amount.

These are all factors that affect the amount of water that can be delivered annually to PWAs.

Table 2-3 shows SWP water³ deliveries and other water delivered to PWAs annually from 1970 to 2015. Other water includes water conveyed in available SWP capacity to those PWAs that purchase water from sources other than the SWP.

**TABLE 2-3
HISTORICAL TABLE A REQUESTS & DELIVERIES TO SWP PWAS**

Year	Initial Table A Requests (af)	Final Allocation Percentage (M&I/Ag)	SWP Water Deliveries ^a (af)	Other Water Deliveries ^b (af)	Total Deliveries ^c (af)
1970	261,800	80	365,842	24,225	390,067
1971	375,590	100	651,922	18,646	670,568
1972	600,354	90	1,034,124	7,414	1,041,538
1973	927,645	100	990,877	19,237	1,010,114
1974	969,306	100	1,290,000	19,401	1,309,401
1975	1,374,330	100	1,844,676	26,281	1,870,957
1976	1,503,191	100	1,963,613	8,534	1,972,147
1977	1,660,138	70	1,009,731	334,458	1,344,189
1978	1,824,826	100	1,498,915	69,202	1,568,117
1979	1,833,508	90	2,306,727	92,944	2,399,671
1980	1,867,472	85	1,931,895	30,173	1,962,068
1981	1,851,165	80	2,817,991	77,860	2,895,851
1982	2,351,350	90	2,026,342	101,401	2,127,743
1983	2,301,797	85	1,195,377	80,012	1,275,389
1984	1,563,620	60	1,851,537	65,415	1,916,952
1985	1,862,709	65	2,302,960	74,032	2,376,992
1986	2,336,808	70	2,032,257	33,119	2,065,376
1987	2,532,715	70	2,244,994	17,264	2,262,258
1988	2,658,355	70	2,385,637	6,794	2,392,431
1989	2,999,451	75	2,856,439	84,422	2,940,861
1990	3,213,690	60	2,587,639	68,358	2,655,997
1991	3,484,027	15	869,548	223,653	1,093,201
1992	3,630,618	40	1,535,737	46,371	1,582,108
1993	3,846,195	90	2,368,197	19,284	2,387,481
1994	3,841,096	45	1,865,102	108,440	1,973,542
1995	2,649,767	55	2,132,959	30,964	2,163,923
1996	2,708,157	65	2,693,354	29,791	2,723,145
1997	2,977,246	70	2,571,320	94,721	2,666,041

³ Water made available by DWR for delivery to the PWAs from the SWP conservation and transportation facilities.

**TABLE 2-3
HISTORICAL TABLE A REQUESTS & DELIVERIES TO SWP PWAS**

Year	Initial Table A Requests (af)	Final Allocation Percentage (M&I/Ag)	SWP Water Deliveries ^a (af)	Other Water Deliveries ^b (af)	Total Deliveries ^c (af)
1998	3,191,045	80	1,846,103	99,252	1,945,355
1999	3,214,259	80	3,046,547	26,302	3,072,849
2000	3,616,645	90	3,713,705	104,375	3,818,080
2001	4,124,136	40	1,810,614	414,682	2,225,296
2002	3,913,698	70	2,876,882	132,417	3,009,299
2003	4,126,926	90	3,495,503	101,503	3,597,006
2004	4,128,811	65	3,101,912	244,435	3,346,347
2005	4,125,686	90	3,949,913	67,533	4,017,446
2006	4,126,831	100	3,739,250	92,963	3,832,213
2007	4,066,854	60	2,831,115	495,091	3,326,206
2008	4,165,931	35	1,403,251	696,063	2,099,314
2009	4,166,376	40	1,580,874	496,626	2,077,500
2010	4,158,246	50	2,497,868	619,062	3,116,930
2011	4,172,126	80	3,883,365	325,752	4,209,117
2012	4,172,256	65	3,005,255	250,866	3,256,121
2013	4,172,396	35	1,762,046	482,608	2,244,654
2014	4,172,536	5	517,538	599,463	1,117,001
2015	4,172,686	20	901,443	527,571	1,429,014

NOTES:

a Includes Table A, Article 12(d), Article 14(b), Article 21, wet-weather water, Article 12(e), and Article 56(c)

b Includes other non-SWP water delivered to SWP PWAs.

c Total water deliveries to SWP PWAs.

SOURCE: California Department of Water Resources -State Water Project Analysis Office

2.3.2 Recent SWP Supply Allocation Amendments

As a result of a settlement of a lawsuit about SWP allocations for four PWAs in Northern California under provisions of their Contracts and referencing area of origin statutes, DWR entered into four settlement agreements and amendments to the Contracts with Solano County WA, Napa County FC&WCD, Yuba City, and Butte County. The amendments modified the four PWAs' SWP allocations to improve SWP water delivery reliability for these PWAs. The new allocation to Solano County WA, Napa County FC&WCD, and Yuba City is established by a method referred to as the "North of Delta Allocation." In addition, the settlement agreements authorize the Solano County WA, Napa County FC&WCD, and Yuba City to borrow water from the SWP in certain years to supplement the existing Table A water delivery schedule to Solano County WA, Napa

County FC&WCD, and Yuba City during periods when demand exceeds other SWP water supplies (referred to as an “Advanced Table A Program”).

The new allocation to Butte County is described in a new Butte County Table that is part of the amendment to its Contract and is distinct from the other three PWAs’ water delivery allocations under their settlement agreements. As part of the implementation of the amendment to Butte County’s Contract, DWR approved separate agreements for the transfer of a portion of Butte County’s Annual Table A amounts between Butte County and several water districts for 2012, 2013, and the years 2014–2021.

2.4 WATER SERVICE PROVISIONS

DWR and each of the 29 PWAs entered into Contracts in the 1960s with 75-year terms. The Contracts are substantially uniform. The first Contract was executed by DWR and the Metropolitan Water District of Southern California (WDSC). See **Table 2-4** for a list of the PWAs and their respective Contract execution and expiration dates.

Contract provisions reflected DWR’s expectations at that time with respect to future water demand and the construction schedule of SWP components. The Contracts also outline how the PWAs will repay all SWP capital and operating costs allocable to water supply in return for the State’s financing, constructing, operating, and maintaining the SWP and providing water service. The Contracts are complex legal documents with multiple provisions, primarily covering water delivery, payments, and general provisions. An example of a current Contract for one of the PWAs is contained in Appendix C for reference, including definitions of Contract terms.

DWR and the PWAs have made many amendments to the Contracts to address matters that have arisen over the past 55 years. The most recent substantial amendments to the Contracts are provided at the end of this chapter. Details on the financial provisions in the Contracts are provided in Chapter 3, State Water Project Financing and Water Supply Contract Financial Provisions. The water service provisions are described in the Contracts and cover a range of issues, some of which are summarized further in this chapter.

**TABLE 2-4
WATER SUPPLY CONTRACT EXECUTION AND CURRENT EXPIRATION DATES**

PWA	Original Execution Dates	Current Expiration Dates
	Date of Execution	75 Years
Alameda County FC&WCD, Zone 7	November 20, 1961	November 20, 2036
Alameda County WD	November 29, 1961	November 29, 2036
Antelope Valley-East Kern Water Agency (WA)	September 20, 1962	September 20, 2037
Butte County	December 26, 1963	December 26, 2038
Santa Clarita WA (formerly Castaic Lake WA)	April 30, 1963	April 30, 2038
Coachella Valley WD	March 29, 1963	March 29, 2038
Crestline-Lake Arrowhead WA	June 22, 1963	June 22, 2038
Desert WA	October 17, 1962	October 17, 2037
Devil's Den WD ^a	December 20, 1963	n/a
Dudley Ridge WD	December 13, 1963	December 13, 2038
Empire West Side Irrigation District (ID)	December 30, 1963	December 30, 2038
Hacienda WD ^b	December 20, 1963	n/a
Kern County WA	November 15, 1963	November 15, 2038
Kings County	August 31, 1967	August 31, 2042
Littlerock Creek ID	June 22, 1963	June 22, 2038
Metropolitan WDSC	November 04, 1960	December 31, 2035
Mojave WA	June 22, 1963	June 22, 2038
Napa County FC&WCD	December 19, 1963	December 19, 2038
Oak Flat WD	March 23, 1965	March 23, 2040
Palmdale WD	February 02, 1963	February 02, 2038
Plumas County FC&WCD	December 26, 1963	December 26, 2038
San Bernardino Valley Metropolitan WD	December 30, 1960	December 31, 2035
San Gabriel Valley Municipal WD	November 03, 1962	November 03, 2037
San Geronio Pass WA	November 16, 1962	November 16, 2037
San Luis Obispo County FC&WCD	February 26, 1963	February 26, 2038
Santa Barbara County FC&WCD	February 26, 1963	February 26, 2038
Santa Clara Valley WD	November 20, 1961	November 20, 2036
Solano County WA	December 26, 1963	December 26, 2038
Tulare Lake Basin Water Storage District (WSD)	December 20, 1963	December 20, 2038
Ventura County Flood Control District (FCD)	December 02, 1963	December 02, 2038
City of West Covina ^c	December 02, 1963	n/a
Yuba City	December 30, 1963	December 30, 2038

NOTES:

- a Consolidated with Castaic Lake WA (now Santa Clarita WA) effective January 1, 1992.
b Consolidated with Tulare Lake Basin WSD effective January 1, 1980.
c Consolidated with Metropolitan WDSC effective August 4, 1965.

2.4.1 Annual Table A Amounts

Water delivery is estimated in each of the Contracts and included in a schedule for each PWA that sets forth the maximum annual amount of water that may be requested to be delivered; this is called the Annual Table A amount. Annual Table A amounts in each of the Contracts ramped up over time until they reached a maximum Annual Table A amount (see **Table 2-5**). The Contracts were structured to reflect anticipated increasing population and water demand, estimated by DWR and the PWAs, and completion of SWP facilities. The maximum Annual Table A amounts were reached for 16 of the PWAs in 1997; the maximum for the remaining 13 PWAs were reached by 2016. In any year, the annual amounts designated in the Table A shall not be interpreted to mean that DWR is able to deliver those amounts in all years. **Table 2-6** shows the increase in the maximum Annual Table A amounts for PWAs in specific geographic service areas. A PWA may request changes to its Annual Table A amount from DWR only if those changes do not impair the financial stability of the SWP. As a result of contract amendments in the 1980s and the Monterey Amendment, the current combined maximum Annual Table A amount for all PWAs is 4.172 million af. The Annual Table A amounts listed in Table 2-6 include past permanent transfers of Annual Table A amounts made between some of the PWAs.

The Contracts require DWR to make all reasonable efforts to complete the water supply facilities necessary to deliver the Annual Table A amounts in the Contracts. Planned requirements of future action were provided because all parties recognized that the original facilities under construction would not be sufficient in the future, by themselves, to meet the PWAs' Annual Table A amounts, and that even the supply provided by those initial facilities would decline as upstream, local water needs increased. The Contracts also specify that DWR make all reasonable efforts to perfect and protect necessary water rights. The Contracts require DWR to take all reasonable measures to make available water that meets water quality objectives specified in each Contract. Whenever the supply of Table A water determined by DWR is less than the total of all PWAs' requests, the available supply of Table A water is allocated among all PWAs in proportion to each PWA's Annual Table A amount.

2.4.2 Article 21 Water

In addition to their Table A water, PWAs may request on a short-term basis Article 21 water when it is available to the SWP. Article 21 water becomes available after the PWAs have scheduled to receive their Table A water and DWR has met the operational and storage requirements of the SWP. This water supply is an intermittent and unpredictable water supply and can be discontinued at any time when conditions warrant (i.e. an example being after storms have moved through and runoff diminishes).

**TABLE 2-5
MAXIMUM ANNUAL TABLE A AMOUNTS**

SWP PWAs	Table A Amount (af)	Type
Alameda County FC&WCD, Zone 7	80,619	M&I
Alameda County WD	42,000	M&I
Antelope Valley-East Kern WA	144,844	M&I/Agricultural ^c
Butte County	27,500	M&I ^a
Santa Clarita WA (formerly Castaic Lake WA)	95,200	M&I
Coachella Valley WD	138,350	M&I
Crestline-Lake Arrowhead WA	5,800	M&I
Desert WA	55,750	M&I
Dudley Ridge WD	48,350	Agricultural
Empire West Side ID	3,000	Agricultural
Kern County WA	982,730	Agricultural/M&I ^b
Kings County	9,305	Agricultural
Littlerock Creek ID	2,300	M&I
Mojave WA	85,800	M&I
Metropolitan WDSC	1,911,500	M&I
Napa County FC&WCD	29,025	M&I
Oak Flat WD	5,700	Agricultural
Palmdale WD	21,300	M&I
Plumas County FC&WCD	2,700	M&I
San Bernardino Valley Metropolitan WD	102,600	M&I
San Gabriel Valley Municipal WD	28,800	M&I
San Geronio Pass WA	17,300	M&I
San Luis Obispo County FC&WCD	25,000	M&I
Santa Barbara County FC&WCD	45,486	M&I
Santa Clara Valley WD	100,000	M&I
Solano County WA	47,756	M&I
Tulare Lake Basin WSD	87,471	Agricultural
Ventura County FCD	20,000	M&I
Yuba City	9,600	M&I
Total	4,172,786	

NOTES:

- a Municipal and Industrial.
b Approximately 15 percent of Kern County WA's Annual Table A amount is classified as municipal and industrial (M&I).
c Approximately 25 percent of Antelope Valley-East Kern WAs SWP water is used by agriculture.

SOURCE: California Department of Water Resources – State Water Project Analysis Office

**TABLE 2-6
ANNUAL TABLE A AMOUNTS 1970–2017**

Year	Upper Feather River	North Bay	South Bay	San Joaquin Valley	Central Coast	Southern California	Total
1970	700	0	114,200	202,000	0	5,700	322,600
1972	970	0	118,300	413,066	0	209,423	741,759
1974	1,230	0	122,400	460,650	0	597,920	1,182,200
1976	1,990	0	126,500	543,417	0	836,480	1,508,387
1978	1,850	0	130,700	635,900	0	1,049,584	1,818,034
1980	1,810	500	134,800	758,100	1,946	1,317,614	2,214,770
1982	1,970	800	139,200	876,500	5,626	1,550,449	2,574,545
1984	3,630	1,100	143,600	979,211	12,698	1,744,098	2,884,337
1986	4,190	1,400	148,100	1,091,946	28,210	1,983,890	3,257,736
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	3,688,335
1990	6,040	28,190	160,900	1,313,450	70,486	2,500,600	4,079,666
1991	11,880	29,590	166,400	1,338,011	70,486	2,510,200	4,126,567
1992	11,920	32,010	171,900	1,342,300	70,486	2,510,200	4,138,816
1993	11,960	34,620	177,400	1,342,300	70,486	2,510,200	4,146,966
1994	12,000	37,215	182,000	1,342,300	70,486	2,510,200	4,154,201
1995	12,050	44,030	184,000	1,342,300	70,486	2,510,200	4,163,066
1996	12,100	48,225	186,000	1,301,630	70,486	2,492,900	4,111,341
1997	12,150	49,315	188,000	1,297,300	45,201	2,492,900	4,084,866
1998	12,200	50,420	188,000	1,272,300	45,201	2,517,900	4,086,021
1999	13,940	55,020	188,000	1,272,300	70,486	2,519,900	4,119,646
2000	14,000	55,945	210,000	1,205,300	70,486	2,565,900	4,121,631
2001	14,670	66,561	220,000	1,185,519	70,486	2,566,900	4,124,136
2002	14,730	67,396	220,000	1,182,519	70,486	2,569,900	4,125,031
2003	14,790	68,231	220,400	1,182,119	70,486	2,570,900	4,126,926
2004	13,100	69,056	222,619	1,170,000	70,486	2,581,800	4,127,061
2005	10,800	69,481	222,619	1,170,000	70,486	2,582,300	4,125,686
2006	11,124	69,856	222,619	1,170,000	70,486	2,582,800	4,126,885
2007	11,520	70,231	222,619	1,170,000	70,486	2,584,450	4,129,306
2008	39,120	70,606	222,619	1,170,000	70,486	2,593,100	4,165,931
2009	39,190	70,981	222,619	1,170,000	70,486	2,593,100	4,166,376
2010	13,491	76,531	222,619	1,140,000	70,486	2,623,100	4,146,227
2011	14,388	76,581	222,619	1,140,000	70,486	2,623,100	4,147,174
2012	39,420	76,631	222,619	1,140,000	70,486	2,623,100	4,172,256
2013	39,510	76,681	222,619	1,140,000	70,486	2,623,100	4,172,396
2014	39,600	76,731	222,619	1,136,556	70,486	2,626,544	4,172,536
2015	39,700	76,781	222,619	1,133,556	70,486	2,629,544	4,172,686
2016	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786
2017	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786

SOURCE: California Department of Water Resources, Bulletin 132-16, June 2017, pages 192-193.

2.4.3 Water Management Practices

To enhance flexibility and reliability of SWP water supplies to PWAs, the Contracts include water supply management practices. Water supply management practices available to PWAs include transfers and exchanges of water among the PWAs to provide flexibility (e.g., changing the location and timing of delivery), especially during dry years (see subsection 2.3.3 for more discussion of water transfers and exchanges). In addition to transfers and exchanges, the Contracts provide flexibility in the management of water supplies by allowing some PWAs to store water in San Luis Reservoir, withdraw and replace water from Castaic Lake and Lake Perris, and to use capacity within the SWP system for the conveyance of non-SWP water for transfers to all PWAs.

Other water supply management practices provided for in the Contracts allow PWAs to carry over allocated water from one year to the next under certain conditions. The water is temporarily stored or carried over in SWP conservation reservoirs, primarily in San Luis Reservoir. Article 12(e) allows Table A water scheduled for delivery in the last 3 months of a year to be delivered in the first three months of the next year, to the extent such deliveries do not adversely affect current or future SWP operations, including filling of SWP reservoirs, flood control releases, and water quality restrictions. Article 56(c) allows a PWA to store its allocated water of the current year in facilities outside of the PWA's service area, in a groundwater basin, or in SWP or non-SWP surface facilities, for later delivery to the PWA's service area. Carryover water under Article 12(e) and storage of water under Article 56(c) both allow the PWAs to make the most beneficial use of allocated water—by not losing such supply at the end of the year and by having water available for contingency planning in the event the following year is a dry year. In addition, Article 14 of the Contracts provides that Table A water not delivered at any time during a year because of a DWR interruption or reduction of deliveries for the purposes of repair, maintenance, and replacement of any of the SWP facilities may be delivered at other times during the year. The delayed delivery is conditioned upon the ability of DWR to deliver that water, considering the Table A water delivery schedules of all PWAs. Article 14(b) provides for delivery in only one succeeding year, rather than in multiple succeeding years.

2.4.4 Water Transfers and Exchanges

DWR has approved water transfers and exchanges of Table A water between PWAs to achieve water supply management flexibility and water supply reliability of the SWP. DWR has administered programs to facilitate management and delivery of both allocated SWP water and non-SWP water purchased by the PWA's such as the Drought Water Banks, numerous water transfers and exchanges, short-term water purchases for

drought relief, and delivery of SWP water on behalf of the PWAs to storage programs outside their service areas as part of exchanges and transfers. These programs provide greater ability to maximize available water for the SWP and to the PWAs during a range of hydrologic years.

Transfers and exchanges have become increasingly important during dry years especially since the mid-1990s, when the PWAs' collective demand for their Annual Table A amounts peaked. When a PWA has excess allocated SWP water available which can be used by another PWA during that year, it can negotiate a return amount for a future dry year supply. Exchanged or transferred water can help PWAs manage both their dry year and wet year supplies on a short-term and long-term basis.

Any transfer or exchange between PWAs especially south of the Delta does not affect SWP operations at the export facilities. The SWP is still exporting the same volume of water, only its delivery location has changed and it is now going to another PWA. The water transferred or exchanged south of the Delta is relabeled as belonging to a PWA buyer, therefore it essentially becomes an accounting exercise of managing how much each PWA has. When a north of Delta PWA exchanges or transfers water to a south of Delta PWA, the additional increment of water transferred or exchanged may be exported in the Delta potentially resulting in a very slight increase in exports.

2.4.4.1 Water Transfers

Under Article 15(a) of the pre-1995 Monterey Agreement contracts, the Department approved the transfer of SWP water from one SWP contractor to another SWP contractor. Additionally, Article 41 provides the Department with the authority to approve a proposed assignment or transfer of any part of the contracts or of a District's rights or interests provided under the contract. Water transfers can be on an annual or permanent basis. Most annual transfers are "same landowner transfers," and occur when a landowner has land in two different PWA service areas.

Permanent transfers of Annual Table A amounts have occurred mainly since 1995. Pursuant to Article 53 of the Contract, 130,000 af of Table A water was transferred from Kern County WA's Agricultural member units to M&I PWAs pursuant to the Monterey Amendment. These transfers helped several agricultural member districts within Kern County WA decrease their payment obligations for SWP water. Permanent transfers of Annual Table A amounts from other SWP agricultural PWAs to M&I PWAs have occurred from the early 2000s, also with the intent to transfer associated payments for the costs of the SWP water.

Pursuant to Article 56(d)(2), DWR administers a program (called Turn-Back Water Pool or Turn-Back Pool) that allows a PWA with more allocated SWP water than it needs in any year to offer a portion of its Table A water for sale to other PWAs or to DWR if there is remaining water. The buying PWA pays the seller a rate equal to a percentage of the Delta Water Rate (the annual cost per acre-feet needed to repay all costs for the conservation and development of that portion of water). Two Pools were established with Pool A water sold at 50 percent of the Delta Water Rate, and Pool B water at 25 percent of the Delta Water Rate. The Pool begins early in the calendar year so that water can be managed and used more efficiently. Previously, when a portion of a PWA's Table A water was not taken, it became available, either late that year or the following year, for other SWP purposes including reallocation to other PWAs with unmet needs. The Turn-Back Pool enables PWAs to be partially compensated for water sold. The Turn-Back Pool is designed and operated such that a seller cannot be a buyer in that same year. Water offered to the Turn-Back Pool has diminished since 2001 because the PWAs have desired greater compensation than allowed under the existing Turn-Back Pool provisions or have implemented storage programs outside its service area. **Figure 2-3** shows the water offered to the Turn-Back Pool from 1996-2013.

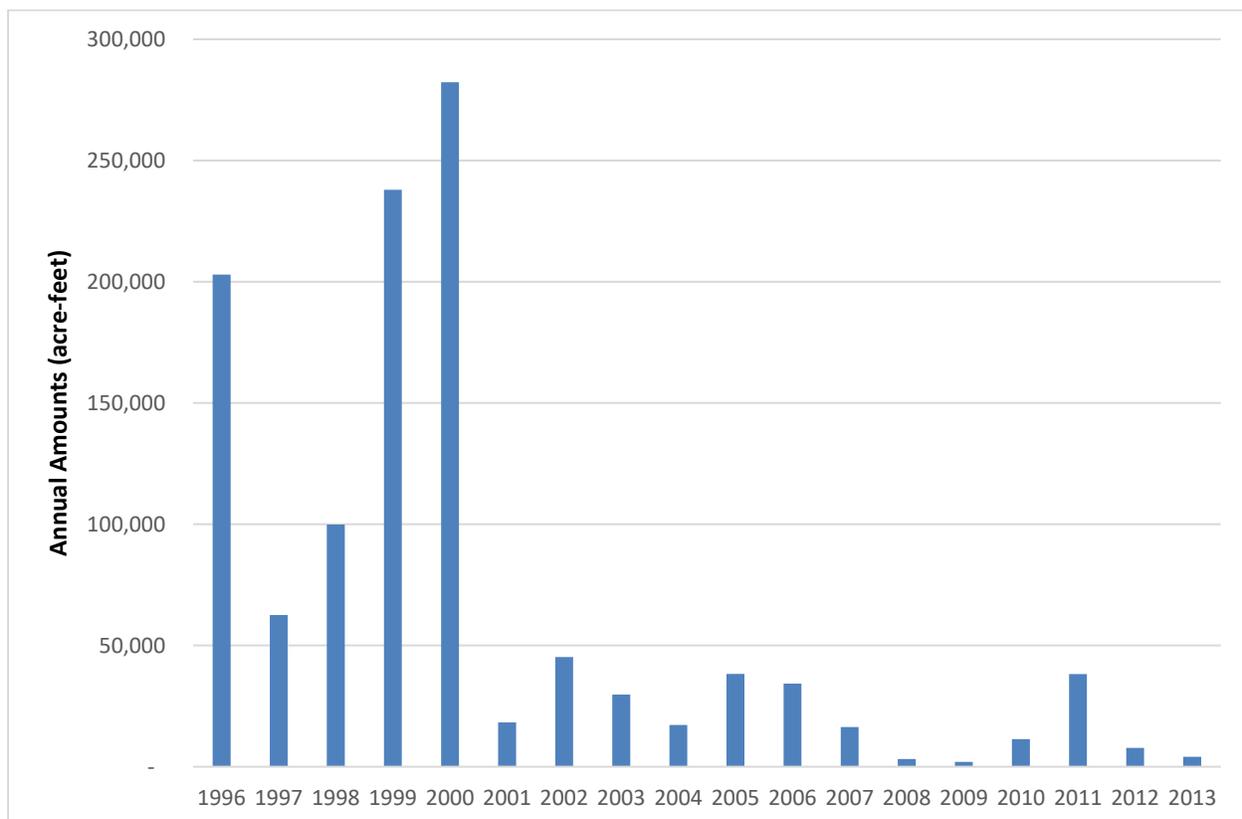


Figure 2-3
Water Offered to the Turn-Back Pool

Due in part to the ongoing 2012-2016 drought, DWR administered on a demonstration basis a multi-year water pool program for 2013-2014 and 2015-2016 that allowed contractors to participate in the two-year program as either a buyer or seller for each of the two years (a decision made at the beginning of each of the two-year programs) with greater compensation for the water than allowed under the Turn-Back Water Pool Program. In this demonstration Program, PWAs could offer and transfer a portion of their Table A water and Article 56(c) water to the multi-year water pool for purchase by other PWAs needing additional water. The program allowed PWAs to offer portions of their Table A water. Based on supply and demand, the offered pool water was allocated among the purchasing PWAs into two buyer pools. The “69 Percent Pool” consisted of water purchased by Metropolitan WDSC and Kern County WA, which together make up 69.36 percent of the total Annual Table A amounts (i.e. they received 69.36 percent of offered water). The remaining 30.64 percent of the Annual Table A amounts was available for the other PWAs to purchase in the “31 Percent Pool.” Sellers were paid for water sold in the pool with prices ranging from \$138/af to \$375/af. **Figure 2-4** shows the PWAs who sold water to the pool from 2013 through 2016.

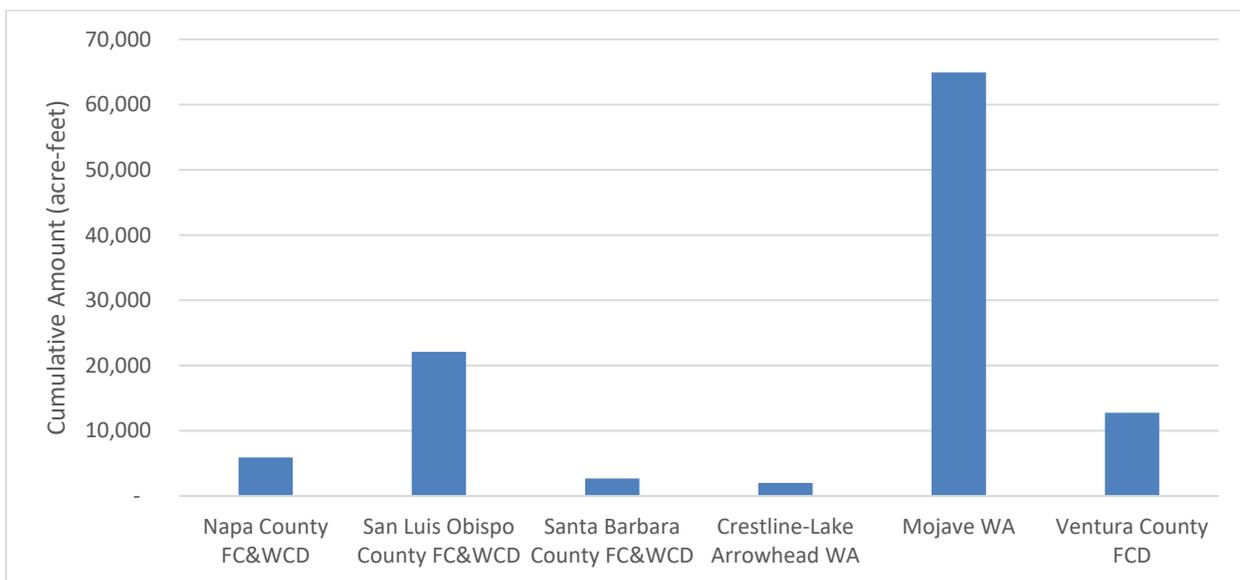


Figure 2-4
Multi-Year Water Pool Program - PWAs Selling Water

DWR has also allowed transfers of Table A water between two PWAs with the same landowner in their respective service areas, but these have not included an exchange of money.

Pursuant to Notice to State Water Project Contractors Number 17-11 *Water Management and the Existing Long-Term Water Supply Contracts*, dated December 18,

2017 (NTC 17-11), DWR clarified the considerations and objectives with respect to Multi-year transfers. The Notice described the type of SWP water that could be transferred, who could be a buyer and a seller, minimum terms, and other provisions. DWR reiterated its right to review and reconsider a multi-year transfer agreement if it determined that delivery under the agreement is impairing the financial feasibility of SWP facilities or is impacting another PWA's ability to take delivery of its Table A water. DWR also stated that it would confirm and supplement its position in a public process.

2.4.4.2 Water Exchanges

Pursuant to Contract Article 56(f), DWR has approved water exchanges between PWAs to help critical needs in drought years, for groundwater replenishment during wet years, for operational reregulation of water supplies, and for the beneficial use of unused Table A water. One PWA will exchange its water with another PWA in one year for future return of water at a determined return ratio. The timeframe for the return water has been up to 10 years, which typically provides a range of hydrological years for a successful return of water. All exchanges are reviewed by DWR and must be approved before any water is moved.

One of the first exchanges between two PWAs was initiated in 1998, between Solano County WA and Mojave Water Agency (WA). In that and subsequent exchanges between Solano County WA and Mojave WA, Solano County WA has provided 2 units of water to the Mojave WA (which is used to help replenish the adjudicated Mojave basin), for a return of 1 unit to Solano County WA during a dry year. This is called a "2:1" exchange.

Since 2007, some exchanges have had a cost compensation component, to offset the fixed costs for the PWA exchanging its SWP supply with another PWA. DWR has also recognized the value of water during dry years and consecutive dry years. During dry years between 2014 and 2016, DWR approved several exchanges where payments to effectuate the exchange of the water between willing buyers and willing sellers ranged from \$400-\$600 per af of water.

The term "bona fide exchange" is used in the Contract Article 56(f) and is defined as "an exchange of water involving a PWA and another party where the primary consideration for one party furnishing water to another is the return of a substantially similar amount of water, after giving due consideration to the timing or other nonfinancial conditions of the return." This provision from the 1995 amendment was included to assure that Table A water being "exchanged" would be returned and not result in a possible sale of Table A water.

NTC 17-11 describes the return period for exchanges, the exchange ratios, time of delivery, and cost compensation. DWR reiterated that it would review requests on a case-by-case basis and would examine: (1) any adverse impact on the ability of the PWA to continue to make payments under its Contract; (2) any adverse effect the action may have on the water rights permits granted to DWR for the operation of the SWP; (3) any adverse impact on the ability of DWR to make deliveries to other PWAs or to meet other obligations of the SWP; and (4) consideration of any issues identified by and compliance with CEQA. Exchange ratios greater than 2:1 up to 4:1 paired to the allocation of Table A water:

- For allocations $\geq 50\%$, return ratio is up to 2:1
- For allocations $>25\%$ & $<50\%$, return ratio is up to 3:1
- For allocations $<25\%$, return ratio is up to 4:1

DWR reiterated that the return period for exchanges would not be longer than 10-year with extensions beyond 10 years needing adequate justification, addressed extended delivery of water into a following year, and provided that a maximum cost compensation would not exceed an exchanging PWA's conservation minimum and capital and transportation minimum and capital charges.

Below are several exchanges that DWR approved to help urban water suppliers meet their needs during drought years:

- In dry year⁴ 2018, DWR approved the delivery of up to 8,000 af of Solano County WA's Table A water to Santa Clara Valley WD, in exchange for a future return of 2,000 af from Santa Clara Valley WD.
- In dry year 2018, DWR approved the delivery of up to 3,000 af of Ventura County's Table A water to San Geronio Pass WA, in exchange for a future return of 1,200 af from San Geronio Pass WA.
- In critically dry year 2015, Antelope Valley-East Kern WA provided 7,500 af of Table A water to Santa Clara Valley WD, for the future return of a like amount from Santa Clara Valley WD.

Likewise, when a PWA has wet year water supplies or unused SWP water, it will exchange some portion for a future amount when it needs additional supplies:

- Partnering with neighboring Little Rock Creek ID, Antelope Valley-East Kern WA has entered into annual 1:1 exchanges with Antelope Valley-East Kern WA since

⁴ The Sacramento River and San Joaquin River basins provide much of the state's water supply and their hydrology is used as an indices of the water year classification. The five water year classifications are critical, dry, below normal, above normal, and wet. Each classification is determined by the measured unimpaired runoff of each basin and are useful in water supply planning and management.

2007. This additional water into Antelope Valley-East Kern WA 's service area would have otherwise been unused by Little Rock Creek ID.

- In wet year 2011, Castaic Lake WA (now Santa Clarita WA) provided approximately 5,600 af of its carryover water to Rosedale-Rio Bravo WSD, a member unit of Kern County WA, for the future return of one-half the amount from Rosedale-Rio Bravo WSD. Rosedale-Rio Bravo WSD has opportunities to store wet year water in its groundwater recharge programs.
- In wet year 2017, Santa Barbara County FC&WCD provided approximately 575 af of its Table A water to the Strand Ranch, a groundwater banking program in Kern County WA's service area. Metropolitan WDSC, on behalf of member agency Irvine Ranch WD, will return one-half of this amount from the groundwater bank, to Santa Barbara County FC&WCD in a future year. This type of exchange illustrates the potential for storing wet year water in groundwater banks.

Figure 2-5 shows occurrences of several PWAs providing and requesting water through exchanges, from 2000-2018.

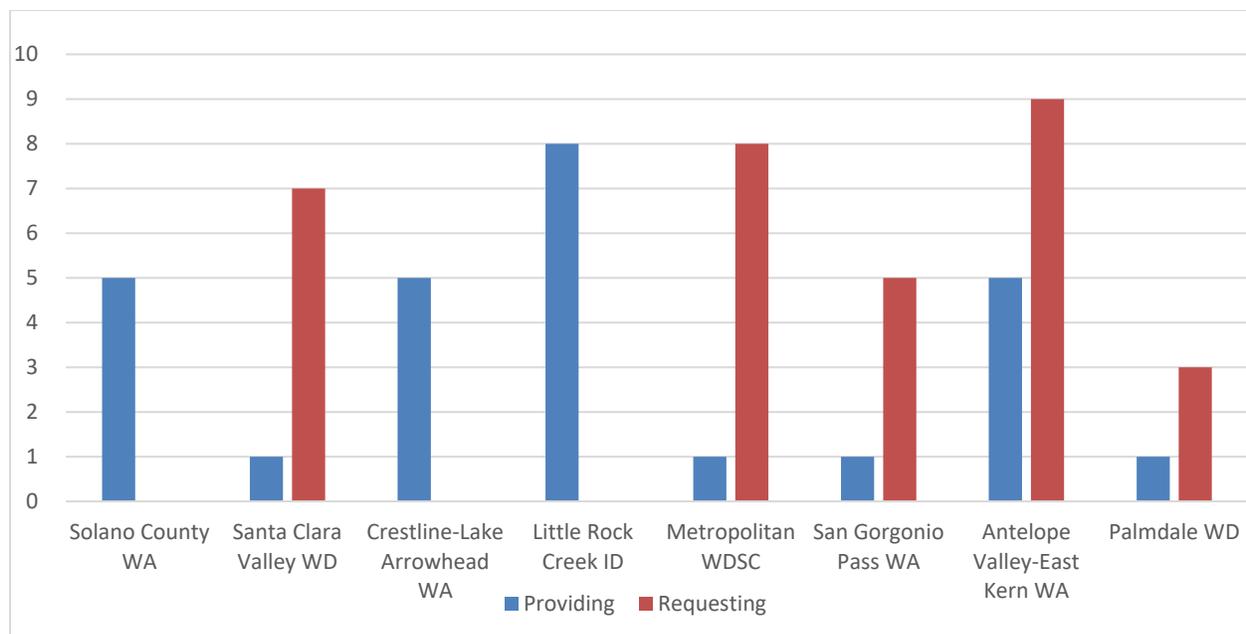


Figure 2-5

Occurrences of Select PWAs Providing and Requesting Water through Exchanges

2.4.4.3 Water Exchanges/Transfer of Carryover and Stored Water in San Luis Reservoir

PWAs have had the opportunity to carry over, or retain, a portion of their allocated Table A water in SWP conservation reservoirs (historically San Luis Reservoir) from one year into the following year(s), subject to conservation reservoir operations including reservoir levels and filling cycles. Carrying over water allows the PWAs to make the

most beneficial use of allocated water by not losing such supply at the end of the year, and for contingency planning in case the next year is dry.

Under Article 56(c), PWAs may store SWP and non-SWP water in SWP conservation reservoirs when the storage capacity is not needed by the SWP for SWP purposes. Historically, this water has been stored in San Luis Reservoir and can be “carried over” from one year to the next. DWR allocates available storage among requesting PWAs in proportion to their Annual Table A amounts, as specified in the article. As DWR needs the storage space for SWP purposes, the carryover water stored for PWAs starts to “spill”. In other words, the carryover water stored for PWA’s reverts to SWP supply at the same rate DWR would otherwise have been able to fill that storage.

In two agreements over the last several years, DWR has approved the exchange of carryover water. These exchange agreements represent a very small percentage of the exchanges approved over the last several years. For example, the recent 5-year drought from 2012 – 2016 with a following wet year necessitated the need and opportunity for most PWAs to use all available SWP water in 2017. With a final allocation of 60 percent (60 percent of the Annual Table A amount) in 2016, and the possibility of another drought year in 2017, PWAs collectively carried over approximately 622,000 af of water in San Luis Reservoir. In January and February 2017, northern California experienced above-average precipitation resulting in high exports. Because of the wet hydrology and increased exports, San Luis began filling quickly, resulting in actions by some PWAs who were unable to take delivery of the carryover. The actions included the exchange of their carryover to avoid having that supply revert back to DWR.

2.5 BACKGROUND ON PREVIOUS CONTRACT AMENDMENTS AND SETTLEMENT AGREEMENTS

2.5.1 Monterey Amendment and Settlement Agreement

In 1994, DWR and PWA representatives agreed to a set of principles to modify the Contracts to address issues related to various articles in the Contracts, and subsequently developed the Monterey Amendment based on those principles. All PWAs except Plumas County FC&WCD and the Empire West Side ID signed the Monterey Amendment. These two PWAs continue to receive SWP water from DWR in accordance with the Contracts in effect before the Monterey Amendment.

In 1995, the EIR for the Monterey Agreement was subject to judicial challenge. In 2000, the Third District Court of Appeal ordered that the EIR be decertified on the grounds that DWR should have been the lead agency and that the EIR was, in part, inadequate. In

May 2003, the parties to the litigation negotiated a settlement agreement that was confirmed by the Superior Court order on June 6, 2003. The settlement agreement included a commitment by DWR to a process that included the plaintiffs and PWAs in the development of a new EIR on the Monterey Amendment and other additional elements (Settlement Agreement). The Monterey Amendment and the Settlement Agreement together comprised the project referred to as Monterey Plus. DWR prepared a new EIR on the Monterey Plus and certified the *Final Environmental Impact Report for the Monterey Amendment to the State Water Project Contracts (Including Kern Water Bank Transfer) and Associated Actions as Part of a Settlement Agreement (Monterey Plus)* on February 1, 2010.

In general, the Monterey Amendment modified the Contracts by providing as follows:

- Changes in the procedures for allocation of Table A water and surplus water among the PWAs
- Approval to permanent transfers of 130,000 af and retirement of 45,000 af of Annual Table A amounts
- Transfer of property known as the “Kern Fan Element (KFE) property” in Kern County
- Changes to water supply management practices
- Restructured rates

In addition to establishing a process for involving plaintiffs and PWAs in the development of the new EIR on the Monterey Amendment, the Settlement Agreement provided the following:

- DWR will communicate SWP water reliability information by substituting the term “Table A amount” for “entitlement” in the Contracts and by implementing new procedures for disclosure of SWP delivery reliability.
- DWR will provide for better public review of major SWP actions by issuing guidelines on DWR’s review of permanent transfers of Table A amounts and issuing principles for the public to observe and comment on the negotiations for certain Contract amendments, including permanent transfers of Table A amounts.
- Certain permanent transfers of Table A amounts under the Monterey Amendment are recognized as final.
- Assurances regarding the KFE property transfer are provided including confirmation that title to the KFE property was retained by the Kern Water Bank Authority (KWBA). Restrictions on the use of the KFE property were included and DWR was required to analyze some operations of the KWBA-developed Kern Water Bank in an independent study.

- Certain measures are implemented pertaining to Plumas County, including provisions relating to the Plumas Watershed Forum, funding for watershed restoration and other purposes and amendment of Plumas County FC&WCD's Contract with respect to access to SWP water.
- DWR will provide funding to the plaintiffs for multiple purposes including watershed restoration.

In 2010, the Monterey Plus EIR was subject to two separate legal challenges. In 2014, the Sacramento County Superior Court ruled in both actions, finding that most of the EIR is adequate under CEQA, but that the EIR's discussion of the KWBA's use and operation of the Kern Water Bank was insufficient. The court ruled that DWR must decertify and revise its EIR to include a description and analysis of the development, use and operation of the Kern Water Bank lands as a water banking and recovery project particularly to groundwater hydrology and water quality. The challengers of the Monterey Plus EIR appealed the ruling. In response to the trial court ruling, DWR published the Monterey Plus Draft Revised EIR on April 28, 2016 to analyze operation of the KWB. In September of 2016, DWR filed its return to writ of mandate to the court. The Revised EIR was subject to a separate legal challenge. In October of 2017, the Sacramento County Superior Court discharged the 2014 writ and ruled in favor of DWR by denying the petition challenging the Revised EIR. This matter is also currently on appeal. See Chapter 3, section 3.4, for additional information on the implementation of the Monterey amendment financial provisions.

2.5.2 Water Supply Contract Extension Amendment

In May 2013, DWR and the PWAs entered into public negotiations to extend the term and make other financial improvements to the Contracts. The outcome of these negotiations resulted in the AIP Concerning Extension of the State Water Project Water Supply Contracts (Contract Extension Project). The Contract Extension Project would amend certain financial provisions of the Contracts and extend the term of the Contracts to 2085 based on the AIP. The proposed project would not create new water management measures, alter the existing authority to build new or modify existing facilities, or change water allocation provisions of the Contracts.

The proposed changes to the Contracts are composed of the following five elements: (1) revise Article 2 to extend the term of the 29 Contracts to December 31, 2085 (subject to the provisions of Article 4); (2) provide for increased SWP financial operating reserves; (3) implement a comprehensive pay-as-you-go repayment methodology with a corresponding billing system that more closely matches the timing of future SWP revenues to future expenditures. The pay-as-you-go repayment methodology generally means to recover capital, operation, and maintenance costs within the year incurred

and/or expended; (4) provide enhanced funding mechanisms and create additional accounts to address SWP financial needs and purposes; and (5) provide for a finance committee and provide other means to increase coordination between DWR and the PWAs regarding SWP financial matters. A DEIR was published in 2016 and DWR provided a public comment period from August 17, 2016 through October 17, 2016. On September 11, 2018, the Joint Legislative Budget Committee held an informational hearing to hear information from the Department and also public comment on the proposed amendments. DWR is preparing to finalize the DEIR, after which it may approve the project and execute amendments to extend the Contracts and revise certain financial provisions with the PWAs. See Chapter 3 for additional information on the existing Contract financial provisions that provide background on financial management of the SWP. See Chapter 6 for discussion of the Contract Extension Project as a probable future project and cumulative impact analysis.

2.6 REFERENCES

DWR (California Department of Water Resources). 2017. Management of the California State Water Project: Bulletin 132-16. Available: <https://www.water.ca.gov/LegacyFiles/swpao/docs/bulletins/bulletin132/Bulletin132-16.pdf>. Accessed May 2018.

Chapter 3

State Water Project Financing and Water Supply Contract Financial Provisions



3 STATE WATER PROJECT FINANCING AND WATER SUPPLY CONTRACT FINANCIAL PROVISIONS

3.1 INTRODUCTION

The proposed project proposes changes to the Contracts to allocate costs of California WaterFix to the participating PWAs and establishes new charge components to recover these costs. See Part II of the AIP included as Appendix A in this DEIR. This chapter provides the reader with background on the current financial provisions of the SWP.

3.2 CAPITAL FINANCING AND OPERATIONS AND MAINTENANCE EXPENDITURES

The major sources of capital financing for construction of the SWP have been and are: the Burns-Porter Act, which authorized General Obligation Bond sales; the Central Valley Project Act, which authorizes the issuance of revenue bonds; State appropriations (e.g., certain tidelands oil revenues); and SWP revenues. The Burns-Porter Act and the Central Valley Project Act also authorize the expenditure of funds for the operation and maintenance (O&M) of the SWP. These financing authorizations and mechanisms are discussed below and in the following pages.

3.2.1 The Burns-Porter Act

As described in Chapter 2, State Water Project, a large portion of the initial SWP facilities were financed by the sale of State general obligation bonds pursuant to the provisions of the Burns-Porter Act (Water Code, Section 12930 et seq.), which authorized the issuance of \$1,750,000,000 in bonds for the construction of the SWP and certain other facilities. Of that authorization, approximately \$1,582,400,000 (including the entire amount available for construction of the initial components of the SWP) has been issued, of which \$49,565,000 was outstanding as of September 2, 2018. The unissued \$167,600,000 of the authorization is available only to provide funds for the construction of certain additional SWP facilities as defined in the Burns Porter Act section 12938.

The Burns-Porter Act also created the California Water Resources Development Bond Fund into which are deposited all revenues received by DWR from the sale, use, and delivery of water and power from the SWP (other than those revenues attributable to the CVP revenue bond financed facilities). Revenues deposited in the California Water Resources Development Bond Fund are used to make payments in the following order of priority to the extent funds are available, as specified in the Burns-Porter Act. The first use of such revenues is to pay the reasonable costs of the annual maintenance, operation and replacement of the SWP. The second use is to reimburse the State

General Fund for the payment of the debt service on the general obligation bonds used to finance a portion of the SWP capital costs. The third use is to repay the California Water Fund for moneys made available for SWP construction; that repayment has been completed (see Subsection 3.2.3). The last use of revenues available in the California Water Resources Development Bond Fund is to pay the costs of the acquisition and construction of additional SWP facilities.

3.2.2 Central Valley Project Act

Additional major funding for portions of the SWP has been obtained through the sale of DWR's long-term CVP revenue bonds (CVP Revenue Bonds) and, pending long-term financing, DWR's short-term CVP commercial paper notes (CVP Commercial Paper). DWR has issued \$4,421,225,000 of CVP Revenue Bonds (exclusive of refunding bonds) to finance specified SWP facilities and projects, and of the total amount of CVP Revenue Bonds issued, approximately \$2,468,905,000 remained outstanding as of December 31, 2017. The CVP Revenue Bond financing program is a continuing program and is the primary source for the funding of the construction of new SWP facilities and the major repair and reconstruction of existing SWP facilities. The moneys used to pay the CVP Revenue Bonds debt service and the revenue-bond-financed facilities' maintenance and operation costs are attributable to the revenue-bond-financed facilities. In addition, DWR has authorized the issuance of CVP Commercial Paper, the proceeds from the sale of which are used to finance SWP facilities prior to permanent financing from the sale of revenue bonds.

SWP revenues from facilities financed by CVP Revenue Bonds are deposited into an account in the CVP Revenue Fund and pledged to the repayment of the CVP Revenue Bonds and thereafter allocated to the payment of the maintenance and operation expenses of the facilities financed by such revenue bonds. SWP revenues from the facilities financed by CVP Commercial Paper are also deposited into accounts in the CVP Revenue Fund and pledged to the payment of the commercial paper.

3.2.3 Capital Resources Financing

In addition to the funds obtained through the sale of Burns-Porter Act general obligation bonds, CVP Revenue Bonds, and CVP Commercial Paper, certain other moneys have been made available to DWR to pay the cost for construction of the SWP, including a portion of the moneys from State tidelands oil royalties, other State appropriations, a Pooled Money Investment Account loan, and federal reimbursements for project costs allocated to flood control. The tidelands oil royalties appropriated by the Legislature for construction of the SWP were deposited in a fund designated as the California Water Fund. Under the Burns-Porter Act, DWR was required to reimburse the California Water

Fund for such appropriations made after November 8, 1960. In April 1998, DWR made the final reimbursement installment to the California Water Fund, reducing the unreimbursed balance to zero. No moneys currently remain in the California Water Fund.

3.3 ANNUAL REVENUES

SWP revenues are used to pay for the SWP purposes of water supply, flood control, and recreation and fish and wildlife enhancement. The predominant source of revenues collected for the SWP comes from the PWAs, payments required under their individual Contracts with DWR. With three exceptions, the PWAs are established as districts under various State statutes providing for the formation of districts for water-related purposes. One PWA is a city (City of Yuba City) and two are counties (County of Butte and County of Kings). Of the 29 PWAs, 24 provide water primarily for municipal and industrial purposes and five provide water primarily for agricultural purposes. Eight of the PWAs are governed by county boards of supervisors, 19 by elected boards of directors, and one by its city council. Many PWAs receive a major portion of their revenue from ad valorem taxes on property. Some PWAs make all payments under their Contracts from ad valorem taxes.

Other annual revenues received by DWR include payments from Reclamation for its proportionate share of the joint use facilities, contributions from the United States Army Corps of Engineers (USACE) for SWP flood control costs, revenues from the sale of electric power produced by SWP power plants, payments from LADWP relating to the Castaic Power Plant, Legislative appropriations and general obligation bond funding for recreation and fish and wildlife enhancement purposes. The Davis-Dolwig Act, in California Water Code Section 11913, intends there be appropriations from the General Fund for enhancement of fish and wildlife and for recreation in connection with State water projects (including the SWP). In 2012, the Legislature enacted legislation that created the Davis-Dolwig Account in the California Water Resources Development Bond Fund and provides a continuous annual appropriation of \$7,500,000 into that account to DWR for the costs of SWP operations, maintenance, and capital costs attributable to recreation and fish and wildlife enhancement (Water Code Section 11913.1). The legislation also provides a continuous annual appropriation of \$2,500,000 to DWR for the payment of SWP recreation and fish and wildlife enhancement costs DWR incurred before 2012 until all such prior costs have been repaid.

The following sections contain a description of the financial and payment provisions of the Contracts pursuant to which the PWAs are charged for costs allocated to the water supply purpose.

3.3.1 Water Supply Contract Cost Recovery

Annual PWA charges represent each PWA's proportionate share of the capital costs, operating costs, and variable costs of the SWP facilities that are allocable to the water supply purpose (referred to as "reimbursable" in the Contracts). The original Contracts provided for two charges to the PWA: (1) a Delta Water Charge relating to the costs of SWP facilities that conserve water (project conservation facilities); and (2) a Transportation Charge relating to the costs of SWP facilities necessary to deliver water to the PWAs (project transportation facilities). Subsequent amendments have provided for several additional charges to recover the financing costs of CVP Revenue Bonds and CVP Commercial Paper relating to specified facilities. Each of these is further described in the following sections.

3.3.1.1 Delta Water Charge

The Delta Water Charge provisions of the Contracts consist of three components: (1) a capital cost component; (2) a minimum operation cost component (operation costs that do not vary with water deliveries); and (3) a variable operation cost component (operation costs that vary with water deliveries). The Delta Water Charge capital cost component consists of costs such as planning, designing, and construction costs of project conservation facilities. The Delta Water Charge minimum cost component consists of costs such as operation, maintenance, power, and administrative costs of project conservation facilities. The Delta Water Charge variable operation costs are currently not billed to the PWAs because as defined, the Conservation water is not water "delivered" to any PWA. The Transportation Charge is basis for bills of delivered water. (Only when a PWA takes delivery of water are they charged for the variable operations costs as described in 3.3.1.2 per the Transportation Variable cost component). All energy costs related to the movement of the water into DWR storage facilities (i.e. into San Luis Reservoir) are therefore included in the Delta Water Charge minimum operation charge component.

The Delta Water Charge is billed to each PWA based on their proportionate share of the Annual Table A amount. As described in Chapter 2 State Water Project, Table A lists each PWA's maximum amount of water supply delivery that may be requested in any given year (if available). It is computed to return to DWR, during the project repayment period as defined in the Contracts, all reimbursable costs of the project conservation facilities, together with interest at the project interest rate. The project conservation facilities now include the Oroville facilities, the Delta facilities, the San Luis Facilities, and a portion of the aqueduct and Banks Pumping Plant that connects the Delta to the San Luis Facilities. Reimbursable costs are those costs determined by DWR to be allocable to the purpose of water supply. Under the Contracts, the project repayment

period ends December 31, 2035,¹ unless bonds are issued with a later maturity date, in which case the project repayment period for the facilities financed by such bonds would be extended to the latest maturity of such bonds. The current project interest rate, at 4.610 percent, is a weighted average interest rate that takes into account the interest rates on the Burns-Porter Act general obligation bonds and certain CVP Revenue Bonds.

3.3.1.2 Transportation Charge

The Transportation Charge also consists of three components: (1) a capital cost component; (2) a minimum operation cost component (operation costs that do not vary with water deliveries); and (3) a variable operation cost component (operation costs that vary with water deliveries). The Transportation Charge is computed to return to DWR, during the term of the Contract, the reimbursable costs of certain facilities necessary to deliver water to a PWA, together with interest. Such facilities include aqueducts, pumping plants, and on-aqueduct power facilities, except for certain facilities covered in specific amendments to the Contracts. The facility costs relating to each aqueduct reach are allocated among all PWAs receiving water through that reach. Certain transportation facilities are the subject of specific amendments that provide for the recovery of the financing costs of CVP Revenue Bonds and CVP Commercial Paper issued to finance those facilities.

The Transportation Charge capital cost component consists primarily of costs for planning, designing, and constructing project transportation facilities. Each year's capital expenditures are allocated among the PWAs, and then repaid with interest (at the Project Interest Rate) over their respective contractual repayment periods. Repayment periods are 50 years for municipal and industrial PWAs, and 75 years for agricultural PWAs. The effect has been that agricultural PWAs' (County of Kings, Dudley Ridge WD, Empire West Side ID, Kern County WA [for most of its Table A amount], Oak Flat WD, and Tulare Lake Basin WD) repayment of transportation capital costs has been spread out over a longer period than the repayment period of such costs for M&I PWAs.

The Transportation Charge minimum cost component consists of costs such as operation, maintenance, and administrative costs of project transportation facilities.

The Transportation Charge variable cost component primarily consists of energy-related expenditures required to transport water to PWAs. The annual net value of power produced by power plants located on the California Aqueduct is credited to all PWAs

¹ As described in Chapter 2 State Water Project, DWR and the PWAs participated in negotiations that propose to extend the term of the Contracts to 2085 and make other financial improvements to the Contracts (Contract Extension Project). The DEIR for the Contract Extension Project was published in 2016.

receiving water flowing through that power plant in proportion to each PWA's portion of the total water flowing through the plant during the year. That is because the PWAs receiving water flowing through that power plant have paid for the cost of that power plant. The credit is given in the form of a reduction in the variable operation cost component of each such PWA's Transportation Charge. The minimum and variable cost components of the Transportation Charge are paid on a "pay-as-you-go" basis in the year they are incurred.

3.3.1.3 CVP Revenue Bond Charges

In the past, amendments to the Contract have been executed to provide for charges to the PWAs to recover the financing costs of CVP Revenue Bonds and CVP Commercial Paper relate to both certain project conservation facilities and certain project transportation facilities. Two of these amendments have been added to all 29 PWAs; the Water System Revenue Bond Amendment and the Off-Aqueduct Power Amendment, which are discussed below.

In addition, certain facilities that have been or will be financed with revenue bonds will only benefit a limited number of PWAs. In those cases, amendments have been entered into with only those PWAs that will benefit from, and be responsible for repaying the costs of, such facilities. Examples of these amendments include the East Branch Enlargement Amendment (with seven PWAs in Southern California), Coastal Branch Extension Amendment (with the Santa Barbara County FC&WCD and San Luis Obispo FC&WCD), East Branch Extension Amendment (with the San Bernardino Valley Municipal WD and San Geronio WA), and the South Bay Aqueduct Enlargement Amendment (with the Alameda County FC&WCD, Zone 7).

The Water System Revenue Bond Amendment with all PWAs provides for the recovery of the financing costs of the construction of certain specified SWP facilities as well as the costs of repairs, additions, and betterments of those facilities and all other SWP facilities existing as of January 1, 1987 (with the exception of facilities covered by other specific revenue bond amendments). It provides for the recovery of the annual financing costs under two elements:

1. A first element consists of the original annual Delta Water Charge and Transportation Charge for such facilities financed with water system revenue bonds.
2. To the extent that those charges are not sufficient to recover all of the related annual financing costs, the second element consists of a surcharge to be paid in such year by all PWAs in proportion to their respective annual interest payments that are charged at the project interest rate.

The Off-Aqueduct Power Facilities Amendment with all PWAs also establishes a separate subcategory of Transportation Charge for Off-Aqueduct Power and changes the method of allocation and payment of costs of such power facilities. Under the Off-Aqueduct Power Facilities Amendment, the annual costs of such facilities are allocated among the PWAs based on power consumed in such year delivering SWP water to each PWA. As of July 2013, the SWP is not receiving any power from any Off-Aqueduct Power Facilities.

3.3.2 Timing and Method of Payment

DWR furnishes each PWA with a statement of estimated charges for the capital cost components (including charges under the Revenue Bond Amendments) and the minimum operation cost components of the Delta Water Charge and Transportation Charge by July 1 for the following calendar year. DWR also furnishes each PWA with a statement that shows the difference between the estimated water charges paid and the actual costs incurred for all prior calendar years. The difference is paid by or credited to each PWA, as applicable, in equal monthly installments commencing on January 1 of the year following the “true-up” calculation. This process results in an approximately 2-year delay in the reconciliation of estimated charges paid and actual costs reimbursed to DWR.

DWR determines the rate (per af) to be charged each PWA in the following calendar year for the variable operation cost component of the Transportation Charge. The variable operation cost component is calculated and billed monthly based on water deliveries for the preceding month and an updated rate determined at the beginning of the calendar year. Payment of the variable operation cost components is due each month following receipt of the monthly statement of charges.

3.4 MONTEREY AMENDMENT FINANCIAL PROVISIONS

In the mid-1990s, DWR and a number of PWAs entered into settlement discussions to resolve contractual issues that had arisen in the first 35 years of the Contracts. These discussions culminated in the Monterey Amendment, signed by DWR and 27 PWAs. The Monterey Amendment included provisions addressing, among other things, water allocations (including during times of shortage), water transfers, transfers of the KFE property, water supply practices, and financial provisions. The financial provisions described in Article 51 established the General Operating Account, the State Water Facilities Capital Account, rate restructuring and reductions, and regular reviews of

financial requirements.² The Monterey Amendment provisions relevant to the proposed project include those involving transfers, exchanges, and stored water in Article 56. See Chapter 2, State Water Project, section 2.5.1, for a more detailed discussion of the Monterey Amendment. The proposed project, as described in the AIP, provides for new Contract payment provisions that would describe new charge components to recover the costs of the California WaterFix facilities and allocation of the costs among the participating PWAs.

² As described in Chapter 2 State Water Project, DWR and the PWAs participated in negotiations that propose to extend the term of the Contracts and make other financial improvements to the Contracts (Contract Extension Project).

Chapter 4

Project Description



4 PROJECT DESCRIPTION

4.1 INTRODUCTION

As described in Chapter 2 State Water Project, DWR constructed and currently operates and maintains the SWP, a system of storage and conveyance facilities that provide water to 29 PWAs. These PWAs include local water agencies and districts legislatively enabled to serve agricultural, municipal and industrial water supply customers or retail water supply agencies throughout the SWP Service Area. The PWAs receive water service from the SWP in exchange for paying all costs associated with planning, constructing, operating and maintaining the SWP facilities that are attributable to water delivery.

The existing Contracts include water management provisions for actions such as the transfer or exchange of SWP water among the PWA's, as well as financial provisions including the methods used by DWR to recover certain costs associated with the planning, construction, and operation and maintenance of SWP facilities.

DWR and the PWA's conducted several negotiation sessions in public that lead to the development of a non-binding agreement in principle known as "Agreement in Principle Concerning the State Water Project Water Supply Contract Amendments for Water Management and California WaterFix" or AIP (see Chapter 1 for further discussion of the public negotiation process). The proposed project would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts based on the AIP. These proposed amendments are described in detail below. Please refer to Chapter 2 State Water Project, and Chapter 3 State Water Financing and Water Supply Contract Financial Provisions for detailed description of existing Contract provisions that are applicable to the proposed amendments.

4.2 STUDY AREA

The study area is defined as the area located within the SWP Service Area which includes the water delivery facilities of the SWP and service areas of the PWAs that receive water from the SWP (see Chapter 2, State Water Project, Figures 2-1 and 2-2).

4.3 PROJECT OBJECTIVES

DWR and the PWAs have a common interest to ensure the efficient delivery of SWP water supplies and to ensure the SWP's financial integrity. In order to address water management flexibility and to allocate costs for California WaterFix, DWR and the PWAs agreed to the following objectives:

1. Supplement and clarify terms of the SWP water supply contract that will provide greater water management regarding transfers and exchanges of SWP water supply within the SWP service area.
2. Provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity.

4.4 PROJECT DESCRIPTION

The proposed project would add, delete, and modify provisions of the Contracts and clarify certain terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water within the service area; and provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity. The proposed project would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts.¹ The proposed project would not change the water supply delivered by the SWP as SWP water would continue to be delivered to the PWAs consistent with current Contract terms, and all regulatory requirements.

The following subsection describes in more detail the proposed amendments as it relates to water transfers, water exchanges and the cost allocation for California WaterFix. For a full description of the proposed project, see the AIP, which is included as Appendix A of this DEIR. Also included are examples of how the proposed amendments for water transfers and exchanges might be implemented by DWR and the PWAs. These examples are for illustrative purposes only to assist readers in understanding the proposed amendments. **Table 4-1** provides a summary of the existing PWA Contracts and the proposed amendments related to water transfers and exchanges.

¹ The maximum amount of SWP water that the PWAs can request pursuant to their individual water supply contract. Annual Table A amounts also serve as a basis for allocation of some SWP costs among the contractors.

Agreement in Principle Components

**TABLE 4-1
SUMMARY OF EXISTING PWA CONTRACTS AND PROPOSED AMENDMENTS FOR WATER TRANSFERS AND EXCHANGES**

	Existing Contracts² Article and Administration of Water Transfers and Exchanges	Proposed Amendment - AIP Item Number³ and Summary
Cost Compensation for Transfers	Article 56 Compensation under Turn-Back Pool based on Delta water rate.	AIP I.1.1 PWAs establish cost compensation for all transfers, including single, Transfer Packages ⁴ and multi-year transfers.
Minimum Term and Duration of Transfers	Article 56(d) Annual	AIP I.1.1 PWAs will establish duration of transfers which may be beyond one year.
Return Period of Exchanges	Article 56(f) Administrative practice uses 1-10 years	AIP I.2 and AIP I.3 Provides return ratios and process regarding exchanges and basic criteria.
Return Ratios of Exchanges	Article 56(f) Provides for exchanges of water.	AIP I.2.1 Establishes specific return ratios of 2:1, 3:1, 4:1, 5:1 based on hydrology. For example, 5:1 ratio for allocations <= 15 percent. AIP I.2.2 Applicable return ratio uses the SWP allocation at the time the exchange transaction is executed among the PWAs.
Maximum Cost Compensation for Exchanges	Article 56(f) Exchange of water allows for reasonable costs in effectuating the exchange and reasonable deductions from water delivered, based on expected storage or transportation losses.	AIP I.2.3 Not to exceed the exchanging PWA's combined conservation facilities, transportation facilities, and California WaterFix facilities' fixed charges (capital and minimum charges including capital surcharges). Clarifies methods for determining compensation of costs related to the exchange. Includes SWP conservation and California WaterFix fixed charges, and includes the transportation minimum charge; Clarifies fixed charges as capital and minimum charges including capital surcharges.
Buyer-Seller Criteria for Transfers and Exchanges	Articles 56(d), 56(f) Transfers/Exchanges of water as approved by DWR Under the Turn Back Pool a PWA is not both a buyer and seller of transfer water in the same year	AIP I.3.1 PWAs may be both buyers and sellers in the same year and enter into multiple transfers and/or exchanges in the same year.

² See Appendix C for an example of a SWP Water Supply Contract

³ See Appendix A for the Agreement in Principle Concerning the SWP Water Supply Contract Amendment for Water Management and California WaterFix

⁴ A Transfer Package is comprised of two or more transfer agreements between the same PWAs (AIP I.1.2)

**TABLE 4-1
SUMMARY OF EXISTING PWA CONTRACTS AND PROPOSED AMENDMENTS FOR WATER TRANSFERS AND EXCHANGES**

	Existing Contracts² Article and Administration of Water Transfers and Exchanges	Proposed Amendment - AIP Item Number³ and Summary
DWR Review of Proposed Transfer and Exchanges	Articles 15(a) and 56 DWR reviews permanent sales of SWP water. DWR and PWAs subject to provisions of Turn-Back Pool	AIP I.3.2 Basic criteria for proposing transfers and exchanges
DWR Right to Reconsider Transfer and Exchanges	Article 15(a) DWR retains right to reconsider transfer proposals if possible harm to SWP and other PWAs	AIP I.3.2.7 DWR Director has discretion when approving exceptions to the basic criteria for proposed transfers and exchanges.
Dispute Resolution Process for Transfers and Exchanges	DWR and PWA have an administrative dispute resolution process that can be followed for disputes that arise during the administration of an agreement.	AIP I. 3.3 Sets process to address disputes of PWAs not participating in the transfer/exchange prior to DWR approval of the transfer/exchange
Priority for Moving Water & Protection of Water for Transfers and Exchanges	Article 12(f) Article 14(b)	AIP I.3.4 Reiterates priority of exchange water pursuant to WSC Article 12(f) Clarifies that exchange water will not have protection of Article 14(b)
Provisions for protection of SWP for Transfers and Exchanges	Standard Practice of DWR-PWA Agreement for exchanges including liability language to protect SWP operations and finances	AIP I.3.5 Requires agreement between DWR and PWAs regarding DWR's role in effectuating transfers or exchanges, such as including indemnification and liability language to protect SWP operations, finances, and minimize DWR liability. The effect of the AIP language does not change the existing practice but will modify the contracts to require this language.
Timely Processing for Transfers and Exchanges	No provision.	AIP 3.6 Reiterates DWR's current practice to timely process requests to be incorporated into the schedule to deliver water in the current year, which includes transfer and exchanges of water.
Shortages of Water for Transfers and Exchanges	Article 18(a)	AIP I.3.7 Clarifies that DWR authority regarding shortage of water is unchanged under Article 18(a).
Article 21 Water for Transfers	Article 21 Allows for PWAs to receive Article 21 water delivered for use in that PWA service area under certain conditions	AIP I.3.8 Provides for the transfer of a portion of their Article 21 water by Tulare Lake Basin Water Storage District, Empire Westside Irrigation District, Oak Flat Water District, and Kings County and by the other PWAs at the discretion of the DWR Director and if certain criteria are met.

**TABLE 4-1
SUMMARY OF EXISTING PWA CONTRACTS AND PROPOSED AMENDMENTS FOR WATER TRANSFERS AND EXCHANGES**

	Existing Contracts² Article and Administration of Water Transfers and Exchanges	Proposed Amendment - AIP Item Number³ and Summary
Due Diligence and Compliance with Laws and Regulations for Transfers and Exchanges	Articles 15(a) and 41 DWR and PWAs are subject to compliance with existing law, including requirements for board meetings and compliance with CEQA	AIP 1.4.1 and 1.4.2 The contracts will be modified to reflect that the PWAs shall provide to DWR a resolution or appropriate document to confirm it has complied with all applicable laws and that the transfer/exchange will not harm others or the SWP operations and to follow a transparent process for transfers/exchanges.
Information for Public and PWAs not a party to a Transfer or Exchange	No provision requiring the public posting of transfers and exchanges.	AIP 4.2 Requires availability of PWA information to the public and non-participating PWAs regarding a proposed exchange or transfer.
DWR Director Authority for Transfers and Exchanges	Article 39	AIP 4.3 Consistent with existing authority in the contracts, affirms DWR Director Authority to request and PWA to confirm basic criteria under AIP 3.2 or provide information supporting the basis for the confirmation.
Storing-Transferring Criteria for Transfers and Exchanges	Article 56(c)(4) PWA may not store and sell water in the same year. Art 56(c)(1) PWA must use carryover water in its service area.	AIP 1.5.1 and 1.5.2 PWAs can store and transfer/exchange carryover water in San Luis Reservoir in the same year. PWA may transfer/exchange carryover water to another PWA's service area.
Types of Water for Transfers and Exchanges	Article 56 Table A water and carryover water	AIP 1.5.1 and 1.5.2 PWAs may store and transfer Table A water in same year, may transfer Carryover water, but only in a single year transfer and subject to other limitations
Additional Carryover Water provisions for Transfers and Exchanges	Articles 56(a) and 56(c)(1) (Carryover water cannot be used in an exchange with another PWA; however, two exchange agreements using carryover were approved during recent 5-year drought based on need)	AIP 1.5.2 <ul style="list-style-type: none"> • Carryover water for transfer/exchange does not include Contract Article 12(e) water. • PWA purchasing carryover water must take delivery in its service area and show need, unless an exception is granted. Carryover water for transfer is only for a one-year period. • A PWA can transfer/exchange up to 50% of its carryover water. • A PWA can transfer/exchange more than 50% of its carryover water but must demonstrate that the transfer/exchange of carryover water will not prevent it from meeting critical water needs in the current year, and must obtain approval by DWR Director. • Requirements for Public Posting/Transparency • Process for Exceptions

NOTE:

Stored Water is water stored in SWP Conservation facilities, non-SWP surface storage facilities, out-of-service area groundwater storage, and Contract Article 12(e) water. Carryover water is stored water but *does not include* Contract Article 12(e) water.

4.4.1 Water Transfers and Exchanges

4.4.1.1 Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, as primarily defined in amended Contract Article 56, subject to DWR's approval. The transfer provisions of the proposed project would facilitate the PWAs ability to:

- Transfer SWP water for multiple years without permanently relinquishing that portion of their Annual Table A Amounts;
- negotiate cost compensation and duration among the PWAs on a willing seller-willing buyer basis for water transfers;
- request DWR approval of Transfer Packages; and
- transfer carryover water in San Luis Reservoir.

All these proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning and management of their SWP water supplies. As stated above, the proposed project, however, would not include any change to the PWA's permanent Annual Table A amounts.

Since the Monterey Amendment, DWR has approved short-term water transfers pursuant to Articles 15(a) and 41, and has administered the short-term Turn-Back Water Pool Program⁵ pursuant to Article 56 of the Contracts. The Turn-Back Water Pool Program allows a PWA to sell Table A water that it will not use, subject to certain conditions, for a set price that is either 50 percent or 25 percent of the Delta Water Rate for that year. DWR has also administered, on a demonstration basis, a multi-year water pool program for 2013-2014 and 2015-2016 that allowed PWAs to participate in the two-year program as either a buyer or seller for each of the two years (a decision made at the beginning of each of the two-year programs) with greater compensation for the water than allowed under the Turn-Back Water Pool Program. DWR has allowed transfers of Table A water among two PWAs with the same landowner in their respective service areas that do not include an exchange of money.

The proposed project would remove all language related to the Turn-back Pool from the Contracts and, compared to the Turn-Back Water Pool Program where DWR established the price based on the Delta water rate, the proposed project would revise the Contracts to allow the PWAs to transfer water based on terms they establish for cost

⁵ A program in which PWAs with allocated Table A supplies in excess of their needs in a given year may turn back such supply for purchase by other PWAs that need additional water that year. The Turn-Back Pool can make water available in all types of hydrologic years, although there is generally less excess water turned back in dry year.

compensation and duration. Also, in contrast to the Turn-Back Water Pool Program, a water transfer could be as long as the remainder of the term of the PWA's Contract. In addition, a PWA would be able to store and transfer water in the same year, and transfer up to 50 percent of its carryover water in San Luis Reservoir, but only for a single-year transfer (i.e., a future or multi-year commitment of transferring carryover water is not allowed).

The proposed amendments would result in a greater amount of water transfers among the PWAs than under the current Contract provisions. Based on past experience and discussions with PWAs, most water transfers that occur due to the proposed amendments would occur among the PWAs located south of the Delta and would not involve additional export of SWP water from the Delta. (See Section 5.1 for further information). Water transfers would be implemented using the existing physical facilities and existing operational and regulatory processes, including CEQA compliance.

The following is an example of a multi-year transfer: Two PWAs could enter into a long-term transfer agreement for 20 years where PWA1 would allocate a portion of their Table A water to PWA2 in 2019, and PWA1 would not take delivery of that portion of their Table A water for 20 years. In 2039, when the long-term transfer term expires PWA1 would reclaim that portion of their Table A water. PWA2 would be able to use a portion of PWA1's Table A water for 20 years, but would not permanently rely on that water because it is not a permanent transfer of PWA1's Annual Table A amounts.

4.4.1.2 Water Exchanges

The proposed project would amend the text in Article 56(f) regarding water exchanges to include additional provisions. The proposed exchange provisions of the AIP would establish return ratios (up to a 5:1 ratio) based on a consideration of varying hydrology and would set compensation based on a PWA's SWP charges.

The proposed amendments would allow PWAs to exchange carryover water in San Luis Reservoir, and exchange up to 50 percent of their carryover water in a single-year transaction (i.e., a future or multi-year commitment of exchanging carryover water is not allowed). The proposed provisions would also allow PWAs to conduct water exchanges of carryover water as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to Articles 15(a), 41, and 56(f), the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. Under the proposed project, exchanges may be used more frequently to respond to variations in hydrology, such as wet years, and in single dry-year and multiple dry-year conditions. For example, in a wet year where

water is abundant PWA1 could deliver 2 units of Table A water to willing PWA2 with the intent that PWA1 gets 1 unit of Table A water back in a dry year. The value of the dry year Table A water is worth PWA1 taking a reduction of return Table A water.

4.4.2 California WaterFix Cost Allocation

The proposed project would also amend the Contracts to include provisions that establish how costs for the California WaterFix would be allocated and billed to the PWAs that directly benefit from California WaterFix. The five north of Delta PWAs (City of Yuba, County of Butte, Plumas County FC&WCD, Napa County FC&WCD, and Solano County WA) would not be allocated any costs for the California WaterFix under the California WaterFix cost allocation because they would not be receiving any California WaterFix benefits. If DWR approves the proposed project, DWR would begin including the California WaterFix costs in the participating PWA's statements of charges pursuant to the amendment after execution of the amendment.

Some of the south of Delta agricultural PWAs are expected to satisfy a portion or all of their financial obligations for California WaterFix costs by contracting with other PWAs for additional water transfers under the provisions of the proposed project. The participating PWAs are expected to have a notable increase in their financial obligations for California WaterFix costs that could result in an increase in water transfers to assist some of them, especially the agricultural PWAs, in paying for their allocated California WaterFix costs. However, water transfers would be implemented using the existing SWP and PWA facilities and existing operational and regulatory processes, including CEQA.

4.5 REQUIRED PERMITS AND APPROVALS

Operation of the SWP is subject to ongoing environmental regulations, including water rights, water quality, and endangered species protection, among other State and federal laws and regulations. The proposed project would be consistent with current SWP operations; therefore, no permits or approvals from the State Water Board or related to endangered species are required for the proposed project. DWR is evaluating if any other approvals from other agencies may be required. The proposed project will require approvals by the PWAs and DWR to execute the Contract amendments. See the discussion in Chapter 1, Introduction, on the uses of this DEIR.

Chapter 5

Environmental Analysis



5 ENVIRONMENTAL ANALYSIS

5.1 METHOD OF ANALYSIS

The Environmental Analysis chapter of this DEIR presents analysis of the following resource topics. Each resource topic section contains: (1) a description of the environmental and regulatory setting; (2) methods of analysis; (3) standards of significance used to evaluate the significance of project impacts; and (4) impacts and mitigation measures.

- 5.2 Aesthetics
- 5.3 Agricultural and Forestry Resources
- 5.4 Air Quality
- 5.5 Biological Resources
- 5.6 Cultural Resources
- 5.7 Energy
- 5.8 Geology, Soils, and Mineral Resources
- 5.9 Greenhouse Gas Emissions
- 5.10 Groundwater Hydrology and Water Quality
- 5.11 Hazards and Hazardous Materials
- 5.12 Land Use and Planning
- 5.13 Noise
- 5.14 Population, Employment, and Housing
- 5.15 Public Services and Recreation
- 5.16 Surface Water Hydrology and Water Quality
- 5.17 Transportation
- 5.18 Tribal Cultural Resources
- 5.19 Utilities and Service Systems
- 5.20 Water Supply

The resource topic sections in this chapter provide an explanation of the relationship between the proposed project and the resulting changes in the Contract provisions (as described in Chapter 4, Project Description), and how the changes might affect the physical environment within the study area. The study area used for the analysis in this DEIR is defined as the area located within the SWP Service Area which includes the water delivery facilities of the SWP and service areas of the PWAs that receive water from the SWP (see Chapter 2, State Water Project, Figures 2-1 and 2-2). The study area includes facilities and service areas within the following counties:

- Plumas County
- Butte County
- Yuba County
- Solano County
- Napa County
- Alameda County
- Santa Clara County
- San Joaquin County
- Stanislaus County
- Merced County
- Fresno County
- Kings County
- Kern County
- San Luis Obispo County
- Santa Barbara County
- Ventura County
- Los Angeles County
- San Bernardino County
- Riverside County
- Orange County
- San Diego County

As described in Chapter 4 Project Description, the proposed project would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts that would provide greater water management regarding transfers and exchanges of SWP water supply within the service area; and provide a fair and equitable approach for cost

allocation of California WaterFix facilities to maintain the SWP financial integrity. The proposed project would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts or the SWP total Table A amount.

CEQA and the CEQA Guidelines do not require an economic analysis, and do not recognize financial changes as physical changes to the environment requiring an impact analysis under CEQA. But, economic and social changes can be used to determine if there are physical changes to the environment (CEQA Guidelines Section 15131). Therefore, to fully evaluate and disclose the potential effects to the physical environment, this chapter evaluates the potential physical change in the environment resulting from the proposed contract amendments for each resource topic. The following presents the overall method of analysis used to evaluate impacts in each of the resource topic sections.

5.1.1 Method of Analysis

5.1.1.1 CEQA Standards of Significance

The physical and regulatory setting provides a point of reference for assessing the environmental impacts of the proposed project. Standards of Significance used in this DEIR include the questions presented in Appendix G of the CEQA Guidelines; criteria based on factual or scientific information; criteria based on regulatory standards of local, State, and federal agencies; and criteria adopted by DWR. The Standards of Significance were the criteria used to determine at what level or "threshold" an impact would be considered significant. In determining the level of significance, the analysis assumes that the proposed project would comply with relevant federal, State, and local regulations and ordinances.

5.1.1.2 Information Gathered for Impact Analysis

Information was gathered from PWAs regarding the proposed project between August 2018 through October 2018 by phone interviews with PWA representatives or written documents submitted to DWR by PWAs. All participating PWAs were asked the following:

- In your agency service area, are there existing local ordinances, regulatory requirements, or other related issues unique to the area that should be considered in DWR's environmental impact analysis?
- What information should DWR use when describing the current status of surface water and groundwater management plans for your service area or county?
- Please describe any reasonably foreseeable changes in your agency's use of water transfers from the proposed amendments.

- Please describe any reasonably foreseeable changes in your agency's use of exchanges from the proposed amendments.
- Please describe any actions you reasonably foresee in your service area that could directly or indirectly cause a physical change to the environment that would result from the proposed amendments for water transfers.
- Please describe any actions you reasonably foresee in your service area that could directly or indirectly cause a physical change to the environment that would result from the proposed amendments for exchanges.

Out of the 29 PWAs, 22 participated in phone interviews with DWR and several also provided written information; 2 provided only written information; 3 have been contacted, but the interview has not been scheduled; and 2 opted not to participate.

Many PWAs stated that they did not reasonably foresee any direct or indirect changes to the physical environment as a result of the implementation of the proposed project. Several PWAs stated that changes to the frequency and timing of Table A water and/or Article 21 water supply moving among the PWAs may occur as a result of implementation of the proposed project. Some PWAs stated that the proposed project may help stabilize water supply in their service area; allow greater flexibility to use water when needed and be able to transfer/exchange the water when it is not needed; relieve the financial burden of WaterFix; result in transfer of SWP water from agricultural to M&I PWAs with possible fallowing of agricultural land and/or changes in cropping patterns (e.g., switching from high water-using crops to low water-using crops); and encourage PWAs to use exchanged/transferred SWP water instead of local groundwater or use local groundwater so that a portion of the PWAs SWP water can be delivered to another PWA.

This information was taken into consideration during the resource area impact analysis in Sections 5.2 through 5.20.

5.1.1.3 Assumptions for the Analysis

The resource topics presented in the sections of this chapter include an evaluation of the proposed project's potential to result in a substantial or potentially substantial adverse change in any of the physical conditions within the proposed project study area (CEQA Guidelines Section 15382). The analysis assesses potential effects (or impacts) of a physical change (consistent with CEQA Guidelines Section 15358(b)) attributed to implementation of the proposed project compared to the baseline conditions that existed at the time of release of the NOP (July 2018) (CEQA Guidelines Section 15162.2). The determination of significance is based on whether or not an impact exceeds the standards (or thresholds) of significance identified in each section. As required under

CEQA Guidelines Section 15126.4, this EIR describes feasible mitigation measures which would minimize any identified significant adverse impacts.

As stated previously, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build or modify existing SWP facilities and would not change each PWA's contractual maximum Table A amounts. DWR would continue to maintain and operate the SWP and deliver total available supplies to the PWAs consistent with the Contract terms and all regulatory requirements.

As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in a direct or indirect physical change to the environment. For example, proposed administrative changes to the Contracts, such as DWR's review of a proposed transfer package, changes in the dispute resolution process, or adding a Contract requirement for the PWAs to present information to the public and non-participating PWAs are contractual modifications that would not result in direct or indirect effects to the environment. Therefore, these types of proposed amendments are not further evaluated in this DEIR. See Table 4-1 in Chapter 4 Project Description for a summary of the existing PWA Water Supply Contracts and the proposed amendments related to water transfers and exchanges.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency and timing of Table A water and/or Article 21 water supply moving among the PWAs that could result in changes to the physical environment. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, the analysis in this DEIR is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

The resource area impact analyses assume the following related to transfers and exchanges.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into additional water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning

of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur among the PWAs located south of the Delta and would not involve additional export of SWP water from the Delta. However, the proposed amendments would not preclude transfers among the north of Delta PWAs or between north of Delta PWAs and south of Delta PWAs.

The proposed project would revise the Contract to allow the PWAs to transfer water based on terms they establish for cost compensation and duration. A PWA would be able to store and transfer water in the same year, and transfer up to 50 percent of its carryover water, but only for a single-year transfer (i.e. a future or multi-year commitment of transferring carryover water is not allowed). In contrast to the Turn-Back Water Pool Program, a water transfer under the proposed project could be as long as the remainder of the term of the PWA's Contract.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs to transfer a portion of their SWP water under the provisions of the proposed project. This could result in an increase in transfer from existing conditions.

After operation of California WaterFix begins, the water transfers that would occur due to the proposed project could then use the California WaterFix facilities. These facilities have undergone separate CEQA review and other required environmental permitting.

However, if the new facilities became operational and improve SWP water supply reliability, the proposed project would only facilitate movement of water among PWAs and not be the reason for development of new water supplies.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. The proposed amendments would allow PWAs to exchange carryover water in San Luis Reservoir, and exchange up to 50% of its carryover water in a single-year transaction (i.e. a future or multi-year commitment of exchanging carryover water is not allowed).

While DWR has approved and administered water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year conditions when less SWP water might be available. As with transfers, it is anticipated that most exchanges would occur among the PWAs located south of the Delta and would not involve additional export of water from the Delta. However, it is still possible that north of Delta PWAs could also engage in increased exchanges under the proposed amendment (either among two north of Delta PWAs or among a north of Delta PWA and a south of Delta PWA). The effects of exchanges on the physical environment are analyzed in this DEIR similar to transfers, due to the time it may take for the exchange water to be returned to a PWA. For example, in an exchange PWA1 could convey water to PWA2, but not receive the return water within the same year or for several years, or even up to 10 years or longer if DWR approved an extension of the applicable exchange agreement. Therefore, analysis in this DEIR takes a conservative approach to exchanges and assumes that water may not come back for immediate use by the PWA originating the exchange.

Potential Changes to the Physical Environment Analyzed in this DEIR

The proposed project could increase the frequency, duration, and timing of water transfers and exchanges. The increase in transfers and exchanges could occur immediately after execution of the proposed project amendments. The increase in transfers could potentially result in less SWP water supplied to agricultural PWAs and more to M&I PWAs. Most of the transfers and exchanges would be expected to occur south of the Delta and therefore would not affect SWP operations in the Delta. For any north of Delta to south of Delta transfers or exchanges, the additional increment of SWP water transferred or exchanged and exported from the Delta potentially would result in a slight increase in exports but would be within existing operations.

Some increases in water transfers are expected to occur as a method for some south of Delta PWAs to pay their share of the proposed allocation of costs of California WaterFix facilities. With these transfers, certain south of Delta agricultural PWAs could enter into multi-year transfer agreements with M&I PWAs to transfer some or all of the incremental water associated with California WaterFix. Such transfer arrangements would not affect Delta operations as they would occur among south of Delta PWAs. In addition, if the transfer is only of this incremental amount, then the transfer would not result in a decrease of the SWP water otherwise supplied to the agricultural PWAs. Such transfers could; however, result in increased water supplies to M&I PWAs.

The environmental effects of an increase in water reliability due to operation of California WaterFix are not part of this project and were evaluated in the California WaterFix EIR/EIS, and is not evaluated in this DEIR. If the new facilities became operational and improve SWP water supply reliability, the proposed project would only facilitate movement of water among PWAs and not be the reason for development of new water supplies.

The analysis in this DEIR evaluates potential changes to the physical environment with implementation of the proposed amendments associated with the potential changes to the frequency and timing of Table A water and/or Article 21 water moving among the PWAs. The potential changes that are considered and evaluated in each of the resource sections, as applicable include:

- increased fallowing of agricultural land or changes in cropping patterns (switch from higher water-using crops to lower water-using crops);
- changes in groundwater pumping;
- changes in flows above or below SWP points of diversions; and
- changes in San Luis Reservoir water levels due to transfers and exchanges of carryover water.

These potential changes are analyzed generally because DWR does not know the amounts to be transferred and exchanged among the PWAs. In addition, there are varying scenarios regarding water use and the transfer of water that could occur, such as a PWA might transfer a portion of its SWP water in excess to its needs, or it could transfer a portion of SWP water and use another source of water such as groundwater in place of surface water. Given that these are reasonably foreseeable choices a PWA may make, the various scenarios are considered in the analysis.

5.1.2 Section Format

Each DEIR section contains the following elements: (1) introduction to the analysis contained in the section (including a summary of the nature of comments received in response to the NOP; (2) environmental setting; (3) regulatory setting; (4) methods of analysis; (5) thresholds of significance used to evaluate the significance of proposed project impacts; (6) impacts not further evaluated; and/or (7) impacts and mitigation measures. The environmental setting and regulatory setting descriptions provide a point of reference for assessing the environmental impacts of the proposed project. The setting discussion is followed by an impacts and mitigation discussion. Preceding each impact and mitigation measure discussion is a summary table that lists the impacts identified and the significance conclusion with implementation of mitigation measures.

5.1.3 Impacts and Mitigation Measures

Each impact discussion includes an impact statement, an explanation of the impact for each proposed amendment in the study area, an analysis of the significance of the impact prior to mitigation, an identification of feasible mitigation measures, if appropriate, an evaluation of whether the identified mitigation measures would reduce the identified impact to a less-than-significant level, and an impact conclusion. Cumulative impacts are discussed in Chapter 6 Cumulative Impacts. A range of reasonable alternatives to the proposed project are discussed in Chapter 7 Alternatives.

5.1.4 Impact Discussion Format

Each impact discussion includes an impact statement (in bold text) and is assigned a number based on the resource section and the order in which they appear (for example, 5.2.1, 5.2.2, etc.).

- The impact discussions are organized as follows:
 - Water transfers
 - Water exchanges
- Identification of mitigation measures, if applicable.
- Impact conclusions are presented following discussion of mitigation measures, if applicable.

5.1.5 Terminology

This DEIR uses the following terminology:

- **Thresholds of Significance:** The set of criteria used by the DWR to determine at what level or “threshold” an impact would be considered significant. Thresholds of Significance used in this DEIR include those discussed in Appendix G of the State CEQA Guidelines; criteria based on factual or scientific information; criteria based on regulatory standards of local, State, and federal agencies; and criteria adopted by DWR. In determining the level of significance, the analysis assumes that relevant federal, State, and local regulations and ordinances would be complied with.
- **Less-than-Significant Impact:** An impact is considered less than significant when it does not reach the threshold of significance and would, therefore, cause no substantial adverse change in the physical environment and no mitigation would be required.
- **Significant Impact:** An impact is considered significant if it would result in a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by evaluating the effects of the proposed project

in the context of specified thresholds of significance. Mitigation measures are identified to reduce these effects to the environment where feasible.

- Significant and Unavoidable Impact: An impact is considered significant and unavoidable if it would result in a substantial adverse change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level.
- Mitigation Measures: The State CEQA Guidelines (Section 15370) define mitigation as:
 - 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; and
 - Compensating for the impact by replacing or providing substitute resources or environments.

5.2 AESTHETICS

5.2.1 Introduction

This section addresses aesthetic resources in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments related to aesthetics were received in response to the NOP (see Appendix B).

5.2.2 Environmental Setting

Visual or aesthetic resources are comprised of both the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. As described in Chapter 2, State Water Project, the SWP is a complex system of reservoirs, dams, power plants, pumping plants, pipelines, and aqueducts that delivers water to PWAs throughout Northern California, the San Joaquin Valley, San Francisco Bay Area, Central Coast Area, and Southern California. SWP facilities include small reservoirs in the northern part of the State, which are primarily used for recreation (Lake Davis, Frenchman Lake, and Antelope Lake), and downstream reservoirs that are primarily used for storage but are also accessed for recreation, including but not limited to Lake Oroville, San Luis Reservoir, Lake Perris, and Castaic Lake. Public use of these reservoirs includes picnic areas, camping, fishing, and boating.

Surface elevation of reservoir water affects the aesthetic (visual) character of SWP reservoirs. When a reservoir is at or near its maximum operating storage level, the water surface generally meets fully vegetated shorelines. As drawdown occurs during the summer and fall, an increasingly broad ring of unvegetated shoreline appears. In narrow or steep-sided branches of the reservoirs, large drawdowns can create conditions in which it appears a reservoir is set within a deep, red-sided canyon. In places where slopes are gradual, areas that appear to be mudflats are created.

SWP conveyance facilities include the use of natural stream channels in Northern California (Sacramento River and Feather River) that deliver water to the Delta, where it is pumped to the California Aqueduct system for delivery to the PWAs located south of the Delta. Surrounding land uses include agricultural, residential, commercial, industrial, and open space uses. Large portions of the California Aqueduct are visible to vehicle travelers on Interstate 5 (I-5) as it winds along the west side of the San Joaquin Valley.

5.2.2.1 Wild and Scenic Rivers

A designated wild and scenic river is one that has remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (see the Regulatory Setting subsection for further description). As currently reported on the federal website

rivers.gov, there are several federally designated wild and scenic rivers within the study area, including Feather River, lower American River, Cosumnes River, and Kern River.

5.2.2.2 Scenic Highways

A scenic highway designation is based on the scenic quality of the landscape, the amount of a natural landscape that can be seen by travelers, and the extent to which development intrudes upon the landscape (see the Regulatory Setting subsection for further description). There are several scenic highways within the vicinity of the study area, including portions of State Route (SR) 1 and I-5.

5.2.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on aesthetics and visual resources.

5.2.3.1 Federal

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (WSRA) of 1968, as amended (Public Law 90-542; 16 U.S. Code 12371–1287), established the National Wild and Scenic Rivers System, which identifies distinguished rivers of the nation that possess remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The WSRA preserves the free-flowing condition of rivers that are designated and protects their local environments. Section 5(d)(1) of the WSRA requires that all federal agencies, when planning for the use and development of water and related land resources, consider potential national wild, scenic, and recreational river areas, which are defined as follows (National Wild and Scenic Rivers System 2015):

- **“Wild” river areas** – Those rivers or sections of rivers that are free of impoundments and are generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- **“Scenic” river areas** – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- **“Recreational” river areas** – 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. Scenic qualities are a major consideration in the designation of rivers as wild (pristine), scenic (largely undeveloped), or recreational (mostly developed), although river segments in any of the three categories typically maintain high scenic qualities.

5.2.3.2 State

California Scenic Highway Program

The California Scenic Highway Program, which began in 1963, was created to enhance and protect scenic highways and adjacent corridors. A scenic highway designation is based on the scenic quality of the landscape, the amount of natural landscape that can be seen by travelers, and the extent to which development intrudes upon the landscape. Official designation requires a local jurisdiction to enact a scenic corridor protection program that protects and enhances scenic resources). This program is under the jurisdiction of the California Department of Transportation.

5.2.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address visual resources.

5.2.4 Impact Analysis

5.2.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing visual resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could adversely affect a scenic resource or change the visual character in the study area. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this visual analysis is programmatic, focusing on the types of reasonably foreseeable

changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.2.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to visual resources is considered significant if the proposed project would do any of the following:

- 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
- Substantially degrade the existing visual character or quality of the site and its surroundings
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area

5.2.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no short-term effects on scenic vistas and/or changes to visual character, damage to scenic resources, or creation of new sources of light and glare. Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent changes to scenic vistas, visual character, or damage to scenic resources. There would also be no new sources of light and glare. As a result, no impacts associated with construction and operation of new or modified facilities would occur and no mitigation measures are required. Therefore, these impacts are not further evaluated in this DEIR.

5.2.4.4 Impacts and Mitigation Measures

Table 5.2-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.2-1
SUMMARY OF IMPACTS CONCLUSIONS – AESTHETICS**

Impact Statement	Transfers	Exchanges
5.2-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in degradation of the visual character or adversely affect scenic vistas and scenic resources in the study area.	LTS	LTS
LTS: Less than Significant		

Impact 5.2-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in degradation of the visual character or adversely affect scenic vistas and scenic resources in the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water transfers are not expected to substantially affect the

acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing of agricultural land or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water exchanges are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Impact Conclusion

It is possible that transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in cropping patterns in the study area; however, this would not change the existing agricultural land use designations in the study area because the land use would remain agricultural. Therefore, the fallowing of agricultural land and/or change in crop patterns as a result of the proposed amendments would not be anticipated to substantially degrade the existing visual character or adversely affect scenic vistas and scenic resources in the study area and these impacts would be **less than significant**.

Mitigation Measures

None required.

5.2.5 References

National Wild and Scenic Rivers System. 2015. California. Available: www.rivers.gov/california.php. Accessed July 22, 2015.

5.3 AGRICULTURAL AND FOREST RESOURCES

5.3.1 Introduction

This section addresses the impacts to agricultural and forestry resources in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments addressing agriculture and forest resources were received in response to the NOP (see Appendix B).

5.3.2 Environmental Setting

Agricultural Resources

The California Department of Conservation (DOC) administers the Farmland Mapping and Monitoring Program (FMMP), California's statewide agricultural land inventory. Through this mapping effort, the DOC classifies farmland into four categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Prime Farmland are those lands with the best combination of physical and chemical features able to sustain long-term agricultural production; Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, including greater slopes or less ability to store soil moisture; Unique Farmland has lesser quality soils and is used for the production of the State's leading agricultural crops; and Farmland of Local Importance and lands important to the local agricultural economy is determined by the county board of supervisors for each county in which such farmland exists and by local advisory committees (DOC 2015).

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open-space use. In return, landowners receive property tax assessments that are much lower than normal because they are based upon farming and open-space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the State via the Open Space Subvention Act of 1971. By State law, only land located in an agricultural preserve is eligible for a Williamson Act contract.

Approximately 750,000 acres of agricultural land, primarily in the San Joaquin Valley, is irrigated with water delivered by the SWP. Agricultural lands in the study area include those designated as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. There are also lands under Williamson Act contract. Agricultural land uses support a variety of crops, including but not limited to, grapes, nursery products, hay, corn, tomatoes, rice, almonds, walnuts, and other vegetables. Other agricultural uses

include dairies, livestock grazing, agricultural industrial uses, and agricultural commercial uses.

According to the DOC *2010–2012 California Farmland Conversion Report*, irrigated farmland in California decreased by approximately 58,587 acres between 2010 and 2012 with loss of Prime Farmland comprising 81 percent of the total loss (DOC 2015). Conversion to urban development was approximately 29,342 acres of the total reduction in irrigated farmland acreage, with natural vegetation or vacant lands accounting for the majority of the total reduction during this period. The southern San Joaquin Valley and counties in the Delta had the largest proportion of direct irrigated land to urban land conversion (47 percent of its total urban increase). Losses of irrigated farmland have resulted in part from drought and salinity-related reductions in water supply and from reclassification of lands. During this same 2010–2012 period, there was a net increase in irrigated farmland that occurred in seven of the San Joaquin Counties and Yolo County. These increases were primarily due to planting of new almonds, vineyards, and row crop plantings in the San Joaquin Counties and high density olive orchards in the Sacramento Valley.

Forest Land

Forest land is defined as native tree cover greater than 10 percent that allows for management of timber, aesthetics, fish and wildlife, recreation, and other public benefits (California Public Resources Code [PRC] Section 12220(g)). Natural forest and woodland vegetation types in the study area typically have greater than 10 percent cover by native trees. Timberland, a subset of forest land, is defined by State law as land that is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products (PRC Section 4526), and can produce an average annual volume of wood fiber of at least 20 cubic feet per acre per year at its maximum production (PRC Section 51104(g)).

Forests can serve as high-quality habitat for fish and wildlife species, sequester carbon to mitigate climate change effects, capture vital runoff for agricultural and domestic water supply, and provide a variety of outdoor recreation and education opportunities. Many rural communities depend on income and employment opportunities resulting from working timber industries, or on amenity values that support a tourist industry and attract new residents seeking a better lifestyle. In metropolitan areas, urban forests contribute to improved air quality, cooling of heat islands for energy conservation, and local employment (CAL FIRE 2010). Portions of the study area are located within forest land, including the Los Padres and Angeles National Forests.

5.3.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on agriculture and forest resources.

5.3.3.1 Federal

Federal Farmland Protection Act Policy

The U.S. Natural Resources Conservation Service (NRCS), within the U.S. Department of Agriculture, is primarily responsible for implementing and administering the Federal Farmland Protection Policy Act. This law is intended to minimize federal contributions to the conversion of farmland to nonagricultural uses by ensuring that federal programs are administered in a manner compatible with state government, local government, and private programs designed to protect farmland. For the purposes of the law, federal programs include construction projects—such as highways, airports, dams, flood protection projects, and federal buildings—sponsored or financed in whole or part by the federal government, and the management of federal lands.

5.3.3.2 State

California Farmland Conservancy Program

The DOC's California Farmland Conservancy Program (CFCP) was established in 1996 to encourage the permanent conservation of productive agricultural lands in collaboration with local entities. In creating the CFCP, the California Legislature recognized the important contribution that farmland makes to the State's food supply and the additional benefits that farmland provides—conserving wildlife habitat, protecting wetlands, and preserving scenic open space. The CFCP supports local efforts to conserve farmland by providing grant funds for the purchase of agricultural conservation easements. Agricultural conservation easements are deed restrictions 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. Grant funds are made available through a competitive process to qualified entities, including nonprofit land trusts and local governments, to purchase conservation easements from landowners. The CFCP also provides planning and technical assistance grants to these same qualified local entities to facilitate development of local and regional farmland conservation strategies.

Important Farmland

The DOC, in conjunction with NRCS, has adopted categorical definitions of Important Farmland for purposes of land use inventories. These definitions recognize the land's suitability for agricultural production, rather than only reflecting the physical and

chemical characteristics of the soil. To this end, the FMMP was established, and the Important Farmland Map Series was developed based on NRCS soil surveys. These maps classify land into categories (DOC 2016):

- *Prime Farmland* is land that has the best combination of physical and chemical characteristics for crop production, as well as high soil quality, appropriate growing season, and adequate moisture supply to sustained high crop yields.
- *Farmland of Statewide Importance* is land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production. The definition is similar to that for Prime Farmland except that crop production characteristics are considered good; not the best.
- *Unique Farmland* does not meet the definition of either Prime Farmland or Farmland of Statewide Importance, but it is land that is being used for specific crops of high economic value. This farmland type has a special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high-quality or high yields of specific crops.

Important Farmland is defined in Appendix G of the CEQA Guidelines as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. These farmland types are defined together under the term “Agricultural Land” in CEQA (PRC Sections 21060.1 and 21095; CEQA Guidelines, Appendix G).

Williamson Act

The Williamson Act is one of the State’s primary agricultural conservation tools. Under this law, local governments can enter into contracts with private property owners to protect land (within agricultural preserves) for agricultural and open space purposes. Williamson Act contracts are required to be a minimum initial term of 10 years, and are automatically extended each year for an additional year, unless either party (landowner or the contracting city or county) notifies the other of the intent not to renew the contract. Of California’s 58 counties, 53 have adopted the Williamson Act program. Farmland Security Zone (FSZ) lands were authorized by a 1998 amendment to the Williamson Act with the same general intent as Williamson Act contracts. Under FSZ provisions, the landowner agrees to keep land that is threatened by development in agricultural use for at least 20 years; in return, the landowner receives the benefits of lower property tax bills, parcel tax exemptions, annexation exemptions, and exemptions from school use. Accordingly, FSZs increase both the duration and the protection of Williamson Act status. An FSZ must be located in an agricultural preserve (an area designated as eligible for a Williamson Act contract). Agricultural landowners in FSZs must enter into contracts with counties for a minimum term of 20 years that are also renewed automatically each year, and these landowners are ensured an additional 35 percent tax benefit over and above the standard Williamson Act contract. The FSZ program has

been adopted by 25 counties, although not all of those counties have executed contracts.

Forest Land, Timberland, and the Forest Taxation Reform Act

As stated previously, forest land is defined as native tree cover greater than 10 percent that allows for management of timber, aesthetics, fish and wildlife, recreation, and other public benefits (PRC Section 12220(g)). A subset of forest land, timberland is land that is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products (PRC Section 4526), and that can produce an average annual volume of wood fiber of at least 20 cubic feet per acre per year at its maximum production (PRC Section 51104(g)). The Forest Taxation Reform Act, enacted in 1976, provides guidelines that allow cities and counties with qualifying timberland to adopt Timber Production Zones (TPZs) that protect timberlands from incompatible uses. TPZs are privately owned land or land acquired for State forest purposes. When a TPZ is established, a private landowner agrees to commit the land to forest production for 10 years. In return, the approving jurisdiction grants the landowner a 35 percent reduction in property taxes. The California Department of Forestry and Fire Protection has jurisdiction over timber harvest and timberland conversion decisions in TPZs, which it passes down to county agriculture departments.

5.3.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address policies that preserve and guide development of agriculture and forestry.

5.3.4 Impacts Analysis

5.3.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include

administrative modifications that would not result in direct or indirect physical changes to agriculture and forestry resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could adversely affect agriculture and forestry resources in the study area. However, the timing of available Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this visual analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.3.4.2 Thresholds of Significance

In accordance with Appendix G of the California Environmental Quality Act (CEQA) Guidelines, an impact related to agriculture and forestry resources is considered significant if the proposed project would do any of the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to non-agricultural use;
- Conflict with existing Williamson Act contracts;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- Result in the loss of forest land or conversion of forest land to non-forest use; or,
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

5.3.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no conversion of agricultural

uses or conflict or loss of forestry resources. Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent changes to agriculture or forestry resources. As a result, no impacts associated with construction and operation of new or modified facilities would occur and no mitigation measures are required. Therefore, these impacts are not further evaluated in this DEIR.

5.3.4.4 Impacts and Mitigation Measures

Table 5.3-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.3-1
SUMMARY OF IMPACTS CONCLUSIONS – AGRICULTURE AND FORESTRY RESOURCES**

Impact Statement	Transfers	Exchanges
5.3-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in the conversion of agricultural land to non-agricultural uses.	LTS	LTS
LTS: Less than Significant		

Impact 5.3-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in the conversion of agricultural land to non-agricultural uses.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water transfers are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing of agricultural land or changing crop patterns would not affect the existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water exchanges are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Impact Conclusion

It is possible that transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in cropping patterns in the study area; however, this would not change the existing agricultural land use in the study area because the land would remain agricultural use. Therefore, the fallowing of agricultural land or changing crop patterns as a result of an increase in the amount of water transfers and exchanges would not be anticipated to result in the conversion of

agricultural land to non-agricultural use or the permanent loss of agriculture resources (i.e., farmlands) in the study area; therefore, impacts would be **less than significant**.

Mitigation Measures

None required.

5.3.5 References

CAL FIRE (California Department of Forestry and Fire Protection). 2010. Fire and Resource Assessment Program. California's Forests and Rangelands: 2010 Assessment. June 2010.

DOC (California Department of Conservation). 2015. California Farmland Conversion Report 2010-2012. Available: http://www.conservation.ca.gov/dlrp/fmmp/Pages/FMMP_2010-2012_FCR.aspx. Accessed July 2, 2018.

DOC 2016. Important Farmland Categories. Available: www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx. Accessed May 21, 2016.

5.4 AIR QUALITY

5.4.1 Introduction

This section addresses air emissions in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments specifically addressing air quality were received in response to the NOP (see Appendix B).

5.4.2 Environmental Setting

5.4.2.1 California Climate and Meteorology

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 (e.g., wind speed, wind direction, and air temperature) in combination with local surface topography (e.g., geographic features such as mountains and valleys) determine how air pollutant emissions affect local air quality.

Because of the strong influence of the Pacific Ocean and mountains, variations in climate in California run in a general east-to-west direction. California's climate varies from Mediterranean (most of the State) to steppe (scattered foothill areas), to alpine (high Sierra), to desert (Colorado and Mojave Deserts).

The Sierra Nevada, Northern Coast, Southern Coast, Cascade, Transverse, and Peninsular mountain ranges act as barriers to the passage of air masses. During summer, California is protected from much of the hot, dry air masses that develop over the central United States. Because of these barriers, and California's western border of the Pacific Ocean, summer weather in portions of the State is generally milder than that in the rest of the country and is characterized by dry, sunny conditions with infrequent rain. In winter, the same mountain ranges prevent cold, dry air masses from moving into California from the central areas of the United States. Consequently, winters in California are also milder than would be expected at these latitudes.

5.4.2.2 Criteria Air Pollutants

As required by the federal Clean Air Act (FCAA) passed in 1970, the U.S. Environmental Protection Agency (USEPA) has identified six criteria air pollutants for which state and national health-based ambient air quality standards have been established. The USEPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), and lead are the six criteria air pollutants. Notably, particulate matter is measured in two size ranges:

PM10 for particles less than 10 microns in diameter, and PM2.5 for particles less than 2.5 microns in diameter.

5.4.2.3 Toxic Air Contaminants

Toxic air contaminants (TACs) are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic and/or carcinogenic) adverse human health effects (i.e., injury or illness). TACs are substances for which federal or State criteria air pollutant standards have not been adopted. Thus, for TACs, there is no federal or State ambient air quality standard against which to measure a project's air quality impacts. For this reason, TACs are analyzed by performing a health risk assessment. TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources, including diesel-fueled engines, gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations.

5.4.2.4 Odorous Emissions

Although odors rarely cause any physical harm, they still remain unpleasant and can lead to public distress, generating complaints. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

5.4.2.5 Sensitive Receptors

Air quality does not affect individuals or groups of individuals in the same way. Some groups are more sensitive to adverse health effects caused by exposure to air pollutants than others. The elderly and the young tend to be more sensitive to the health effects of air pollutants, as are those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public 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 reduce overall 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 must follow regulations set forth

by the Occupation Safety and Health Administration to ensure the health and well-being of their employees.

5.4.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on air quality.

5.4.3.1 Federal

Criteria Pollutants

The 1970 FCAA (last amended in 1990) required that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all national ambient standards by the deadlines specified in the FCAA. These ambient air quality standards are intended to protect public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed. **Table 5.4-1** presents current national and state ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant. Pursuant to the 1990 Federal Clean Air Act Amendments (FCAAA), the USEPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the National Ambient Air Quality Standards (NAAQS) has been achieved. "Unclassified" is defined by the FCAAA 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.

The FCAA required each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The FCAAA added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. 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 USEPA has the responsibility to review all states' SIPs to determine if they conform to the mandates of the FCAAA and will achieve air quality goals when implemented. If the USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation

**TABLE 5.4-1
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES**

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NOx) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
	8 hours	0.07 ppm	0.07 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	---	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	---	0.030 ppm		
Respirable Particulate Matter (PM10)	24 hours	50 ug/m ³	150 ug/m ³	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 ug/m ³	---		
Fine Particulate Matter (PM2.5)	24 hours	---	35 ug/m ³	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.
	Annual Avg.	12 ug/m ³	12 ug/m ³		
Lead	Monthly Avg.	1.5 ug/m ³	---	Disturbs gastrointestinal system and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present sources: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 ug/m ³		
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal power plants, petroleum production, and refining.
Sulfates	24 hour	25 ug/m ³	No National Standard	Breathing difficulties, aggravates asthma, reduced visibility	Produced by the reaction in the air of SO ₂ .
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See PM2.5.

NOTES:

ppm = parts per million; ug/m³ = micrograms per cubic meter.SOURCE: California Air Resources Board, 2016. Ambient Air Quality Standards. www.arb.ca.gov/research/aaqs/aaqs2.pdf. Standards last updated May 2016; California Air Resources Board, 2009. ARB Fact Sheet: Air Pollution Sources, Effects and Control. www.arb.ca.gov/research/health/fs/fs2/fs2.htm. Page last reviewed by CARB December 2009.

Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

Toxic Air Contaminants

TACs are regulated under both state and federal laws. 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. Both terms encompass essentially the same compounds. The 1977 FCAAA required USEPA to identify National Emission Standards for Hazardous Air Pollutants to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 FCAAA, 189 substances are regulated as HAPs.

5.4.3.2 State

Criteria Pollutants

Although the FCAA established the NAAQS, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already adopted its own air quality standards when federal standards were established, and because of the unique meteorology in California, there is considerable diversity between the State standards and NAAQS, as shown in Table 5.4-1. 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 toward attainment.

Toxic Air Contaminants

The California Health and Safety Code defines TACs as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a present or potential hazard to human health. The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) HAPs adopted in accordance with AB 2728. The Air Toxics “Hot Spots” Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however,

AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. “High-priority” facilities are required to perform a health risk assessment, and if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, the California Air Resources Board (CARB) approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk by 2020 as compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel. Subsequent CARB regulations and programs regarding diesel emissions include the On-Road Heavy-Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road 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.

5.4.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Enforcement of the FCAA through permitting of all air pollution and emissions from stationary sources (non-vehicular sources), rests primarily with the local and regional air pollution control authorities known as Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMDs). These local air districts issue permits for construction and operation of facilities. SWP facilities are located within the jurisdictions of multiple local air districts.

Individual air districts or groups of air districts prepare air quality management plans designed to bring an air basin into compliance for nonattainment criteria pollutants. Those plans are submitted to the CARB for approval and usually contain an emissions inventory and a list of rules proposed for adoption. Furthermore, each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address air quality.

5.4.4 Impacts Analysis

5.4.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA’s

Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing air emissions.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to existing land uses, which could impact air quality in the study area. However, the timing of available Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this air emissions analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.4.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to air emissions is considered significant if the proposed project would do any of the following:

- conflict with or obstruct implementation of applicable air quality plans;
- violate any air quality standards or contribute substantially to an existing or projected air quality violation;
- cause cumulatively considerable net increases of any criteria pollutant for which an affected region is in non-attainment under applicable federal or state ambient air quality standards;
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

5.4.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and

use of equipment) would not occur and there would be no short-term increases in criteria air pollutants, TAC or odors that could exceed ambient air quality standards or expose sensitive receptors to pollutants. Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent increase in criteria air pollutants, TAC or odors that could exceed ambient air quality standards or expose sensitive receptors to pollutants. Therefore, there would be no conflict with applicable air quality plans. As a result, no impacts associated with construction and operation of new or modified facilities would occur and no mitigation measures are required. Therefore, these impacts are not further evaluated in this DEIR.

5.4.4.4 Impacts and Mitigation Measures

Table 5.4-2 summarizes the impact conclusions presented in this section by for easy reference.

**TABLE 5.4-2
SUMMARY OF IMPACTS CONCLUSIONS – AIR QUALITY**

Impact Statement	Transfers	Exchanges
5.4-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges by PWAs could result in changes in existing land use practices that could increase the amount of criteria air emissions.	LTS	LTS
LTS: Less than Significant		

Impact 5.4-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges by PWAs could result in changes in existing land use practices that could increase the amount of criteria air emissions.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of how costs to the south of Delta PWAs for California WaterFix would be allocated. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. As discussed in Section 5.8 Geology, Soils, and Mineral Resources, land that is fallowed or idled is more susceptible to soil erosion because there is reduced vegetative cover to secure the soil and prevent soils from being blown or washed away. This could result in an increase in particulate matter at levels that could violate air quality standards. However, additional water transfers are not expected to substantially affect soil erosion because, as discussed in Section 5.2 Agricultural and Forest Resources, these lands would remain in agricultural use as dry farmed or fallow land. Furthermore, additional water transfers are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. As discussed in Section 5.8 Geology, Soils, and Mineral Resources, land that is fallowed or idled is more susceptible to soil erosion because there is reduced vegetative cover to secure the soil

and prevent soils from being blown or washed away. This could result in an increase in particulate matter at levels that could violate air quality standards. However, additional water exchanges are not expected to substantially affect soil erosion because, as discussed in Section 5.3 Agricultural and Forest Resources, these lands would remain in agricultural use as dry farmed or fallow land. Furthermore, additional water exchanges are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Impact Conclusion

It is possible that transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands or changing crop patterns which could lead to a reduction of vegetation cover resulting in an increase in particulate matter due to an increase rate of soil erosion. However, these changes would not be considered significant because these lands would remain in agricultural use as dry farmed or fallow land. Therefore, changes in agricultural practices would not be expected to result in a substantial change in soil disturbance and associated particulate matter that could violate air quality standards as a result of the proposed project. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

5.4.5 References

CARB (California Air Resources Board), 2016. Ambient Air Quality Standards. www.arb.ca.gov/research/aaqs/aaqs2.pdf. Standards last updated May 2016; California Air Resources Board, 2009. ARB Fact Sheet: Air Pollution Sources, Effects and Control. www.arb.ca.gov/research/health/fs/fs2/fs2.htm. Page last reviewed by CARB December 2009.

5.5 BIOLOGICAL RESOURCES

5.5.1 Introduction

This section addresses biological resources in the study area and the potential changes that could occur as a result of implementing the proposed project. Comments were received in response to the NOP on the topic of biological resources (see Appendix B). Specifically, comments stated that the Delta ecosystem is in decline and needs increased flows (and reduced diversions) to recover.

5.5.2 Environmental Setting

The study area covers a broad area of California with widely varying topography, vegetation, and weather. As a result, the habitat types that support terrestrial and aquatic resources in the study area are numerous and varied. This section provides a description of the sensitive biological resources that are present within the study area. The sub-sections below discuss the resources found in the broad categories of riverine, lacustrine, estuarine and terrestrial habitats.

5.5.2.1 Riverine Habitat

Riverine habitat within the study area primarily occurs within the Sacramento River, the Feather River, the American River, the San Joaquin River, and the Stanislaus River. Riverine habitat is aquatic habitat characterized by moving water. The nature and characteristics of riverine habitat can vary considerably and depending on the size of the drainage basin and topography, riverine habitats can consist of large, slow-moving water to small, fast-moving water found in higher elevation drainages. Historically in the Central Valley, smaller streams and rivers typically were dry in the late summer. Only the larger rivers or spring-fed streams were consistently perennial. With construction of reservoirs on most of the larger streams and rivers in the Central Valley, most flows have been regulated resulting in less variable flows supporting aquatic habitat within and among years. Aquatic and emergent vegetation is typically sparse in riverine habitats and limited to slower moving shallow areas of the channel. Emergent vegetation is restricted to the margins and backwaters of rivers in areas of shallow, slow-moving water.

Fish assemblages in the riverine habitats of the study area include native and non-native species. More than 30 species of fish are known to use riverine habitats in the study area (Moyle 2002). Primary species of management concern (e.g., special status and recreationally important species) include four runs of Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), green sturgeon (*Acipenser medirostris*), and striped bass (*Morone saxatilis*). The distribution and

abundance of these species in riverine habitat within the study area varies depending on the location and specific conditions of the riverine habitat such as water temperature, gradient, turbidity and substrate composition, among others.

5.5.2.2 Lacustrine Habitat

Lacustrine habitats in the study area are represented by artificial impoundments. Lacustrine habitat includes the lake bed and shoreline areas (benthic) and also the open water (pelagic) habitat. Large reservoirs like Lake Oroville typically maintain both a cold and warm water fishery. Management of the cold water pool is an important consideration to successfully manage for cold water fishes downstream of these large dams. Permanent, shallow waters can support emergent and aquatic plants in shallow areas and along the margins of the water body. Most reservoirs, because of their seasonally fluctuating water levels, do not support emergent or submerged aquatic vegetation.

Fish associated with lacustrine habitat vary substantially depending on the size and characteristics of the habitat and whether species have been intentionally or unintentionally introduced. Larger reservoirs in the study area thermally stratify in the summer and can support warm and cold water fish assemblages.

5.5.2.3 Estuarine Habitat

Estuarine habitat occurs in tidally influence areas of the Delta where fresh and saltwater meet. The Delta is comprised of tidal river channels and sloughs and many constructed features. The constructed features include the Sacramento and Stockton deepwater ship channels, the Delta Cross Channel and Clifton Court Forebay. The Delta contains the diversion intakes and fish screens for the CVP and SWP located in the southwest side of the Delta. Suisun Bay provides shallow water, estuarine habitat that is important for many fish species. More than 120 fish species rely on the Delta as important areas to complete one or more life stages. Channels and sloughs of the Delta and Suisun Bay provide important migration and rearing habitats for anadromous salmonids (i.e., Chinook salmon and steelhead), green sturgeon, delta smelt (*Hypomesus transpacificus*), and longfin smelt (*Spirinchus thaleichthys*) (Moyle 2002). Numerous programs have been, and continue to be, implemented to monitor the status of fish species in the Delta.

5.5.2.4 Terrestrial Habitat

Historically, the Central Valley, Delta, and the surrounding foothills contained a mosaic of riverine, wetland, and riparian habitat along rivers and streams with surrounding terrestrial habitats consisting of perennial grassland and oak and conifer woodland. With

settlement of the Central Valley, agricultural and urban development converted land from native habitats to cultivated fields, pastures, residences, water impoundments, flood control structures, and other developments. As a result, native habitats generally are restricted in their distribution and size and are highly fragmented. Agricultural land comprises most of the study area and includes row and field crops, rice, pasture, and orchards. A large number of special-status animal and plant species occur within terrestrial habitats in the study area.

The Central Valley, including the Sacramento River and San Joaquin River watersheds, contains approximately one-fifth the land area (27,000 square miles) of the state, and once supported a variety of grassland, savannah, riparian, and wetland habitats. Today the Central Valley is predominantly agricultural, with rice, orchards, and vineyards in the northern part of the valley and cotton and citrus orchards in the southern part. Undeveloped land in the Central Valley is mostly non-native annual grasslands. However, the Central Valley still includes remnants of native perennial grassland, vernal pool wetlands, riparian, and oak woodland habitats providing the Central Valley with a diversity of habitats.

The Delta region also contains about 641,000 acres of agricultural land that dominate its lowland areas. Other dominant habitats in the region include valley foothill riparian and fresh and saline emergent wetlands. Although less prominent, other important habitats include seasonal freshwater wetlands and non-tidal freshwater, tidal, freshwater and brackish water emergent marsh. Hundreds of miles of waterways divide the Delta into islands, some of which are below sea level. The Delta Region relies on more than 1,000 miles of levees to protect these islands.

5.5.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on biological resources.

5.5.3.1 Federal

Endangered Species Act

The Endangered Species Act (ESA) grants protection over species that are formally listed as threatened, endangered, or proposed for listing. The primary protective requirement in the case of projects requiring federal permits, authorizations, or funding, is Section 7 of the ESA, which requires federal lead agencies to consult (or "confer" in the case of proposed species or proposed critical habitat) with the US Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) to ensure that their actions do not jeopardize the

continued existence of federally-listed species. In addition to Section 7 requirements, Section 9 of the ESA protects listed wildlife species from “take.” Take is broadly defined as those activities that “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect [a protected species], or attempt to engage in any such conduct.” Reclamation is the lead federal agency responsible for consultation for CVP activities with the USFWS and NMFS under Section 7 of the ESA. If an activity would result in the take of a federally-listed species, one of the following is required: an incidental take permit (ITP) under Section 10(a) of ESA, or an incidental take statement issued pursuant to federal interagency consultation under Section 7 of ESA. Such authorization typically requires various measures to avoid and minimize species take, and to protect the species and avoid jeopardy to the species’ continued existence.

Authorization may involve a letter of concurrence that the project will not result in the potential take of a listed species, or may result in the issuance of a Biological Opinion (BiOp) that describes measures that must be undertaken to minimize the likelihood of an incidental take of a listed species.

Biological Opinions

The Coordinated Long-Term Operation of the CVP and SWP is currently subject to BiOps issued by USFWS (2008) and NMFS (2009) pursuant to Section 7 of the ESA. The USFWS BiOp concluded that the operation of these water projects would result in jeopardy to delta smelt and adverse modification of critical habitat, and included Reasonable and Prudent Alternatives to avoid jeopardy to this species. The NMFS BiOp also concluded that the operations were likely to jeopardize the continued existence of several threatened and endangered species, including Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and the Southern Distinct Population Segment of North American green sturgeon, and included Reasonable and Prudent Alternatives to avoid jeopardy to these species.

In 2011, the BiOps were remanded by court order to the Federal fish and wildlife agencies for revision. This decision was appealed to the Ninth Circuit Court of Appeals and in 2014 the orders to rewrite the BiOps were reversed. The Ninth Circuit decision affirmed the requirement that the United States Department of the Interior, Reclamation complete an EIS on implementing the BiOps by December 1, 2015. The Final EIS was published on November 23, 2015 and the Record of Decision was signed on January 11, 2016.

Magnuson-Stevens Fishery Conservation and Management Act – Essential Fish Habitat

The Pacific Fishery Management Council (PFMC) has designated the Delta, San Francisco Bay, and Suisun Bay as Essential Fish Habitat (EFH) to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries such as Pacific salmon. The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect EFH of commercially managed marine and anadromous fish species.

As part of the Biological Assessment on the Coordinated Long-Term Operations of the CVP and SWP, Reclamation and DWR have addressed anticipated effects of SWP and CVP operations on EFH within the Delta estuary for use in the re-consultation for compliance with the Act. The EFH provisions of the Sustainable Fisheries Act are designed to protect fishery habitat from being lost due to disturbance and degradation.

Real-Time Decision-Making to Assist Fishery Management

DWR and Reclamation work closely with USFWS, NMFS, California Department of Fish and Wildlife (CDFW), and other agencies to coordinate the operation of the SWP and CVP with fishery needs. This coordination is facilitated through several forums, including the Water Operations Management Team, the Operations Group (composed of the Operations and Fishery Forum, Data Assessment Team, and B2 Interagency Team), and the Fisheries Technical Teams (composed of the Sacramento River Temperature Task Group, Delta Operations for Salmonids and Sturgeon Group, Delta Smelt Working Group, and American River Operations Work Group).

Clean Water Act Section 404

Section 404 of the Clean Water Act (CWA) requires that a permit be obtained from the USACE for the discharge of dredged or fill material into “waters of the United States, including wetlands.” Waters of the United States include wetlands and lakes, rivers, streams, and their tributaries. Wetlands are defined for regulatory purposes, at 33 CFR 328.3 and 40 CFR 230.3, as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

5.5.3.2 State

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the California Fish and Game Code, a permit from CDFW is required for a project that could result in the take of a state-listed threatened or endangered species (i.e., species listed under CESA). Under CESA, the definition of “take” includes an activity that would directly or indirectly kill an individual of a species, but the state definition does not include “harm” or “harass,” as the federal definition does. As a result, the threshold for take under the CESA is typically higher than that under the ESA. Under CESA, CDFW maintains a list of threatened and endangered species (California Fish and Game Code 2070). The CDFW also maintains two additional lists: (1) a list of candidate species that are species CDFW has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species; and (2) a list of “species of special concern;” these lists serve as “watch lists.”

California Fish and Game Code Fully Protected Species

The California Fish and Game Code includes several sections that protect a variety of sensitive biological resources. 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. It also is possible for a species to be protected under the California Fish and Game Code, but not fully protected.

Habitat Conservation Plan (HCP)/Natural Community Conservation Planning (NCCP)

Across the State, as of October 2017, there are a total of 9 Habitat Conservation Plans (HCPs) in the implementation stage, 10 HCP/ (Natural Community Conservation Plans (NCCPs) in the implementation stage, 7 HCPs in the planning stage, and 8 HCP/NCCPs in the planning stage (CDFW 2017) that have been developed in accordance with CDFW. HCPs generally provide a regional approach to managing urban development vis-à-vis habitat conservation and, in some cases, also involves agricultural protection. Typically, an HCP identifies species that are listed as State or federally threatened or endangered, and determines the limits of development for jurisdictions to ensure that these habitats and species are appropriately protected. In addition, per Fish and Game Code Sections 2800-2835, the Natural Community Conservation Planning Act sets the standards for developing NCCPs. Section 2805 defines a NCCP as a plan prepared pursuant to a planning agreement entered into in accordance with Section 2810 of the Fish and Game Code. The plan is required to identify and provide for those measures necessary to conserve and manage natural

biological diversity within the plan area while allowing compatible and appropriate economic development, growth, and other human uses.

5.5.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address sensitive biological resources.

5.5.4 Impact Analysis

5.5.4.1 Methods of Analysis

As described in Section 5.1, Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing sensitive habitats or special-status species.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could change the frequency and timing of water to sensitive habitats resulting in impacts to special-status species. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.5.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to biological resources is considered significant if the proposed project would do any of the following:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- Have 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.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- 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.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5.5.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance and the existing BiOps for the Coordinated Long-Term Operation of the CVP and SWP (see above). The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no disturbance or loss of sensitive habitats or associated special-status species and no short-term disruption of the movement of native or migratory fish or wildlife species. Furthermore, because the proposed project would build no new facilities or modify existing facilities, and operations would continue to be implemented consistent with requirements in the Federal BiOps, the long-term impacts of operating and maintaining new or modified facilities would not occur. As a result, there would be no adverse effect on any fish wildlife corridors, aquatic and riparian habitat, other sensitive natural communities, or federally protected wetlands as defined by Section 404 of the CWA, and there would be

no conflict with HCP/NCCPs. Therefore, these impacts are not further evaluated in the DEIR.

5.5.4.4 Impacts and Mitigation Measures

Table 5.5-1 summarizes the impact conclusions presented in this section for easy reference

**TABLE 5.5-1
SUMMARY OF IMPACTS CONCLUSIONS – BIOLOGICAL RESOURCES**

Impact Statement	Transfers	Exchanges
5.5-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could change the frequency, duration, and timing of water to sensitive habitats in the study area.	LTS	LTS
5.5-2: Changes in San Luis Reservoir water levels or flows in the Feather, Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges of carryover water implemented by PWAs could change the frequency, duration, and timing of water to sensitive habitats.	LTS	LTS

LTS: Less than Significant

Impact 5.5-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could change the frequency, duration, and timing of water to sensitive habitats in the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. The proposed project, however, would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing of agricultural land or changing crop patterns would not affect the existing agricultural land use designations in the study area because the land use would remain in agricultural use, and would continue to allow for similar or slightly improved levels of cover, hunting and foraging for wildlife (e.g. raptors). Furthermore, additional water transfers are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.). Because agricultural land would remain and there would be no change in land use, there would be no conflict with provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat protection plan in the study area.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing of agricultural land or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. It would continue to allow for similar or slightly improved levels of cover, hunting and foraging for wildlife (e.g. raptors). Furthermore, additional water exchanges are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.). Because agricultural land would remain and there would be no change in land use, there would be no conflict with provisions of an

adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat protection plan in the study area.

Impact Conclusion

It is possible that transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in cropping patterns in the study area; however, this would not be a significant change to the existing conditions for biological resources in the study area because the land would remain as agriculture and would continue to allow for similar or slightly improved levels of cover, hunting and foraging for wildlife (e.g. raptors), wildlife migration. Furthermore, because there would be no change in land use, there would be no conflict with provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat protection plan in the study area. Therefore, the fallowing of agricultural land or changing crop patterns as a result of changes in the frequency, duration, and timing of transfers and exchanges would not be anticipated to result in adverse effects on sensitive natural communities, special-status species, special-status species habitat, or provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat protection plan in the study area and these impacts would be **less than significant**.

Mitigation Measures

None required.

Impact 5.5-2: Changes in San Luis Reservoir water levels or flows in the Feather, Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges of carryover water implemented by PWAs could change the frequency, duration, and timing of water to sensitive habitats.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. The proposed project, however, would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta. In addition, the proposed amendments would allow PWAs to transfer a portion of their carryover water in San Luis Reservoir, and transfer up to 50 percent of its carryover water in a single-year transfer (i.e., a future or multi-year commitment of transferring carryover water is not allowed).

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

With the proposed project, changes in water levels due to transfers of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held in beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may result in lower water levels in San Luis Reservoir if transferred water is delivered in before its scheduled date for release.

Transferring SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. Changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers could adversely affect special-status fish species.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. The proposed amendments would allow PWAs to exchange a portion of their carryover water in San Luis Reservoir, and exchange up to 50 percent of its carryover water in a single-year transaction (i.e. a future or multi-year commitment of exchanging carryover water is not allowed).

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. With the proposed project, changes in water levels due to exchanges of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held in beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may

result in lower water levels in San Luis Reservoir if transferred water is delivered in before its scheduled date for release.

Exchanging SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. Changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers could adversely affect special-status fish species.

Impact Conclusion

It is possible that transfers and exchanges of SWP water from one PWA to another PWA could result in changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers that might adversely affect special-status fish species. However, the SWP would continue to be operated consistent with Contract terms (including that transfers and exchanges shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and the proposed project would be using existing SWP facilities used for existing transfers and exchanges. Furthermore, DWR would continue to work closely with USFWS, NMFS, CDFW, and other agencies to coordinate the operation of the SWP and CVP with fishery needs and in compliance with BiOps from NMFS and USWFS. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

5.5.5 References

CDFW (California Department of Fish and Wildlife), 2017. California Regional Conservation Plans. October, 2017.

Moyle, P. 2002. *Inland Fishes of California, Revised and Expanded*. University of California Press. Berkeley, California.

5.6 CULTURAL RESOURCES

5.6.1 Introduction

This section describes the prehistoric and historic setting of the study area, along with description of typical cultural resource types identified within the study area. This section addresses potential impacts to cultural resources resulting from project implementation. Cultural resources include, but are not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. No comments related to cultural resources were received in response to the NOP (see Appendix B).

5.6.2 Environmental Setting

5.6.2.1 Prehistoric Setting

Current archaeological evidence indicates that human occupation in California began at least 15,000 years ago. Perceptions of human colonization of the Americas have shifted in the past 20 years. Terrestrial migration, where big-game hunters crossed over the ice bridge from northeastern Asia and traveled down the ice-free corridor into the central plains, has recently been remodeled. Archaeologists now understand that coastal migrations as well as multiple periods of migration should be included in a viable discussion about California's first human settlement (Erlandson et al. 2007).

Categorizing prehistoric human occupation into broad environmental regions and cultural stages allows researchers to describe a wide number of archaeological sites with similar cultural patterns and components in a particular location, during a given period of time, thereby creating a regional chronology. Numerous and varying cultural chronologies have been developed for California's regions; however interregional diversity cannot be simplified. The variation of environments in California has created differences in both the cultural behavior of the prehistoric inhabitants as well as in the approach of archaeological methods and research, thereby creating a complex and ever expanding understanding of California prehistory (Moratto and Chartkoff 2007).

While the names and dates of California's prehistoric periods vary by region, time has generally been divided into broad periods that reflect major changes in material culture and settlement patterns (i.e., the Paleoindian Period, the Early Period, the Middle Period, and the Late Period). Economic and technological types, socio-politics, trade networks, population density, and variations of artifact types further delineate cultural periods.

The Paleoindian Period (ca. 15,000 to 8000 Before Common Era or B.C.E.) was characterized by big-game hunters occupying broad geographic areas. During the Early Period (ca. 8000 to 500 B.C.E.) geographic mobility continued and is characterized by the milling slab and handstone as well as large wide-stemmed and leaf-shaped projectile points. Cut shell beads and the mortar and pestle are first documented in burials during this period, indicating the beginnings of a shift to more sedentary ways. During the Middle Period (ca. 500 B.C.E. to Common Era or C.E. 1200) geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The occurrence of sites in a wider range of environments suggests that the economic base was more diverse and mobility was slowly replaced by the development of small villages. During the Late Period (ca. C.E. 1200 to 1550), social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the Late Period include the bow and arrow, small corner-notched points, and a diversity of beads and ornaments.

5.6.2.2 Native American Tribes

The project corridor extends through a number of traditional Native American territories. Prior to appearance of European American explorers and settlers, the study area was populated by the Wintu, Yana, Patwin, Maidu, Nisenan, Yokuts, Luiseno, Serrano, Chemehuevi, Tataviam, and Kitanemuk among others. Synthesized narratives, such as the Handbook of North American Indians, California: Volume 8 (Heizer 1978), categorize California Native traditions and practices; however, the complexity of regional diversity should not be overlooked.

The Upper Sacramento Valley was populated by the Wintu, Yana, and Patwin. The Wintu occupied the Sacramento River corridor and many of its most productive tributaries, and the Yana lived in the eastern foothills and stream corridors of the southern Cascade. The Patwin occupied areas adjacent to the river in Southern Colusa and northern Yolo counties. The Northwestern Maidu occupied a portion of the river in northern Colusa and southern Glenn counties. The material culture and lifestyles of the groups were quite similar, with semi-permanent or permanent villages on the terraces above main stream corridors and emphasized the use of fish (especially salmon), shellfish, acorns, small mammals, birds, and native plant foods. Housing was comprised of conical, semi-subterranean family residences, approximately 10 feet in diameter, often located near a larger communal structure used as a residence and for ceremonies.

The Valley Nisenan lived along the Sacramento River from downstream of the confluence with the American River, upstream to beyond Yuba City/Marysville, and eastward along the American River. Nisenan villages may have had 500 to 1,000 occupants, with houses and granaries for storage of acorns and other supplies. The ethnographic territory of the Plains Miwok consists of the area along the Sacramento River between Freeport and the confluence of the Cosumnes River. Plains Miwok lived in large, semi-sedentary villages along the major river courses of the delta system, focusing on plant collecting with some fishing and hunting activities.

The Delta includes lands claimed by the Penutian-speaking Yokuts. These peoples occupied an area extending from the crest of the Coast Diablo and Temblor Ranges east into the foothills of the Sierra Nevada, north to the American River (for the Northern Valley Yokuts), and south to Buena Vista and Kern Lakes at the southernmost end of the Great Central Valley (for the Southern Valley Yokuts). North Valley Yokuts life centered along the San Joaquin River and its many tributaries, which is flanked by dry, treeless grasslands along its length. Round, single-family dwellings built of reeds were the primary structure in North Valley Yokuts villages. Basketry and other fiber weaving work constituted the primary craft, along with a lithics industry manufacturing tools from locally obtainable chert, jasper, and chalcedony. Trade with neighboring peoples such as the Costanoans and Miwok was common. Villages typically consisted of a scattering of small structures, each containing a single family of three to seven people, although larger villages that were maintainable seasonally might also contain an earth lodge. The Yokuts used a wide variety of wooden, bone, and stone artifacts to collect and process their food.

The Luiseño territory was bordered by Agua Hedionda Creek on the south and Aliso Creek on the northwest, encompassed most of the drainage of the San Luis Rey River and the Santa Margarita River, and extended east as far as the San Jacinto Mountains. Today, this area is located within northern San Diego, southern Orange, and Riverside Counties, and would have encompassed a diverse environment including lagoons and marshes, coastal areas, inland river valleys, foothills, and mountains. The Cahuilla are generally divided into three groups based on their geographic setting: the Pass Cahuilla of the Beaumont/Banning area; the Mountain Cahuilla of the San Jacinto and Santa Rosa Mountains; and the Desert Cahuilla from the Coachella Valley, as far south as the Salton Sea. The Cahuilla occupied territories that ranged from low or moderately low desert to the mountain regions of the Transverse and Peninsular ranges.

The Serrano occupied territories that ranged from low or moderately low desert to the mountain regions of the Transverse and Peninsular ranges. The Serrano were organized into clans, with the clan being the largest autonomous political entity. They

lived in small villages where extended families lived in circular, dome-shaped structures made of willow frames covered with tule thatching. The Chemehuevi, a branch of the Southern Paiute, had a territory that stretched from the Colorado River to the San Bernardino Mountains. Chemehuevi material culture and subsistence was similar to the Serrano. Tataviam territory was concentrated along the upper reaches of the Santa Clara River drainage, east Piru Creek, and along the southern slopes of Sawmill and Liebre Mountains; and extending north into the southern end of the Antelope Valley. Tataviam villages varied in size from larger centers with as many as 200 people, to smaller villages with only a few families. The Kitanemuk were the northern neighbors of the Tataviam, and occupied a territory that extended from the Tehachapi Mountains into the western end of the Antelope Valley.

While traditional anthropological literature portrays Native peoples as having static cultures, today it is better understood that many variations of culture and ideology existed within and between villages. While these “static” descriptions of separations between native cultures of California make it an easier task for ethnographers to describe past behaviors, this masks Native adaptability and self-identity. California’s Native Americans never saw themselves as solely members of larger “cultural groups,” as described by anthropologists. Instead, they see themselves as members of specific villages, perhaps related to others by marriage or kinship ties, but viewing the village as the primary identifier of their origins.

The 2000 U.S. Census recorded 220,657 American Indians in California, for those designating only one race, excluding Alaska Natives and Native Hawaiians. Of that number, some come from tribes outside the modern boundaries of California. Currently there are 107 federally recognized Tribes in California and approximately 40 groups seeking to gain recognition. While the devastation brought about by the introduction of disease and displacement following European contact was overwhelming, Native American individuals and communities have continued to protect their cultural heritage and identity and maintain their languages and traditions.

5.6.2.3 Historic Setting

The earliest European presence in California came with the Spanish discovery and exploration of the California coast in the mid-sixteenth century. Alta California had been claimed for Spain in 1542 by the Portuguese Juan Cabrillo, who sailed up the Pacific Coast as far as Fort Ross. Due to the prosperity of its more southern colonies and the great distances required to travel so far north, Spain largely ceased overland and maritime exploration of Alta California until the eighteenth century. Spain had originally focused its energy and attention on its southern colonies in New Spain, however, in the

eighteenth century the increased presence of Russian settlements along the northwest coast and the British acquisition of Canada in 1763 encouraged Spain to explore and occupy Alta California in order to prevent Russian and British encroachment from the north.

European expansion into Alta California began when Spanish Mexico instigated the establishment of a string of Franciscan missions throughout the region. The California mission system had two goals: to Christianize and civilize the native population of California and to gain political and social control of the area for the Spanish government in Mexico. Mission San Diego de Alcalá, the first of 21 California missions, was founded in July 1769. Over the next 50 years the mission system was extended further north. Alongside the missions came a network of military establishments or presidios and civilian settlements or pueblos. Exploration of the California hinterland focused predominantly on the identification of rancho sites to support the mission network as well as the recapture of runaway Natives.

Although the original Spanish plan for the mission system included secularization, the process did not begin until Mexican independence from Spain. Fueled by reports of Franciscans padres degrading the Native peoples and failing to provide food and services to the military, the Mexican government began secularization in mid-1834. During the process, the mission lands were to be divided among the Native American neophytes, although rarely did this actually happen. More often the mission lands were granted to high-ranking Mexican Californian soldiers, politicians, and socialites.

Mexican Californians, or Californios, were well known for their hospitality, and early accounts describe ranchos with large households, operated by a large Native American labor force. Most ranchos were intensively involved in the hide-and-tallow trade, supporting huge herds of cattle on their vast landholdings. The cattle were driven to matanzas, or slaughter sites, that were usually as near to water transportation as possible for easy transport onto foreign trade vessels. The relationship between the Californios and the foreign ships had been active since the early 1820s. The ships imported all manner of trade goods, since little refined manufacturing occurred in Mexican California.

Beginning in the 1830s, Americans began to migrate to California. Ewing Young was the first American known to actually enter the Sacramento Valley in 1832. The first Anglo-American to travel to what is now Sacramento County was Jedediah Strong Smith. Later, Captain John A. Sutter established New Helvetia, the first non-Indian settlement in the Central Valley, in 1839. He established Sutter's Fort in the City of Sacramento as a trading post. In response to hinterland explorations, the Mexican

government provided land grants to Mexican citizens within the Sacramento Valley to fortify their sovereignty. Many Americans became Mexican citizens, married into prominent Californio families, and were granted lands from the governor. These first immigrants became acculturated into Mexican society and politics, while many were prominent businessmen and landowners.

The discovery of gold in California in 1848 instigated one of the largest migrations in history. Thousands came by land and sea in search of their fortunes. Most came to dig for the gold, but many came with the foresight that miners needed supplies. Earlier residents of California, including many Californios and previous Euroamerican immigrants, capitalized on the new immigrant population. Many Californios also struggled to hold on to their vast landholdings. Although the Treaty of Guadalupe Hidalgo promised that property belonging to the Mexicans be “inviolably respected,” the new Americans generally believed that the lands in California should be public property as a privilege of military victory. The vague land-grant maps, or *diseños*, that marked the boundaries of each rancho territory were protested and ignored by the land-hungry immigrants. “Squatters” settled on land officially owned by Mexicans and violence often erupted. Many Californios lost substantial amounts of land, despite legal efforts to hold on to it. Although many claims were confirmed, the Mexican landowners were often bankrupt by the end of the long and costly proceedings.

Mining camps and towns were established almost immediately throughout California’s gold-bearing regions, which are generally located along the western foothills of the Sierra Nevada mountain range and along the Klamath and Trinity river basins. At the outset, the mining population was made up almost exclusively of single men. But miners needed food and supplies, and people who could provide those goods followed. Ultimately women and children also relocated to mining communities. The influx also brought an extreme diversity of cultures and nationalities. California gold mining was very successful; in 1852 California produced more than \$81,000,000 worth of gold—60 percent of the world production for that year (Clark 1957; Caltrans, 2008).

The agricultural potential of California was recognized in the second half of the 19th century. The Central Valley was settled in the 1850s by hay and barley growers, although the primary agricultural industry was stock raising. In addition, fruits and wine grapes were grown and timber mills developed along the rivers. Unreliable precipitation and the need for protection from periodic flooding limited further growth of agriculture in the region until irrigation facilities started to be constructed in the 1890s. Almost immediately after the discovery of gold, investors began talking about the construction of a transcontinental railroad that would connect eastern goods, money, and services to the new western enterprises. The first Transcontinental Railroad from Sacramento to

Omaha was completed May 1869. The Central Pacific Railroad, the Pacific end of the railroad, largely took over nearly all freight across the Sierra Nevada in Northern California.

In 1862, the Homestead Act passed, allowing settlement of public lands and requiring only residence, improvement, and cultivation of the land. Although settlement was encouraged by the Homestead Act of 1862 and the Desert Land Act of 1877, which permitted disposal of 640-acre tracts of arid public lands at \$1.25 per acre to homesteaders if they proved reclamation of the land by irrigation, the hinterlands of Southern California did not see much growth until after the coming of the railroad. In 1876, the Southern Pacific Railroad line that ran south from the San Joaquin Valley was connected to the line from Los Angeles, encouraging development of the region. In 1884, this line joined the Atchison, Topeka, and Santa Fe line that ran east through Needles.

Water Conveyance and Flood Control

Water in California and all aspects of its use and management have been of paramount concern since California's inception as a state within the United States. Surveyor-General John A. Brewster recognized a need for a coordinated state water policy as early as 1856. In 1874, Colonel Barton S. Alexander, Chief Engineer to the Military Division of the Pacific, concluded that large-scale irrigation was possible and much land could be reclaimed from swamps in the Bay for use in agriculture. Shortly after the report by the Alexander Commission, the California legislature established an Office of State Engineer in 1878 with the responsibility for water planning in California.

In 1919, Robert S. Marshall, Chief Hydrographer of the U.S. Geological Survey (USGS) presented a statewide plan, sometimes referred to as the Marshall Plan. The plan included a huge dam and reservoir on the Sacramento River, two major canals and lesser canals, aqueducts, tunnels, and storage reservoirs all supplying water from Northern California to the Central Valley and even Southern California. Few people took Marshall's plan seriously and it would be over a decade before a large-scale water conveyance project would be undertaken at the state level (JRP and Caltrans 2000).

The California Legislature created a Department of Public Works in 1921. This new entity consisted of five divisions, including a Division of Water Rights, Division of Water Resources (predecessor of DWR), and a Division of Engineering and Irrigation. The Legislature requested a plan to irrigate the maximum amount of land and provide maximum protection from floods. This was to be a comprehensive water plan for the state which would address conservation, flood control, storage, distribution, and uses. In

1931, a “State Water Plan” report was submitted by the Division of Water Resources to the legislature; this plan would later be known as the “Central Valley Project.”

Passed in 1933, the California Central Valley Project Act authorized the sale of \$170 million in revenue bonds to build the CVP. The Act provided for dams, reservoirs, canals, pumping plants, and power plants in an extensive system to improve utilization of the Sacramento, San Joaquin, and other rivers. The Act authorized several facilities including: Kennett Dam (now Shasta Dam), Contra Costa Conduit, San Joaquin Pumping System, Friant Dam, Madera Canal, and the Friant-Kern Canal. The CVP was designed to provide irrigation and flood control, improve river navigability, and control saltwater intrusion into freshwater areas. During the Depression era, the State could not afford to initiate the CVP, so the Federal government passed the Central Valley Project Improvement Act (CVPIA) in 1935 and took over the development of the CVP. Initial construction was conducted by the USACE with Reclamation completing the majority of the work. Construction of the initial units began in October 1937 with the Contra Costa Canal, which workers completed in its entirety in 1948, although the first delivery of water was made in 1940. Work began on Shasta Dam, a keystone of the CVP, in 1938 and was completed in 1945. Storage of water at the reservoir began in January 1944, and the first power from the power plant was delivered in June 1944 (JRP and Caltrans 2000).

During and after World War II, growth in population, industry, and military installations created new demands for water in Southern California (Meyerson 2009). The California Legislature responded to the growing number of water consumers by passing the State Water Resources Act of 1945. The Act gave the state the authority to organize water development by creating the Water Resources Board to survey the state’s water resources and produce plans for solving its water problems. In 1947, the State Legislature gave the initial authorization for a statewide water project, and a plan was developed under the direction of State Engineers Edward Hyatt and Arthur Edmonston.

Throughout the late 1940s and 1950s, the government authorized new divisions of the CVP. The USACE built several dams in California under the Flood Control Act of 1944, including several of which they integrated into CVP. In 1951, Edmonston presented the Feather River Project (later renamed the SWP) to the State Legislature. The project included a multipurpose dam and reservoir near Oroville complete with a power plant, an afterbay dam, a peripheral canal, an electric power transmission system, an aqueduct to transport water from the Delta to Santa Clara and Alameda counties, and a second aqueduct to carry water from the Delta to the San Joaquin Valley and Southern California. In that same year, the State Legislature authorized construction of a water storage and supply system to capture and store runoff in Northern California and distribute it to Northern and Southern California, the San Francisco Bay area, and the

San Joaquin Valley. Edmonston later augmented the project, adding plans for the San Luis Reservoir, South Bay Aqueduct, and NBA.

After devastating floods in the Sacramento Valley in 1955–1956, the State Legislature created DWR to oversee all State agencies involved in water development. The Governor appointed Harvey O. Banks director of the new department and tasked him with developing a plan for the proposed SWP. An emergency appropriation of approximately \$25 million was passed by the Legislature in 1957 for flood control facilities on the Feather River and construction began at the Oroville site that same year. Appropriations were continued to fund the construction of the South Bay and California aqueducts in 1959 (JRP and Caltrans 2000).

As described in Chapter 2, State Water Project, authorization and initial financing for the SWP, was enacted into law in the Burns-Porter Act (Water Code section 12930 et seq.), which was passed by the California Legislature in 1959 and approved by the voters in 1960. Construction of the SWP commenced in the 1960s and water was first delivered in 1962 through a portion of the South Bay Aqueduct to Alameda and Santa Clara counties. Large-scale water deliveries began in the late 1960s. The SWP has been delivering water for over 50 years and is the largest state-owned, multi-purpose, user financed water storage and delivery system in the United States.

5.6.2.4 Paleontological Resources

Paleontological resources may remain in areas that have not been fully developed. Paleontological resources would likely occur throughout the areas at depths below historic soil disturbance. Paleontological sensitivity is a qualitative assessment made by a professional paleontologist accounting for the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and any other local factors that may be germane to fossil preservation and potential yield. According to the Society of Vertebrate Paleontology (SVP) (1995), “Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data.” **Figure 5.6-1** shows the approximate eras associated with rock formations in California. These eras are described below.

Precambrian Era—Approximately 4.5 Billion to 540 Million Years Ago: Within the study area, sedimentary rocks from the Precambrian and Early Paleozoic are most often found in Southern California. Most rocks of Precambrian age do not contain fossils, although some traces and a few fossils have been found dating to the Proterozoic Eon (between approximately 2.5 billion years ago and 540 Million Years Ago).



SOURCE: California Geological Survey 2000

SWP Water Supply Amendments for Water Management and California Waterfix . 120002.08

Figure 5.6-1
Distribution of Rock Formations

Paleozoic Era—540 Million to 250 Million Years Ago: Deposits from the mid- to late Paleozoic (Cambrian through Devonian periods) are common in the Klamath Mountains and Sierra Nevada provinces. These deposits may contain numerous marine fossils, including corals, ammonites, and brachiopods. Freshwater and marine sedimentary rocks deposited in the late Paleozoic exhibit fossils from both shallow- and deep water deposits, including swamps and estuarine deposits. These formations are found primarily in the northern portion of the study area (Shasta and Butte counties).

Mesozoic Era—251 Million to 65.5 Million Years Ago: Uplifting of the Sierra Nevada Province during the Mesozoic Era led to erosion of the mountain range and deposition in the Great Valley Province during this era. Invertebrates, marine reptiles, and a variety of terrestrial flora are represented in the fossil record in Mesozoic rocks throughout California. Uplift of the Coast and Transverse ranges also began in the latter part of the Mesozoic.

Cenozoic Era—65.5 Million Years Ago to Present: Continuing uplift of the Coast and Transverse ranges, fluctuating sea levels, glaciations in the Sierra Nevada, and development of today's lakes and river systems led to deposition of shallow marine, estuarine, freshwater, and terrestrial rocks throughout California. Cenozoic fossil records in these rocks are diverse and include marine, freshwater, and terrestrial flora and fauna. The Pleistocene epoch, known as the “great ice age,” began during the Cenozoic approximately 1.8 Million Years Ago. Mammalian inhabitants of the Pleistocene alluvial fan and floodplain included mammoths, mastodons, horses, camels, ground sloths, and pronghorn antelopes.

5.6.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on cultural and paleontological resources.

5.6.3.1 Federal

Section 106 of the National Historic Preservation Act

Archaeological resources are protected through the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470f), and its implementing regulations, Protection of Historic Properties (36 Code of Federal Regulations [CFR] Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979. Prior to implementing an “undertaking” (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation and the State Historic Preservation Officer (SHPO) a reasonable

opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register of Historic Places (NRHP). As indicated in section 101(d)(6)(A) of the NHPA, properties of traditional religious and cultural importance to a tribe are eligible for inclusion in the NRHP. Under the NHPA, a resource is considered significant if it meets the NRHP listing criteria at 36 CFR 60.4. This project is not subject to Section 106 of the NHPA because it does not involve a federal undertaking.

National Register of Historic Places

The NRHP was established by the NHPA of 1966, 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” (CFR 36 section 60.2). The NRHP recognizes both historic-period and prehistoric archaeological properties that are significant at the national, state, and local levels.

To be eligible for listing in the NRHP, 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 established criteria (National Parks Service 1995). Unless the property possesses exceptional significance, it must be at least 50 years old to be eligible for NRHP listing (National Parks Service 1995).

In addition to meeting the criteria of significance, a property must have integrity. Integrity is defined as “the ability of a property to convey its significance” (National Parks Service 1995). The NRHP recognizes seven qualities that, in various combinations, define integrity. To retain historic integrity a property must possess several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance. The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association.

5.6.3.2 State

California Environmental Quality Act

CEQA, as codified in California Public Resources Code sections 21000 et seq., is the principal statute governing the environmental review of projects in the state. See also the CEQA Guidelines for Implementing the California Environmental Quality Act (California Code of Regulations, Title 14, section 15000, et seq.) CEQA requires lead agencies to determine if a proposed project would have a significant effect on historical resources, including archaeological resources.

CEQA Guidelines section 15064.5 (a)(3) allows a lead agency to treat a resource that is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage as potentially historically significant.

CEQA Guidelines section 15064.5 (c)(4) also provides that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment.

California Public Resources Code

Several sections of the California Public Resources Code protect paleontological resources. California Public Resources Code section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under State, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted permission. Section 7050.5 of the Health and Safety Code protects human remains by prohibiting the disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery. Section 5097.98 of the California Public Resources Code (and reiterated in CEQA Guidelines section 15064.5 (e)) also states that in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, there are specific steps to undertake.

California Public Resources Code, section 21080.3.1, et seq., also requires, for projects in which a NOP was issued on or after July 1, 2015, formal notification to California Native American Tribes upon written request to start formal consultation between the California Native American Tribe and the CEQA Lead Agency. The NOP for the proposed project was issued on September 12, 2014. No comments were received on the NOP from California Native American tribes.

California Register of Historical Resources

The California Register of Historic Resources (CRHR) is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (California Public Resources Code section 5024.1[a], Title 14 California Code of Regulations [CCR], section 4850 et seq.). The criteria for eligibility to the CRHR are based on NRHP criteria (California Public Resources Code section 5024.1[b], Title 14 CCR, section 4850 et seq.). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties listed in or formally determined eligible for listing in the NRHP. For a resource to be eligible for the CRHR, it

must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the NRHP criteria may still be eligible for listing in the CRHR.

Paleontological Resources

Paleontological resources are explicitly afforded protection by CEQA section V(c) of Appendix G, the “Environmental Checklist Form,” which addresses the potential for adverse impacts to “unique paleontological resource[s] or site[s] or ... unique geological feature[s].” This provision discusses significant fossils—remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group—as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth. Mitigation of adverse impacts to paleontological resources is therefore required under CEQA. Appendix G (Part V) of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, stating that a project will normally result in a significant impact on the environment if it will “...disrupt or adversely affect a paleontological resource or site or unique geologic feature, except as part of a scientific study.”

The SVP has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most California State regulatory agencies accept the SVP standard guidelines as a measure of professional practice.

California Public Resources Code and California Health and Safety Code Provisions Regarding Human Remains

California Health and Safety Code section 7050.5 protects human remains by prohibiting the disinterring, disturbing, or removing of human remains from any location other than a dedicated cemetery. Public Resources Code section 5097.98 and CEQA Guidelines section 15064.5(e) also identify steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery. Health and Safety Code section 7052 states that the disturbance of Native American, or any other, human remains is a felony, unless the disturbance has been lawfully authorized.

5.6.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each of these counties and cities has local regulations and General Plans with unique goals and policies that address

sensitive historic, archeological, tribal and paleontological resources. These include policies guiding action following accidental discovery, consultation with tribes prior to project construction, and protection of character defining features of significant historic structures and buildings.

5.6.4 Impacts Analysis

5.6.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes that could result in effects on cultural resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in a changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could change water levels in existing SWP storage and/or conveyance facilities. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.6.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to cultural resources is considered significant if the proposed project would do any of the following:

- Cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5.
- A substantial adverse change in the significance of a unique archaeological resource.

- Disturbance or destruction of a unique paleontological resource or site or unique geologic feature.
- Disturbance of any human remains, including those interred outside or formal cemeteries.

Historical Resources

CEQA Guidelines section 15064.5 requires the lead agency to consider the effects of a project on historical resources. A historical resource is defined as any building, structure, site, or object listed in or determined to be eligible for listing in the CRHR, or determined by a lead agency to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California. Types of historical resources potentially located in areas where suction dredge mining is conducted includes submerged vessels, historic-era mining sites and features, prehistoric sites, and sites or features important to Native American groups. Archaeological resources that are potentially historical resources according to CEQA Guidelines section 15064.5 are addressed in *Unique Archaeological Resources* below.

Archaeological Resources

The effects of a project on archaeological resources, both as historical resources according to CEQA Guidelines section 15064.5, as well as unique archaeological resources as defined in CEQA Guidelines section 21083.2 (g) must also be considered.

Human Remains

Human remains, including those buried outside formal cemeteries, are protected under a number of state laws including California Public Resources Code section 5097.98 and Health and Safety Code section 7050.5.

5.6.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no impacts to known or unknown subsurface archaeological or paleontological resources, or human remains.

Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur. DWR is treating the SWP as potentially historically significant because it is over 50 years of age and is associated with events that have

made a significant contribution to the broad patterns of California's history and cultural heritage. The SWP provided the necessary infrastructure to deliver water from Northern California throughout regions in California, including the San Francisco Bay Area and Central and Southern California, which has supported the needs of California communities and agricultural sectors, thereby contributing to California's development, land use, and agricultural history.

In general, a significant effect would occur if the proposed project results in a substantial adverse change in the significance of a historical resource. Substantial adverse change in the significance of a historical resource means 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. The significance of a historical resource is materially impaired when a proposed project demolishes or materially alters in an adverse manner those physical characteristics that convey its historical significance. The Contracts, although signed over 50 years ago, are not a physical feature of the SWP, and are not central to the historical significance of the SWP.

Additionally, the proposed project would not result in physical changes (no demolition or alteration) to the SWP. The facilities for delivering water from Northern California to various regions of California would remain unchanged; therefore, implementation of the proposed project would not result in any effects to the SWP, including character-defining features of the SWP. As a result, the proposed project would not result in a substantial adverse change to the physical characteristics of the SWP that convey its historical significance and the proposed project would have no impact to historical resources.

5.6.4.4 Impacts and Mitigation Measures

Table 5.6-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.6-1
SUMMARY OF IMPACTS CONCLUSIONS – CULTURAL RESOURCES**

Impact Statement	Transfers	Exchanges
5.6-1: Changes in San Luis Reservoir water levels or flows in Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges of carryover water implemented by PWAs could result in damage or destruction of cultural resources.	LTS	LTS
LTS: Less than Significant		

Impact 5.6-1: Changes in San Luis Reservoir water levels or flows in Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges of carryover water implemented by PWAs could result in damage or destruction of cultural resources.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta. In addition, the proposed amendments would allow PWAs to transfer a portion of their carryover water in San Luis Reservoir, and transfer up to 50 percent of its carryover water in a single-year transfer (i.e., a future or multi-year commitment of transferring carryover water is not allowed).

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

With the proposed project, changes in water levels due to transfers of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held in beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may result in lower water levels in San Luis Reservoir if transferred water is delivered in before its scheduled date for release.

Transferring SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. Changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers could expose

known or unknown cultural resources which could result in a substantial adverse change to the significance of historical resources or to the integrity of cultural resources.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. The proposed amendments would allow PWAs to exchange a portion of their carryover water in San Luis Reservoir, and exchange up to 50 percent of its carryover water in a single-year transaction (i.e. a future or multi-year commitment of exchanging carryover water is not allowed).

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. With the proposed project, changes in water levels due to exchanges of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held in beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may result in lower water levels in San Luis Reservoir if transferred water is delivered in before its scheduled date for release.

Exchanging SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. Changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers could expose known or unknown cultural resources which could result in a substantial adverse change to the significance of historical resources or to the integrity of cultural resources.

Impact Conclusion

It is possible that transfers and exchanges of SWP water from one PWA to another PWA could result changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers that might expose known or unknown cultural resources. However, the SWP would continue to be operated consistent with Contract terms (including that transfers and exchanges shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and the proposed project would be using existing SWP facilities used for existing transfers and exchanges. Therefore, it is not anticipated

that increased movement of SWP water among the PWAs would result in a substantial adverse change to the significance of historical resources or to the integrity of cultural resources, and this impact would be **less than significant**.

Mitigation Measures

None required.

5.6.5 References

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5.7 ENERGY

5.7.1 Introduction

This section addresses energy resources in the study area and the potential changes in energy use that could occur as a result of implementing the proposed project. No comments addressing energy resources were received in response to the NOP (see Appendix B).

This chapter was prepared pursuant to CEQA Guidelines sections 21100(b)(3) and 15126.4(a)(1)(c), and Appendix F of the State CEQA Guidelines. As stated in Appendix F, “[i]n order to ensure that energy implications are considered in project decisions,” an Environmental Impact Report (EIR) must discuss “the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.” Appendix F, Section I states that, “Potentially significant energy implications of a project shall be considered in an EIR to the extent relevant and applicable to the project.”

5.7.2 Environmental Setting

5.7.2.1 State Water Project Energy Sources and Use

The SWP is one of the largest water and power systems in the world. The multipurpose nature of the SWP affects how its facilities are operated. Under normal operations, the priority is to maximize water deliveries to PWAs within regulatory constraints. SWP operations are closely coordinated with those of the CVP through the COA. (See Section 5.20 Water Supply for a description of the COA.) Energy is generated at various SWP facilities in Northern, Central, and Southern California for use in operation of SWP pumps and other facilities. However, the SWP is a net energy consumer because it uses more energy than it generates as a result of the extensive nature of delivering water supplies from Northern California to the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and Southern California. To meet its annual demand, the SWP has a diversified portfolio of energy sources.

A substantial portion of the SWP demand is met by SWP hydropower sources, and long-term hydropower purchases. The SWP operates several hydroelectric power plants with a combined capacity of over 1,000 megawatts (MW) (DWR 2012a). The Hyatt-Thermalito Complex at Lake Oroville includes Edward Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Powerplant, and Robie Thermalito Pumping-Generating Plant, with a combined generation capacity of 762 MW. In total, these generate over 2.2 million megawatt-hours per year (MWh/yr) of energy in a median year. South of the Delta, SWP facilities include Alamo Powerplant with 17 MW of

capacity, Devil Canyon Powerplant with 276 MW of capacity, Mojave Siphon Powerplant with 30 MW of capacity, and Warne Powerplant with 74 MW of capacity. Generation at these facilities varies with the amount of water being conveyed. Gianelli and O'Neill pumping-generating plants at San Luis Reservoir are jointly owned and operated by the SWP and the CVP and have 424 MW and 14.4 MW of generation capacity, respectively. Generation at these facilities also varies with the amount of water being conveyed. Additionally, the SWP has long-term and short-term agreements for purchases of power with the Metropolitan WDSC (30 MW), Kings River Conservation District (165 MW), and the Western Systems Power Pool (variable depending on participating suppliers). DWR also has a cooperative agreement with LADWP for the operation of the Castaic Powerplant pursuant to which DWR may receive up to 214 MW.

Because hydropower availability is variable according to precipitation and water availability, and subject to periodic outages, such as the current multiyear outage at the Hyatt-Thermalito facility to repair damage from fire, SWP demand is also served by non-hydropower sources. The Lodi Energy Center and Camelot Solar Photovoltaic Project (a solar power generation facility) are recent additions to the SWP's energy portfolio. The Lodi Energy Center is a natural gas power plant with a capacity of 280 MW, of which DWR has a 33.5 percent partial interest (DWR 2012b). The Camelot Solar Photovoltaic Project is a solar power generation facility with a capacity of 45 MW (DWR 2015). The remaining balance of energy demand is met with short- and mid-term contract power purchases and real-time purchases from the California Independent System Operator's (CAISO) energy market.

Energy generated and purchased from the above-mentioned sources is used to power the SWP 20 pumping plants and 4 pumping-generating plants that contribute to SWP energy consumption. SWP pumping plants that have historically consumed most of the energy are Gianelli Pumping-Generating Plant, Banks Pumping Plant, Dos Amigos Pumping Plant, Ira J. Chrisman Pumping Plant, and A. D. Edmonston Pumping Plant. Pumping water through the SWP system annually consumes 3.4 to 9.9 million MWh of electricity (DWR 2012c) (see Chapter 2, State Water Project, Figure 2-2 Primary State Water Project Water Delivery Facilities).

5.7.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on energy use. Power production and energy efficiencies are regulated by the federal and state governments. Local

ordinances, General Plans, and Climate Action Plans govern energy efficiency measures at the local level.

5.7.3.1 Federal

Federal Energy Regulatory Commission

The Federal Energy Commission (FERC) regulates the transmission of oil, natural gas, and electricity for both Federal and non-Federal power projects. FERC licenses state, local and privately-owned hydroelectric projects and oversees hydroelectricity, electrical transmission, and large-scale electricity policy initiatives. FERC ensures the reliability of interstate electricity transmission systems.

North American Electric Reliability Corporation

The North American Electric Reliability Corporation (NERC) is an international regulatory authority that develops and enforces power system reliability standards, and assesses seasonal and long-term energy reliability. NERC is subject to FERC oversight.

Western Electricity Coordinating Council

With delegated authority from NERC and FERC, the Western Electricity Coordinating Council (WECC) is a regional entity that coordinates and promotes bulk electric system reliability in the western United States. WECC participates in development of the reliability standards, and enforces them.

The Energy Policy Act of 2005

The Energy Policy Act (Public Law 109-58) addresses energy production in the United States, including: energy efficiency, renewable energy, oil and gas, coal, vehicles and motor fuels, including ethanol, electricity, hydropower and geothermal energy, climate change technology, etc. For example, a provision of the act increases the amount of biofuel that must be mixed with gasoline sold in the United States (USEPA 2017).

Federal Fuel Efficiency Standards

The Energy Independence and Security Act of 2007 (Public Law 110-140, at 42 USC section 7545(o) (2)) increased the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard, which requires the blending of 36 billion gallons of renewable fuel in transportation fuels by 2022. It also tightened the Corporate Average Fuel Economy standards that regulate the average fuel economy in the vehicles produced by each major automaker, requiring that these standards be increased such that, by 2020, new cars and light trucks deliver a combined fleet average of 35 miles per gallon (USEPA 2017).

5.7.3.2 State

In addition to the State regulations described below, laws pertaining to the emission of greenhouse gas (GHG) emissions associated with energy generation and consumption are described in Section 5.9, Greenhouse Gas Emissions.

California Energy Commission

The California Energy Commission (CEC) is the state's primary energy policy and planning agency. Amongst its responsibilities, CEC forecasts future energy needs, licenses thermal power plants over 50 MW, including large solar thermal generation facilities, develops renewable energy resources, and plans for and directs state response to energy emergencies.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates privately owned electricity and natural gas companies. CPUC requires hydroelectric power companies to certify compliance with operations and maintenance standards for each generating unit. Regulated utilities must obtain a CPUC certificate of Public Convenience and Necessity to construct transmission lines 200 kilovolts (kV) and above or a Permit to Construct, for facilities between 50 kV and 200 kV. DWR facilities are not subject to CPUC oversight.

California Independent System Operator Corporation

CAISO is an independent operator of approximately 80 percent of the statewide wholesale power grid, and is responsible for system reliability and scheduling of available transmission capacity.

California Renewable Energy Resources Act, adding and amending various sections of the Fish and Game Code, Public Resources Code, and Public Utilities Code.

As described in greater detail in Section 5.9, Greenhouse Gas Emissions, this Act codified California's commitment to expanding the State's Renewables Portfolio Standard (RPS) to include 33 percent renewable power by 2020. In 2013, the Pacific Gas and Electric Company (PG&E) served 23.8 percent of its retail customers with renewable energy, while Southern California Edison served its customers with 21.6 percent, and San Diego Gas & Electric with 23.6 percent (CPUC 2015).

Senate Bill 350

Effective on January 1, 2016, Senate Bill (SB) 350 raised the RPS for both investor and publicly owned utilities for the amount of electricity generated and sold to retail

customers per year from eligible renewable energy resources from 33 percent to 50 percent by 2030.

Senate Bill 100

Effective September 10, 2019, SB 100 revised the above-described legislative findings and declarations to state that the goal of the program is to achieve 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by 2045. This bill sets interim renewable energy resources targets of 50 percent renewable energy resources by 2026 and 60 percent renewable energy resources by 2030.

5.7.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address reduction in combustion of fossil fuels to produce electricity, reduction in electricity use, and management of peak energy loads.

5.7.4 Impact Analysis

5.7.4.1 Methods of Analysis

Project impacts on energy fall into three categories: (1) impacts to consumption of power due to changes in SWP operations; (2) impacts to hydropower generation and pumping associated with changes in water levels and conveyance; and, (3) potential conflict with local General Plans that have been adopted for the purpose of improving energy efficiency.

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing energy use.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to energy use. However, the timing of availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this energy analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.7.4.2 Standards of Significance

As described in Appendix F of the CEQA Guidelines, an EIR must include a discussion of a proposed project's impacts on energy, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (PRC section 21100(b)(3)). Appendix F lists possible energy impacts and suggested mitigation measures designed to assist in preparing an EIR. Consistent with Appendix F, an impact to energy use is considered significant if implementation of the proposed project would cause any of the following:

- Inefficient, wasteful, or unnecessary long-term consumption of energy to energy consumption due to construction-related activities;
- inefficient, wasteful, or unnecessary long-term consumption of energy to energy consumption or hydroelectric generation due to operations and maintenance of constructed facilities or pumping associated with changes in water levels and conveyance; and
- Potential conflict with applicable plans, policies, or regulations of local counties that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels.

5.7.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities (including hydropower facilities) and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and therefore there would be no substantial inefficient, wasteful, or unnecessary long-term consumption of energy or changes in hydropower generation. Furthermore, because no new facilities

would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no inefficient, wasteful, or unnecessary long-term consumption of energy or changes in hydropower generation. As a result, no impacts associated with construction and operation of new or modified facilities would occur and no mitigation measures are required.

Therefore, these impacts are not further evaluated in this DEIR.

5.7.4.4 Impacts and Mitigation Measures

Table 5.7-1 summarizes the impact conclusions presented in this section by proposed amendment for easy reference.

**TABLE 5.7-1
SUMMARY OF IMPACTS CONCLUSIONS – ENERGY**

Impact Statement	Transfers	Exchanges
5.7-1: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in inefficient, wasteful, or unnecessary long-term consumption of energy or changes to hydropower generation in the study area.	LTS	LTS
5.7-2: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in increased energy consumption due to growth inducement that conflicts with applicable plans, policies, or regulations of local county and/or State energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels in the study area.	LTS	LTS
5.7-3: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could conflict with applicable plans, policies, or regulations of local county and/or State energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels in the study area.	LTS	LTS

LTS: Less than Significant

Impact 5.7-1: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in inefficient, wasteful, or unnecessary long-term consumption of energy or changes to hydropower generation in the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's

Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

During water transfers, SWP facilities would continue to be operated as efficiently as feasible. Water would be distributed at the lowest possible pressure to minimize friction losses, which would reduce the energy needed for pumping. If additional energy is required for SWP facilities, it may be provided through increases in renewable energy procurement.

Water transfers may use more energy to transfer water from one PWA to the other, and in other cases they may use less energy. Energy needed for water transfers would depend on the parties transferring the water, and the source and destination of the water. Over a multiple year period, energy use as a result of transfers among the PWAs are expected to average in such a way that it is very similar to historical operations with no substantial changes to energy use or hydropower generation.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy (see Section 5.10 Groundwater Hydrology and Water Quality for more information on groundwater pumping and the Sustainable Groundwater Management Act [SGMA]).

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. While DWR has approved water

exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

During water exchanges, SWP facilities would continue to be operated as efficiently as feasible. Water would be distributed at the lowest possible pressure to minimize friction losses, which would reduce the energy needed for pumping. If additional energy is required for SWP facilities, it may be provided through increases in renewable energy procurement.

Water exchanges may use more energy to transfer water from one PWA to the other, and in other cases they may use less energy. Energy needed for water exchanges would depend on the parties transferring the water, and the source and destination of the water. Over a multiple year period, energy use as a result of exchanges among the PWAs are expected to average in such a way that it is very similar to historical operations with no substantial changes to energy use or hydropower generation.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy (see Section 5.10 Groundwater Hydrology and Water Quality for more information on groundwater pumping and SGMA).

Impact Conclusion

The proposed project will not cause wasteful, inefficient, or unnecessary use of energy or require changes to hydropower generation. The impact is **less than significant**.

Mitigation Measures

None required.

Impact 5.7-2: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in increased energy consumption due to growth inducement that conflicts with applicable plans, policies, or regulations of local county and/or State energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels in the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions. After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

As discussed in Chapter 6 Other CEQA Considerations, indirect growth as a result of water transfers or exchanges is not anticipated. In addition, it is assumed that energy standards, such as the Energy Policy Acts 2005, promote strategic planning that reduce consumption of fossil fuels, increase use of renewable resources, and enhance energy efficiency would be followed by DWR and the PWAs. In general, these regulations and policies specify strategies to reduce fuel consumption and increase fuel efficiencies and energy conservation. It is anticipated that the proposed project would conform to applicable plans, policies, or regulations of local county and/or state energy standards.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

As discussed in Chapter 6 Other CEQA Considerations, indirect growth as a result of water transfers or exchanges is not anticipated. In addition, it is assumed that energy

standards, such as the Energy Policy Acts 2005, promote strategic planning that reduce consumption of fossil fuels, increase use of renewable resources, and enhance energy efficiency would be followed by DWR and the PWAs. In general, these regulations and policies specify strategies to reduce fuel consumption and increase fuel efficiencies and energy conservation. It is anticipated that the proposed project would conform to applicable plans, policies, or regulations of local county and/or state energy standards.

Impact Conclusion

State and local energy plans, policies and regulations will not be affected by water transfers and exchanges. The impact is **less than significant**.

Mitigation Measures

None required.

Impact 5.7-3: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could conflict with applicable plans, policies, or regulations of local county and/or State energy standards that have been adopted for the purpose of improving energy efficiency or reducing consumption of fossil fuels in the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is assumed that energy standards, such as the Energy Policy Acts 2005, promote strategic planning that reduce consumption of fossil fuels, increase use of renewable resources, and enhance energy efficiency would be followed by DWR and the PWAs. In general, these regulations and policies specify strategies to reduce fuel consumption and increase fuel efficiencies and energy conservation. It is anticipated that the proposed project would conform to applicable plans, policies, or regulations of local county and/or state energy standards.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

It is assumed that energy standards, such as the Energy Policy Acts 2005, promote strategic planning that reduce consumption of fossil fuels, increase use of renewable resources, and enhance energy efficiency would be followed by DWR and the PWAs. In general, these regulations and policies specify strategies to reduce fuel consumption and increase fuel efficiencies and energy conservation. It is anticipated that the proposed project would conform to applicable plans, policies, or regulations of local county and/or state energy standards.

Impact Conclusion

State and local energy plans, policies and regulations will not be affected by water transfers and exchanges. The impact is **less than significant**.

Mitigation Measures

None required.

5.7.5 References

- CPUC (California Public Utilities Commission). 2015. California Renewables Portfolio Standard. April 6, 2015. Available: www.cpuc.ca.gov/PUC/energy/Renewables. Accessed April 10, 2015.
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5.8 GEOLOGY, SOILS, AND MINERAL RESOURCES

5.8.1 Introduction

This section addresses geologic conditions, soil characteristics, and mineral resources in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments addressing geologic conditions, soil characteristics, or mineral resources were received in response to NOP (see Appendix B).

Groundwater resources, including impacts associated with land subsidence as a result of groundwater pumping, are discussed in Section 5.10, Groundwater Hydrology and Water Quality.

5.8.2 Environmental Setting

The geological setting in regions which the project traverses is varied and complex. The geological setting for the study area is essentially the geological setting for most of the state of California. This section describes the geology and geomorphology, seismicity and neotectonics (current tectonic activity occurring within the past 1.6 million years, called the Quaternary Period), soils, and mineral resources located within the SWP study area.

5.8.2.1 *Geology and Geomorphology*

The SWP traverses 6 of the 12 geomorphic provinces in California: the Sierra Nevada, the Great Valley, the Coast Ranges, the Transverse Ranges, the Peninsular Ranges, and the Colorado Desert. These geomorphic provinces are based on landforms and late Cenozoic structural and erosional history (Norris and Webb 1990), and are summarized below (CGS 2002):

- **Sierra Nevada Province:** Deep river canyons are cut into the western slope of the Sierra Nevada Province. Their upper courses, especially in massive granites of the higher Sierra, are modified by glacial sculpturing, forming such scenic features as Yosemite Valley. Metamorphic bedrock contains gold-bearing veins in the northwest trending Mother Lode.
- **Great Valley Province:** The Great Valley is an alluvial plain in central California in which sediments have been deposited almost continuously over the last 160 million years. Its northern part is the Sacramento Valley and its southern part is the San Joaquin Valley.
- **Coast Ranges Province:** Between the Pacific Ocean and the Great Valley Province lay the Coast Ranges. The sedimentary Coast Ranges south of San Francisco Bay are subparallel to the San Andreas Fault.

- **Transverse Ranges Province:** The Transverse Ranges are an east-west trending series of steep mountain ranges and valleys in Southern California. The Transverse Ranges is one of the most rapidly rising regions on earth.
- **Peninsular Ranges Province:** The Peninsular Ranges are between the Pacific Ocean and the Colorado Desert, and include a series of valleys which lay subparallel to faults branching from the San Andreas Fault. The Peninsular Ranges Province encompasses the Los Angeles Basin. Geology of the Peninsular Ranges includes granitic rock intruding older metamorphic rocks.
- **Colorado Desert Province:** The Colorado Desert Province is a depressed block between active branches of the San Andreas Fault; it lies well below sea level. The province is characterized by alluvium. The Salton Sea is located in the Colorado Desert Province.

5.8.2.2 Seismicity and Neotectonics

Much of California is subject to neotectonics. This activity is responsible for continued uplift of the Transverse Ranges. The 600-mile-long San Andreas Fault and numerous associated smaller faults are also active. Both the Sierra Nevada and Central Valley provinces are part of the Sierra Nevada microplate, which is one component of a broad tectonically active belt that accommodates motion between the North American plate to the east and the Pacific plate to the west (CGS 2002; Wakabayashi and Sawyer 2001).

Although a fault rupture can cause significant damage along its narrow surface trace, earthquake damage is mainly caused by strong, sustained groundshaking (WG02 2003). Seismic groundshaking can also cause soils and unconsolidated sediments to compact and settle. If compacted soils or sediments are saturated, pore water is forced upward to the ground surface, forming sand boils or mud spouts. This soil deformation, called liquefaction, may cause minor to major damage to infrastructure. Earthquake groundshaking hazard potential is low in most of the Sacramento and San Joaquin valleys and Sierra Nevada foothills. The potential increases along the western side of the valley, and into the Coast Ranges. The Delta, San Francisco Bay area, and much of Southern California are located near major, active faults and have a higher potential for groundshaking (CSSC 2003).

5.8.2.3 Soils

The development of individual soils is based largely on parent material, climate, associated biology, topography, and age. These factors combine to create the more than 2,000 unique soils in the State. Soil characteristics and issues are generally similar within each of the various physiographic regions in the state. In most of the SWP service area, the dominant soil type is loam, while sandier soils are commonly found in the alluvium of Southern California (University of California 1980).

The accumulation of salts in the soils of the San Joaquin Valley is due to a combination of the regional geology, high water table, intensive irrigation and fertilization practices, and the importation of water from the Delta that is high in salinity. Excess salinity is harmful to plants including crops. The dominant form of salinity in the San Joaquin Valley, sodium sulfate, adversely affects soil structure, reducing permeability and hydraulic connectivity, and further impacting plant growth (San Joaquin Valley Drainage Implementation Program Salt Utilization Technical Committee 1999).

Soils in the Delta remained saturated with water over thousands of years, allowing organic matter to accumulate faster than it could decay. These soils are typically dark and acidic because of their high organic matter content, and are usually referred to as peat. Drainage of Delta peat soils for agricultural production has allowed the decomposition process to accelerate, and in many areas the oxidation of peat soils has led to subsidence. In areas that remain saturated, peat soils can emit flammable gases such as methane.

5.8.2.4 Mineral Resources

The SWP study area includes large area of the State with diverse geological formation and regions that contain many different kinds of valuable mineral resources, including gold, silver, iron, clays, bentonite clay, aggregate, feldspar, gemstones, gypsum, iron ore (used in cement manufacturing), lime, magnesium compounds, perlite, pumice, salt, soda ash, and zeolites (DOC 2014).

5.8.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on geology, soils and minerals resources.

5.8.3.1 Federal

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act, amended 2004, (42 U.S. Code 7701 et. seq.) 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.” To accomplish this, the act established the National Earthquake Hazards Reduction Program. The National Earthquake Hazards Reduction Program Act (NEHRPA) significantly amended this program in November 1990 by refining the description of agency responsibilities, program goals, and objectives. The NEHRPA designates the Federal Emergency Management Agency as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities.

5.8.3.2 State

Geologic/Seismic Regulations

1990 Seismic Hazards Mapping Act

The 1990 Seismic Hazards Mapping Act (PRC sections 2690 through 2699.6) addresses strong ground shaking, liquefaction, landslides, or other ground failures as a result of earthquakes. This act requires statewide identification and mapping of seismic hazard zones, which would be used by cities and counties to adequately prepare the safety element of their General Plans and protect public health and safety. Local agencies are also required to regulate development in any seismic hazard zones, primarily through permitting. Permits for development projects are not issued until geologic investigations have been completed and mitigation measures have been developed to address identified issues.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (PRC section 2621) was passed by the California Legislature to mitigate the hazard of surface faulting to structures. The act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

California Building Standards Code

The State of California provides minimum standards for building design through the California Building Standards Code (CBC) (see Title 24, Part 2, Table 18-1-B). Where no other building codes apply, Chapter 29 regulates excavation, foundations, and retaining walls. The CBC also applies to building design and construction in the State and is based on the Federal Uniform Building Code used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with numerous more detailed and/or more stringent regulations.

The State's earthquake protection law (California Health and Safety Code, section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC identifies seismic factors that must be considered in structural design.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, and Appendix Chapter A33 regulates grading activities, including drainage and erosion control, and construction on unstable soils such as expansive soils and liquefaction areas.

Mineral Resources

The Surface Mining and Reclamation Act (SMARA), Chapter 9, Division 2 of the Public Resources Code, requires the State Mining and Geology Board to adopt State policy for the reclamation of mined lands and the conservation of mineral resources. These policies are prepared in accordance with the Administrative Procedures Act, (Government Code) and are found in California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1. The California Mining and Geology Board is responsible for classifying mineral resources and designates specific areas as containing significant mineral resources based on a four zone mineral resource ranking system (with two zones broken into an a and b configuration). The four mineral resource zones (MRZs) are listed below:

- MRZ-1: Areas where adequate information is available to indicate that no significant mineral deposits exists or are likely to exist.
- MRZ-2a: Areas where mineral deposits are underlain where geologic data indicate the presence of measured or indicated resources.
- MRZ-2b: Areas where mineral deposits are underlain where geologic data indicate the inferred presence of resources.
- MRZ-3a: Areas holding known mineral deposits that may qualify as mineral resources.
- MRZ-3b: Areas holding inferred mineral deposits that may qualify as mineral resources.
- MRZ-4: Areas where, based on geologic information, neither the presence or absence of mineral resources can be determined (DOC 2000).

5.8.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address seismic safety, soil constraints, and mineral resources.

Typically, General Plans incorporate provisions of the Surface Mining and Reclamation Act that protect significant mineral resources from incompatible land uses and regulate

mining operations and reclamation. General Plans typically include mechanisms for controlling pollutant discharges in construction site runoff, including requiring grading plans and engineered erosion, sediment, and runoff control plans. Local permits are generally required for construction activities, and construction projects must conform to local drainage and erosion control policies and ordinances. Some General Plans also contain policies to conserve soil as a resource, without regard to its agricultural suitability or prime farmland status (Reclamation et al. 2013).

5.8.4 Impact Analysis

5.8.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing geologic conditions, soil characteristics, and mineral resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) could result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that may result in a change to geologic conditions, soil characteristics, and mineral resources. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.8.4.2 Thresholds of Significance

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

- Expose people or structures to 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
- 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 landslides, 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 risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.
- Result in the loss of availability of a known mineral resource that would be of 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.

5.8.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no change in earth disturbance, rate or amount of soil erosion, or the loss of topsoil; and no loss of a known mineral resource or a locally-important mineral resource recovery site.

Structures would be not constructed as part of the proposed project, therefore people or structures would not be exposed to risk of loss, injury, or death associated with fault rupture, ground shaking, seismic-related ground failure, landslides, unstable soils, or expansive soils. In addition, as structures would not be built, the proposed project would not be located on a geologic unit or soil that is unstable and potentially result in on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse.

The operation of the proposed project is not anticipated to potentially result in on- or off-site landslides, lateral spreading, liquefaction or collapse, or that would become

unstable as a result of the project as no new or modified facilities would be constructed or operated as a result of the proposed project. Additionally, because no new facilities would be constructed or operated, there would be no related concerns regarding the capability of soils to adequately support the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

As a result, no impacts to geologic conditions, soil characteristics, and mineral resources in the study area associated with construction and operation of new or modified facilities would occur and no mitigation measures are required. Therefore, these impacts are not further evaluated in this DEIR.

5.8.4.4 Impacts and Mitigation Measures

Table 5.8-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.8-1
SUMMARY OF IMPACTS CONCLUSIONS – GEOLOGY, SOILS, AND SEISMICITY**

Impact Statement	Transfers	Exchanges
5.8-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in substantial soil erosion or loss of topsoil in the study area.	LTS	LTS
LTS: Less than Significant		

Impact 5.8-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in substantial soil erosion or loss of topsoil in the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A Amounts. Most water transfers would occur south of the Delta and would not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for

additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study. Land that is fallowed or is more susceptible to soil erosion or loss of topsoil because there is reduced vegetative cover to secure the soil and prevent soils from being blown or washed away. However, additional water transfers are not expected to substantially affect soil erosion or loss of topsoil because, as discussed in Section 5.3 Agricultural and Forest Resources, these lands would remain in agricultural use as dry farmed or fallow land. Furthermore, additional water transfers are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study. Land that is fallowed or is more susceptible to soil erosion or loss of topsoil because there is reduced vegetative cover to secure the soil and prevent soils from being blown or washed away. However, additional exchanges are not expected to substantially affect soil erosion or loss of topsoil because, as discussed in Section 5.3 Agricultural and Forest Resources, these lands would remain in agricultural use as dry farmed or fallow land. Furthermore, additional water exchanges are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Impact Conclusion

It is possible that transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in cropping patterns in the study area which could lead to a reduction of vegetation cover resulting in an increase in the rate of soil erosion or loss of topsoil; however, these changes would not be considered significant because these lands would remain in agricultural use. Therefore, changes in agricultural practices would not be expected to result in a substantial change in soil disturbance and associated wind-generated erosion as a result of the proposed project. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

5.8.5 References

- CGS (California Geological Survey). 2002. California Geomorphic Provinces, Note 36.
- CSSC (California Seismic Safety Commission). 2003. Earthquake shaking potential for California. Publication No. 03-02. Available: www.seismic.ca.gov/pub/shaking_18x23.pdf. Accessed March 11, 2008.
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5.9 GREENHOUSE GAS EMISSIONS

5.9.1 Introduction

This section provides background information on GHG emissions and associated regulatory framework, and addresses the potential changes that could occur as a result of implementing the proposed project. Climate Change is discussed in Chapter 8 Climate Change and Resiliency. No comments related to the production of GHGs were received in response to the NOP (see Appendix B).

5.9.2 Environmental Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth. Local GHG emissions contribute in a cumulative manner to influence global GHG concentrations in the atmosphere, which in turn contribute to changes in global climatic patterns and other natural phenomena. This section describes the current knowledge of GHG and its relationship to climate change, globally and in California.

5.9.2.1 Greenhouse Gases and Climate Change

Global climate change refers to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuing rise. The IPCC reported that the globally averaged combined land and ocean surface temperature data show a warming of 1.53 degrees Fahrenheit (°F) (0.85 degrees Celsius (°C)) over the period 1880 to 2012 (Intergovernmental Panel on Climate Change [IPCC] 2014a).

The causes of this warming have been identified as both natural processes and human actions. IPCC concludes that variations in natural phenomena such as solar radiation and volcanic eruptions produced most of the warming from pre-industrial times to 1950. However, after 1950, increasing GHG concentrations resulting from human activities,

such as the use of fossil fuels and deforestation, have been responsible for most of the observed temperature increase. More than half of the observed increase in global average surface temperatures from 1951 to 2010 was likely caused by the anthropogenic increase in GHG emissions (IPCC 2014a).

Some GHGs occur naturally and are necessary for keeping the Earth's surface habitable. GHGs naturally trap heat by impeding the exit of solar radiation that has entered the Earth's atmosphere that would otherwise reflect back into space. Because increases in the concentrations of these gases in the atmosphere during the last hundred years have decreased the amount of solar radiation that is reflected back into space, there has been an increase of global average temperatures.

The principal GHGs of concern are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), perfluorocarbons (PFC), and hydrofluorocarbons (HFC). Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). The potential heat trapping ability of each of these gases vary significantly from one another. For example, CH₄ is 23 times as potent as CO₂, while SF₆ is 22,200 times more potent than CO₂. GHGs are typically reported in CO₂ equivalents (CO₂e). CO₂e takes into account the relative potency of non-CO₂ GHGs and converts their quantities to an equivalent amount of CO₂ so that all GHG emissions can be reported as a single quantity.

The primary man-made processes that release GHGs include, but are not limited to: burning of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release CH₄ such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of gases with high global warming potential, such as SF₆, PFC, and HFC. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO₂ from the air and altering the Earth's albedo or surface reflectance, allowing more solar radiation to be absorbed. For additional discussion of climate change, see Chapter 8 Climate Change and Resiliency.

5.9.2.2 Greenhouse Gas Emissions Inventories

A GHG inventory involves quantification of all GHG emissions within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (i.e., for global or national entities) or on a small scale (i.e., for a particular building or person). While quantification of GHGs can be complex, several agencies have developed tools to streamline quantification of emissions from certain sources. **Table 5.9-1** outlines the most recent global, national and statewide GHG inventories to help contextualize the magnitude of potential project-related emissions. Transportation, energy consumption

(residential, commercial, and industrial electricity usage and fuel consumption), and agriculture are the largest emitters of GHGs in the study area.

**TABLE 5.9-1
GLOBAL, NATIONAL, STATE, AND LOCAL GHG EMISSIONS INVENTORIES**

Emissions Inventory	CO₂e (metric tons (mtCO₂e))
2010 IPCC Global GHG Emissions Inventory	49,000,000,000
2010 USEPA National GHG Emissions Inventory	6,673,000,000
2016 CARB State GHG Emissions Inventory	429,400,000
Sources: IPCC, 2014b; USEPA, 2016; CARB, 2018.	

5.9.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on GHG emissions.

5.9.3.1 Federal

Mandatory Greenhouse Gas Reporting Rule

The USEPA is the federal agency responsible for implementing the CAA and its amendments. The Supreme Court of the United States ruled on April 2, 2007 that CO₂ is an air pollutant as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. The ruling in this case resulted in the USEPA taking steps to regulate GHG emissions and lent support for state and local agencies' efforts to reduce GHG emissions.

On September 22, 2009, the USEPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year 2008 Consolidated Appropriations Act (Public Law 110-161), that required the USEPA to develop "... mandatory reporting of GHGs above appropriate thresholds in all sectors of the economy...." The Reporting Rule applies to most entities that emit 25,000 metric tons (mt) of CO₂e or more per year. Starting in 2010, facility owners are required to submit an annual report with detailed calculations of facility GHG emissions. The Reporting Rule also mandates recordkeeping and administrative requirements in order for USEPA to verify annual GHG emissions reports.

Federal Clean Air Act

The Federal Clean Air Act (CAA) (42 U.S. Code section 7401 et seq.) of 1970 is the comprehensive Federal law that regulates air emissions from stationary and mobile

sources. Among other things, this law requires USEPA to establish air quality standards and regulate the emission of air pollutants. The CAA has been amended numerous times; in 2007, the U.S. Supreme Court held that USEPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency et al.*, 12 states and cities, including California, together with several environmental organizations sued to require the USEPA to regulate GHGs as pollutants under the CAA (127 S. Ct. 1438 (2007)). The Supreme Court ruled that GHGs fit within the CAA's definition of a pollutant and the USEPA had the authority to regulate GHGs.

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- **Endangerment Finding:** The current and projected concentrations of the six key GHGs—CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆—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.

5.9.3.2 State

The legal framework for GHG emission reduction has come about through Governors' Executive Orders, legislation, and regulation. The major components of California's climate change initiative are described below.

California Environmental Quality Act and Greenhouse Gas Emissions

CEQA Guidelines section 15064.4 specifically addresses the significance of GHG emissions, requiring a lead agency to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents. Section 15064.4 further states that the analysis of GHG impacts should include consideration of: (1) the extent to which the project may increase or reduce GHG emissions; (2) whether the project emissions would exceed a locally applicable threshold of significance; and (3) the extent to which the project would comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions." The CEQA Guidelines also state that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of GHG emissions) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (CEQA Guidelines section

15064(h)(3)). The CEQA Guidelines do not, however, set a numerical threshold of significance for GHG emissions.

The CEQA Guidelines also include the direction on measures to mitigate GHG emissions, when such emissions are found to be significant (CEQA Guidelines section 15126.4(a).)

California Clean Air Act

Air quality planning programs have generally been developed in response to requirements established by the CAA of 1972 and subsequent amendments to the act; however, the enactment of the CCAA of 1988 produced additional changes in the structure and administration of air quality management programs in California. The CARB is responsible for coordinating and overseeing State and local air pollution control programs in California and for implementing the CCAA.

California Health and Safety Code Sections 42823 and 43018.5 (Assembly Bill 1493)

In 2002, then-Governor Gray Davis signed AB 1493, which required CARB to develop and adopt regulations to reduce vehicle emissions in the state. To meet the requirements of AB 1493, CARB approved amendments to their regulations adding GHG emissions standards to California's existing standards for motor vehicle emissions. This law resulted in amending Section 42823 of, and adding section 43018.5 to, the California Health and Safety Code. The USEPA granted California a waiver under the CAA in 2009 in light of these higher state standards.

Executive Order S-3-05

In 2005, then-Governor Schwarzenegger established Executive Order (EO) S-3-05, recognizing California's vulnerability to climate change. The EO S-3-05 sets forth a series of target dates by when statewide GHG emissions would be progressively reduced: GHG emissions should be reduced to 2000 levels by 2010; 1990 levels by 2020; and 80 percent below 1990 levels by 2050. Executive Orders apply to State agencies but not to local, regional, or private entities.

Executive Order B-30-15 (Safeguarding California Plan)

In 2015, Governor Brown established EO B-30-15, setting forth a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 is established in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050.

Global Warming Solutions Act and California Public Utilities Code Chapter 3, Section 8340 (Assembly Bill 32 and Senate Bill 1368)

In 2006, the California legislature passed AB 32 (California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), also known as the Global Warming Solutions Act. AB 32 requires CARB to design and implement feasible limits, regulations, and other measures to reduce statewide GHG emissions to 1990 levels by 2020 (representing a 25-percent reduction in emissions). AB 32 anticipates that the GHG reduction goals will be met, in part, through local government actions. The CARB has identified a GHG reduction target of 15 percent from current levels for local governments.

Pursuant to AB 32, the CARB adopted a Climate Change Scoping Plan in December 2008 (reapproved by the CARB on August 24, 2011) outlining measures to meet the 2020 GHG reduction goals.

The CARB manages a Cap-and-Trade Program, which is an integral element of meeting the goals of AB 32. The Cap-and-Trade Program is a key element of California's climate plan and sets a statewide limit on sources responsible for 85 percent of California's GHG emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest-cost options to reduce emissions. The Cap-and-Trade Program began in 2013 for electricity generators and large industrial facilities emitting 25,000 mtCO₂e or more annually, and in 2015 for distributors of natural gas and other fuels. DWR does not operate facilities that emit 25,000 mtCO₂e or more, and is not involved with the Cap-and-Trade program.

SB 1368, which added Section 8340 to the California Public Utilities Code, is the companion bill of AB 32. SB 1368, codified in Section 8340 of Division 4.1 of the California Public Utility Code, required the CPUC to establish a GHG emission performance standard for baseload generation from investor-owned utilities. The CEC was also required to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

California Renewable Energy Resources Act, adding and amending various sections of the Fish and Game Code, PRC, and Public Utilities Code. This Act codified California's commitment to expanding the State's RPS to include 33 percent renewable power by

2020. This RPS goal applies to all electricity retailers in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must adopt the goals of 20 percent of retail sales from renewables by the end of 2013 and 25 percent by the end of 2016, with the 33 percent requirement being met by the end of 2020. In 2016, PG&E served 32.9 percent of its retail customers with renewable energy, while Southern California Edison served its customers with 28.2 percent, and San Diego Gas & Electric with 43.2 percent (CPUC 2017).

DWR Climate Action Plan, Phase 1: Greenhouse Gas Emissions Reduction Plan

DWR's Greenhouse Gas Emissions Reduction Plan (GGERP) details DWR's progress and future plans for reducing GHG emissions consistent with the GHG emissions reduction targets established in AB 32, EO S-3-05, and department-specific policies. The GGERP also outlines DWR's plan to monitor its progress and to reduce its emissions by over 80 percent below 1990 levels (DWR 2012).

The GGERP provides estimates of historical (going back to 1990), current, and future GHG emissions related to operations (e.g., energy use), construction (e.g., bulldozers), maintenance (e.g., flood protection facility upkeep), and business practices (e.g., DWR building-related emissions). The GGERP specifies aggressive 2020 and 2050 emission reduction goals and identifies a list of GHG emissions reduction measures that DWR will undertake to achieve these goals.

GHG emissions related to SWP operations account for 98 percent of emissions from DWR activities. The overwhelming majority of DWR GHG emissions are emitted by non-hydroelectric-generation facilities which are needed to supply energy to move water through the SWP. These facilities emit between 1.2 million and 4.1 million mtCO₂e per year, with an average production of 2.4 mtCO₂e per year from 2007 to 2010. Emissions related to construction represent the second largest source of GHG emissions from DWR's activities, but are less than two percent of DWR's total GHG emissions.

Chapter 12 of DWR's GGERP outlines how individual projects can demonstrate consistency with the GGERP so that they may rely on the analysis it provides for the purposes of a CEQA cumulative GHG impacts analysis.

In addition, if implementation of the proposed project would result in additional energy demands on the SWP system of 15 gigawatt hour (GWh) per year or greater, the project must perform additional analyses with the DWR SWP Power and Risk Office. From these analyses, DWR will determine any additional necessary steps beyond those identified in the GGERP to achieve its emissions reduction goals.

5.9.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Enforcement of the FCAA through permitting of all air pollution and emissions from stationary sources (non-vehicular sources), rests primarily with the local and regional air pollution control authorities known as APCDs or AQMDs. These local air districts issue permits for construction and operation of facilities. Furthermore, each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address air quality. Each of these counties and cities has General Plans with unique goals and policies that address GHG emissions, including Climate Action Plans.

5.9.4 Impact Analysis

5.9.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes associated with GHG emissions.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes in energy use that could lead to increased GHG emissions. However, the timing of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this GHG emissions analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

As stated previously, the geographic scope of potential cumulative GHG impacts encompasses the numerous local air districts and county jurisdictional areas and statewide, national, and international boundaries. However, for purposes of practicality and reasonableness (see CEQA Guidelines section 15130(b)), this analysis focuses on the State as a reasonable geographic boundary, including considerations related to effects on the attainment of State global climate change policies.

GHG emission-related impacts are cumulative impacts by nature; therefore, a project-specific evaluation cannot determine the level of potential impact (CAPCOA 2008). Thus, the analysis and conclusions provided below consider the cumulative effects of GHG emissions. Overall, the approach to evaluate project-level cumulative GHG emissions should be consistent with the GGERP.

5.9.4.2 Standards of Significance

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

- generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or,
- conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

5.9.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as use of equipment) would not occur and there would be no short-term increases in GHG emissions.

Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent increase in GHG emissions. As a result, no impacts associated with construction and operation of new or modified facilities would occur and these impacts are not further evaluated in this DEIR.

5.9.4.4 Impacts and Mitigation Measures

Table 5.9-2 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.9-2
SUMMARY OF IMPACTS CONCLUSIONS – GREENHOUSE GAS EMISSIONS**

Impact Statement	Transfers	Exchanges
5.9-1: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in an increase in GHG emissions.	LTS	LTS
LTS: Less than Significant		

Impact 5.9-1: Changes in pumping associated with changes in transfers and exchanges implemented by PWAs could result in an increase in GHG emissions.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR’s approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA’s Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

As described in Section 5.7, Energy, during water transfers, SWP facilities would continue to be operated as efficiently as feasible. Furthermore, if additional energy is required for SWP facilities it may be provided through increases in renewable energy procurement. In addition, increased water transfers among the PWAs could use more energy, and in other cases they may use less energy. Energy needed for water transfers would depend on the parties transferring the water, and the source and destination of the water. Over a multiple year period, energy use as a result of transfers are expected to average in such a way that it is very similar to historical operations with no substantial changes to energy use or hydropower generation. Therefore, increased

transfers attributed to the proposed project would not be anticipated to result in a substantial increase in GHG emissions.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. As described in Section 5.7, Energy, during water exchanges, SWP facilities would continue to be operated as efficiently as feasible. Furthermore, if additional energy is required for SWP facilities it may be provided through increases in renewable energy procurement. In addition, increased water exchanges among the PWAs could use more energy, and in other cases they may use less energy. Energy needed for water exchanges would depend on the parties transferring the water, and the source and destination of the water. Over a multiple year period, energy use as a result of exchanges are expected to average in such a way that it is very similar to historical operations with no substantial changes to energy use or hydropower generation. Therefore, increased water exchanges attributed to the proposed project would not be anticipated to result in a substantial increase in GHG emissions.

Impact Conclusion

It is possible that increase in transfers and exchanges could result in a slight increase in energy use in the study area; however, if more energy would be required, it would be provided through increases in renewable energy procurement. Furthermore, over a multiple year period, energy use would be expected to average in such a way that it is very similar to historical operations with no substantial changes to energy use or hydropower generation. In addition, SWP facilities would continue to be operated as efficiently as feasible and in compliance with the GGERP. Under the GGERP, DWR has established department-wide GHG emissions goals and identified activities to meet those goals, which are consistent with AB 32 and subsequent related state laws and regulations. DWR has also developed procedures to determine a proposed project's consistency with the GGERP. The proposed project would be considered not likely to create significant impacts or conflicts to the goals and objectives established through AB 32 and subsequent related state law and regulations, if all potential impacts can be managed and mitigated through procedures and protocols established in the GGERP.

Therefore, changes in the frequency, duration, and timing of water transfers and exchanges would not be anticipated to result in a substantial increase in GHG emissions and these impacts would be **less than significant**.

Mitigation Measures

None required.

5.9.5 References

- CAPCOA (California Air Pollution Control Officers Association). 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. January 2008.
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5.10 GROUNDWATER HYDROLOGY AND WATER QUALITY

5.10.1 Introduction

This section describes groundwater resources, including supply and quality, in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments addressing groundwater hydrology or water quality were received in response to NOP (see Appendix B).

5.10.2 Environmental Setting

The proposed project geographic setting encompasses the SWP facilities and PWA service areas. Groundwater basins within these areas are located within portions of the Sacramento River, San Joaquin River, Tulare Lake, San Francisco Bay Area, Central Coast, Colorado River, and Lahontan hydrologic regions. More than 70 percent of California's groundwater extraction occurs in the Central Valley from Tulare Lake, San Joaquin River, and Sacramento River hydrologic regions combined; therefore, these hydrologic regions are described in greater detail than the other regions in the following sections. Information specific to groundwater resources includes groundwater levels and budget and groundwater quality (DWR 2003).

DWR develops statewide reports on the status of California's water resources and groundwater resources on a periodic basis, including the California Water Plan and Bulletin 118. The California Water Plan is updated every five years and is the State's strategic plan for sustainably managing and developing water resources for current and future generations. Currently, DWR is working on Water Plan Update 2018. Bulletin 118 is California's official publication on the occurrence and nature of groundwater statewide. Bulletin 118 defines the boundaries and describes the hydrologic characteristics of California's groundwater basins and provides information on groundwater management and recommendations for the future. With the passage of the SGMA in 2014), Bulletin 118 now serves an additional role by providing Groundwater Sustainability Agencies (GSAs) with three critical pieces of information regarding groundwater basins: Critical Conditions of Overdraft, Basin Boundaries, and Basin Priority (SGMA is discussed in more detail in Section 5.10.3.2, below). In 2016, DWR released an Interim Update of Bulletin 118, updating information from Bulletin 118 Update 2003 to include time-sensitive information important to implementing the new SGMA, however this 2016 document did not include groundwater production or quality updates. DWR will release comprehensive updates to Bulletin 118 in 2020 and every five years thereafter. Therefore, the information in the following groundwater environmental setting discussion relies on the groundwater resource information from

the 2013 California Water Plan Update, the most recent and best publicly-available Statewide groundwater resource information.

5.10.2.1 Sacramento River Hydrologic Region

Regional Hydrogeology

Groundwater resources in the Sacramento River Hydrologic Region are supplied by both alluvial and fractured rock aquifers. Groundwater resources within the Sacramento River Hydrologic Region are primarily associated with alluvial aquifers within the Great Valley Geomorphic Province in California. Alluvial aquifers are composed of sand and gravel or finer grained sediments, with groundwater stored within the voids, or pore space, between the alluvial sediments.

The majority of the groundwater within the Sacramento River Hydrologic Region is stored in alluvial aquifers within 88 alluvial groundwater basins and subbasins recognized in Bulletin 118: California's Groundwater (DWR 2003). The largest and most heavily used basins are within the Sacramento Valley Groundwater Basin. Within this basin, the North American, Colusa, Solano, Yolo and East Butte subbasins account for 52 percent of the average 2.7 million acre-feet (maf) of groundwater pumped annually during the 2005–2010 period.

Fractured-rock aquifers consist of impermeable granitic, metamorphic, volcanic, and hard sedimentary rocks, with groundwater being stored within cracks, fractures, or other void spaces. Fractured-rock aquifers supply a small portion of the groundwater within the Sacramento River Hydrologic Region, which is generally found in the mountainous area of the hydrologic region between the edge of the alluvial groundwater basin and the foothill areas, and into the surrounding mountains.

Groundwater-Surface Water Interaction

Groundwater resources in the Sacramento River Hydrologic Region are influenced by surface waters in this hydrologic region as sources of recharge or as bodies receiving groundwater inflow. Rivers that bring water from the upland mountainous areas in the form of snowpack spring melt provide a source for recharge to groundwater basins in the alluvial basins of the Central Valley. Groundwater modeling studies of the Sacramento Valley suggest that, on average, the flux of groundwater discharging to the rivers is approximately equal to the quantity of water that leaks from streams to recharge the aquifer system (Glenn Colusa Irrigation District and the Natural Heritage Institute 2010).

In areas with a shallow groundwater table, rivers can receive groundwater inflow, which may contribute to providing a cooling effect to local river water. The Sacramento and

Feather rivers on the valley floor are gaining (water from groundwater enters the rivers) throughout most of the year, except in areas of depressed groundwater levels, where the water table has been artificially lowered through groundwater pumping. In these areas, the rivers are losing (water leaves the rivers and recharges the groundwater system) (Reclamation et al. 2013).

Rivers drain the Coast Ranges and the Sierra Nevada, bringing water into the Central Valley and converging at the confluence of the Sacramento and San Joaquin Rivers; the Delta. These rivers are almost exclusively losing streams in their upper reaches, but transition to gaining streams farther downstream near their confluences with the Sacramento River. In addition to the Sacramento River, the Sacramento Valley has several major creeks that drain the valley including Stony, Cache, Putah, and numerous other west side tributary creeks that flow to the Sacramento River (Reclamation et al. 2013).

Regional Groundwater Production

Between 2005 and 2010 the average annual extraction volume within the Sacramento River Hydrologic Region was approximately 2.7 maf. This accounts for approximately 17 percent of all the groundwater extraction in California (DWR 2013). Groundwater contributes about 31 percent of the total water supply within this region; with extraction of 2.4 maf to meet approximately one-third of agricultural demands and extraction of approximately 465 thousand acre-feet (taf) to meet half of the urban water demand (DWR 2013).

Groundwater Quality

Regional and statewide groundwater quality monitoring information and data are available on the State Water Board Groundwater Ambient Monitoring and Assessment (GAMA) web site and the GeoTracker GAMA groundwater information system developed as part of the Groundwater Quality Monitoring Act of 2001. Primary constituents of concern in the hydrologic region include arsenic, boron, localized contamination by organic compounds and nitrates, and chromium 6 (DWR 2013).

High concentrations of arsenic are found in wells along the Sacramento and Feather rivers. Boron has been detected at concentrations greater than the non-regulatory human-health notification levels of 1,000 micrograms per liter ($\mu\text{g/L}$) in several aquifers located within southern and middle parts of the Sacramento Valley from wells located along Cache and Putah creeks. The solvent tetrachloroethylene (PCE) has been detected in some public supply wells in Butte and Sacramento counties at concentrations that exceed the maximum contaminant level (MCL) or drinking water standards. Nitrate levels in most public water supply wells in the region are below

drinking water standards, but some wells in the Sacramento River Hydrologic Region have occasionally exceeded the nitrate MCL. Additional areas in the Sacramento River Hydrologic Region that have high nitrate levels include Chico and the Antelope area of Red Bluff. Chromium-6 has been detected at concentrations above the detection limit (above 1 µg/L) in many active and standby public wells along the west or valley portion of the Sacramento Valley (DWR 2013).

Land Subsidence

Subsidence in California is occurring because of: (1) aquifer compaction caused by pumping-related reduction of groundwater levels; (2) compaction and disappearance of soils with high organic content due to development (Reclamation 1997); (3) recent (Quaternary) tectonic activity; and (4) subsidence due to collapsible near-surface soils. This discussion focuses on subsidence due to category one, aquifer compaction caused by pumping related reduction of groundwater levels.

In the Sacramento River Hydrologic Region, land subsidence associated with groundwater withdrawal was observed in the early part of the twentieth century in Yolo County (Ikehara 1995), and has since been documented in the North American subbasin as well. Between 1925 and 1977, land in the area of Zamora and Knights Landing in Yolo County sank by as much as 6 feet. Subsidence slowed until the drought of 1978-1993, which led to increased groundwater pumping and associated subsidence (Water Education Foundation 2018).

DWR has established a Sacramento Valley subsidence monitoring network that has shown land subsidence in some areas. Land subsidence had exceeded 1 foot by 1973 in two areas in the southwestern part of the valley near Davis and Zamora (DWR 2003). The Zamora site has been monitored since 1992 and shows a total land displacement of over 1 foot with an average subsidence of 0.05 feet per year (DWR 2013).

5.10.2.2 San Joaquin River Hydrologic Region

Regional Hydrogeology

Groundwater resources in the San Joaquin River Hydrologic Region are primarily associated with alluvial aquifers within the Great Valley Geomorphic Province in California. Other geomorphic provinces in the region primarily associated with fractured rock aquifers include the Sierra Nevada to the east and the Coast Ranges to the west.

The majority of the groundwater within the San Joaquin River Hydrologic Region is stored in alluvial aquifers within 11 groundwater basins and subbasins recognized in Bulletin 118 (DWR 2003). The most heavily used subbasins within the San Joaquin Valley Groundwater Basin include Eastern San Joaquin, Modesto, Turlock, Merced,

Chowchilla, Madera, and Delta-Mendota, which account for more than 90 percent of the average 3.2 maf of groundwater pumped annually during the 2005 through 2010 period.

Fractured-rock aquifers in the San Joaquin River Hydrologic Region typically supply individual domestic and stock wells, or small community water systems. These fractured-rock aquifers are typically found in the mountain and foothill areas adjacent to the Cosumnes, Eastern San Joaquin, Modesto, Turlock, Merced, and Madera groundwater basins (DWR 2013).

Groundwater-Surface Water Interaction

In the San Joaquin Valley groundwater basin, long-term groundwater production throughout this basin has lowered groundwater levels beyond what natural recharge can replenish. Groundwater pumping and recharge from imported irrigation water have resulted in a change in regional groundwater flow patterns. Flow largely occurs from areas of recharge toward areas of lower groundwater levels caused by groundwater pumping (Bertoldi et al. 1991). As previously mentioned, most rivers draining the Coast Ranges and the Sierra Nevada into the Central Valley are losing streams that recharge groundwater; this is the case in most of the San Joaquin River. In downstream portions of the San Joaquin River as it enters the Delta, groundwater levels are shallower and groundwater discharges into the river (Reclamation et al. 2013).

Regional Groundwater Production

Groundwater within the San Joaquin River Hydrologic Region is used for agricultural, urban and for managed wetlands. Approximately 81 percent of the region's groundwater extraction supports agricultural needs and 13 percent supports urban needs. The remaining 6 percent of the groundwater use in the region is used to support managed wetlands in the region. Groundwater use in the San Joaquin River Hydrologic Region increased during the 2007 through 2009 drought as a result of reduced surface water supplies in the region. Agricultural groundwater use was estimated to be approximately 1.6 maf in 2005 and increased to more than 3.2 maf by 2009. Groundwater accounted for approximately 38 percent of the estimated average annual total water supply for the region from 2005 through 2010 (DWR 2013).

Groundwater Quality

Regional and statewide groundwater quality monitoring information and data are available on the State Water Board GAMA web site and the GeoTracker GAMA groundwater information system developed as part of the Groundwater Quality Monitoring Act of 2001. Groundwater quality in the San Joaquin River Hydrologic Region varies considerably. Within the San Joaquin Valley Groundwater Basin,

groundwater quality is generally suitable for most urban and agricultural uses (DWR 2003). Primary constituents of concern in the hydrologic region include salinity, nitrate, arsenic, gross alpha particle activity and uranium, chromium 6, and localized contamination by PCE and trichloroethylene (TCE) (DWR 2013).

Salinity management has been a long-term water quality issue in the San Joaquin River Hydrologic Region. Water applied in the western part of the San Joaquin Groundwater Basin for crop irrigation and wetland management via federal, State, and local water projects causes salts in the soil to be leached out of the soil (DWR 2013). Salt is purposefully leached below the root zone to maintain salt balance in the root zone, such that most leached salt ends up in the groundwater (Reclamation et al. 2013). Nitrate concentrations in 24 percent (21 of 88) of the domestic wells sampled from 1993 through 1995 in the regional aquifer survey and land-use studies of the eastern San Joaquin Valley exceeded the drinking-water standard of 10 µg/L established by the USEPA (DWR 2013). Concentrations of nitrate and pesticides in the shallow part of the aquifer system at depths of domestic wells in the study area have increased over time due to continued contributions of recharge water containing these constituents. Concentrations of nitrates and pesticides in the shallow part of the aquifer are likely to move to deeper parts of the groundwater flow system (Burow et al. 2004). Arsenic is generally considered naturally occurring and has been detected in raw and untreated water from public supply wells in the eastern portion of the valley floor and in the foothills of Madera County with levels that exceed the MCL (DWR 2013).

Land Subsidence

Land subsidence in the San Joaquin River Hydrologic Region was first noted near the Delano area in 1935 (Galloway et al. 1999). Since that time, the San Joaquin Valley has undergone several periods of regional aquifer compaction as a result of groundwater extraction, largely for agricultural uses. In the late 1960s and early 1970s, surface water was imported via canals, and the California Aqueduct began importing supplies to the subsiding areas, reducing groundwater pumping and reducing new land subsidence in the western and southern portions of the San Joaquin Valley Groundwater Basin (Ireland 1986). By 1981, subsidence reached nearly 30 feet the greatest subsidence recorded in the United States (Bertoldi et al. 1991). Reduced surface-water availability during 1976 and 1977, 1986 through 1992, 2007 through 2009, and 2012 through 2015 caused groundwater-pumping increases in the San Joaquin Valley, declines in water-levels to near or beyond historic lows, and renewed aquifer compaction. The resulting land subsidence has reduced the freeboard and flow capacity of the Delta-Mendota Canal—as well as the California Aqueduct and other canals that transport floodwater and deliver irrigation water (USGS 2018).

Various programs are under way in the San Joaquin River Hydrologic Region to monitor land subsidence, including California Aqueduct elevation surveys, seven active monitoring sites, Caltrans Highway 152 elevation monitoring and groundwater level monitoring and subsidence (DWR 2013). A USGS study published in 2015 looked at subsidence in the Central Valley (Faunt and Sneed 2015). The study compared historical and recent subsidence patterns, and found that while subsidence has decreased in some areas, it has continued or increased in others. Subsidence along the western San Joaquin Valley has decreased in size and magnitude. Subsidence around Pixley has continued, groundwater levels declined to near or below historical lows during 2007–2010 and 2012–2015. Additionally, subsidence has strongly increased in the El Nido area; this area had the largest subsidence magnitude in the San Joaquin Valley during 2007–2015, and, similar to the Pixley area, groundwater levels declined to near or below historical lows during 2007–2010 and 2012–2015. The Pixley area is more extensive than the El Nido subsidence area, but subsided at a slower rate during 2007–2015.

5.10.2.3 Tulare Lake Hydrologic Region

Regional Hydrogeology

Groundwater resources in the Tulare Lake Hydrologic Region are primarily associated with alluvial aquifers within the Great Valley Geomorphic Province in California. Other geomorphic provinces in the region primarily associated with fractured rock aquifers include the Sierra Nevada to the east and the Coast Ranges to the west.

The majority of the groundwater within the Tulare Lake Hydrologic Region is stored in alluvial aquifers within seven subbasins in the San Joaquin Valley Groundwater Basin and 12 subbasins outside the San Joaquin Valley Groundwater Basin recognized in Bulletin 118 (DWR 2003). The aquifer system of the San Joaquin Valley Groundwater Basin consists of younger and older alluvium, flood-basin deposits, lacustrine and marsh deposits and unconsolidated continental deposits. These deposits form an unconfined to semi-confined upper aquifer and a confined lower aquifer in most parts of the Basin. The aquifers are separated by the Corcoran Clay (E-Clay) member of the Tulare Formation, which occurs at depths between 200 and 850 feet along the central and western portion of the basin. Fine-grained lacustrine deposits can be up to 3,600 feet thick in the Tulare Lake region. The most heavily used subbasins within the San Joaquin River Hydrologic Region include Kings, Westside, Kaweah, Tulare Lake, Tule, and Kern County, which account for approximately 98 percent of the average 6.8 maf of groundwater pumped annually during the 2005–2010 period (DWR 2013).

Fractured-rock aquifers in the Tulare Lake Hydrologic Region are typically found in the mountain and foothill areas adjacent to the alluvial groundwater basins. Information related to fractured-rock aquifers in the Tulare Lake Hydrologic Region was not developed as part of DWR's California Water Plan Update (DWR 2013). There are several groundwater adjudications in the Tulare Lake Hydrologic Region (DWR 2015).

Groundwater-Surface Water Interaction

For much of the Tulare Lake Hydrologic Region, due to extensive groundwater pumping over the years the groundwater table has been disconnected from the surface water system for decades and provides no contribution to surface flow (DWR 2013).

Regional Groundwater Production

The Tulare Lake Hydrologic Region meets about 50 percent of its local uses with groundwater extraction, with almost 90 percent used to meet agricultural demand and over 9 percent to meet urban demand. Approximately one-half percent of the groundwater supply is used to meet managed wetland demand. Groundwater is used conjunctively with surface water when those supplies are not sufficient to meet the region's demand for agricultural, municipal, and industrial uses (DWR 2003). During critically dry periods such as 2009, groundwater supplies account for almost 69 percent of the applied water demand for agricultural use (DWR 2013). The estimated average annual total water supply for the region from 2005 to 2010 was 11.7 maf, with 6.2 maf made up from groundwater supplies (DWR 2013).

Groundwater Quality

Similar to the San Joaquin River Hydrologic Region, groundwater quality in the Tulare Lake Hydrologic Region varies considerably throughout the area, but in general, is suitable for most urban and agricultural uses (DWR 2003). Primary constituents of concern on a regional level include: total dissolved solids (TDS), boron, nitrates, arsenic, selenium, 1,2-dibromo-3-chloropropane, radon, and uranium.

Land Subsidence

The relationship between groundwater extraction and subsidence is not as strong in the Tulare Lake Hydrologic Region as it is in the San Joaquin River Hydrologic Region, likely due to differences in aquifer sediments and applied stresses in the regions. However, despite these differences, subsidence trends in the Tulare Lake Hydrologic Region mirror those of the San Joaquin River Hydrologic Region, with increased subsidence during drought periods.

Land subsidence was first noted in the San Joaquin Valley in 1935 and by the mid-1950s, land subsidence was a widely recognized problem with continued land subsidence. The area continued to see great reduction in groundwater levels, until surface water deliveries from the SWP and other regional conveyance facilities in the 1970s and 1980s significantly reduced the agricultural demand for groundwater, however subsidence still continued in some areas, but at a slower rate, because of the time-lag related to the redistribution of pressures in the confined aquifers. A combination of drought conditions, regulatory restrictions of imported surface water, increasing population, and agricultural trend toward the planting of more permanent crops has incrementally led to a renewed reliance on groundwater pumping in the Tulare Lake region over the last few decades. For example, drought conditions and regulatory restrictions on imported surface water in 2007 through 2009 resulted in a doubling of groundwater pumping to meet agricultural demand, as compared with the 2005-2006 groundwater estimates. As new and existing agricultural wells extracted groundwater to meet increased permanent crop demand, deep aquifer pumping increased, confined aquifer pressures decreased, and groundwater levels in some regional areas reached historic lows. Evidence of land subsidence began to be observed in areas where little or no subsidence had previously been recorded. More recent studies indicate that land subsidence rates of one foot per year have returned to San Joaquin Valley basins that are highly reliant on groundwater supplies (DWR 2015).

5.10.2.4 San Francisco Bay Area Hydrologic Region

The San Francisco Bay Area Hydrologic Region includes 33 groundwater basins, as defined by DWR (DWR 2003). The most heavily used basins which receive imported water from the Delta include the Santa Clara Valley, Napa Valley, and Livermore Valley groundwater basins. Santa Clara County water supplies include SWP water via the South Bay Aqueduct, CVP water via the San Felipe Division of the CVP, and water from San Francisco Public Utility Commission's (SFPUC) Hetch Hetchy System (Santa Clara Valley Water District 2018).

While the water demand within the San Francisco Bay Area Hydrologic Region is served with imported water from Sierra Nevada and the Delta sources through various State, federal, and local projects, groundwater remains an important component of the overall water supply portfolio for agencies in the region to offset the variability of imported water. The estimated average annual total water supply from 2005 through 2010 was 1.285 maf. Groundwater accounts for only 21 percent of the region's total water supply (approximately 260 taf), with 71 percent of groundwater supplies used to meet urban demand and 29 percent used to meet for agricultural demand (DWR 2013). The South Bay planning area is a large user of groundwater in the region, with an

annual average demand of 181 taf or 70 percent of the total groundwater supply in the region (DWR 2013).

5.10.2.5 Central Coast Hydrologic Region

The Central Coast Hydrologic Region contains 60 alluvial groundwater basins and subbasins as recognized by DWR (DWR 2003). The most heavily used groundwater basins in the region are the Salinas Valley, Pajaro Valley, Gilroy-Hollister Valley, Santa Maria Valley, and the Santa Barbara groundwater basins.

The Central Coast Hydrologic Region has the most reliance of all hydrologic regions in the State on groundwater to meet its local uses, with more than 80 percent of its water use supplied by groundwater in an average year (Reclamation et al. 2013). The estimated average annual total water supply for the Central Coast Hydrologic Region from 2005 through 2010 was 1.3 maf, of which 1.1 maf was met with groundwater supplies (DWR 2013). There are several groundwater adjudications in the Central Coast Hydrologic Region (DWR 2015).

5.10.2.6 Southern California Region (South Coast, Colorado River, and South Lahontan Hydrologic Regions)

The South Coast Hydrologic Region contains 73 alluvial groundwater basins and subbasins as recognized by DWR (DWR 2003). The most heavily used groundwater basins in the region are the Coastal Plain of Los Angeles, Coastal Plain of Orange County, the Upper Santa Ana Valley, and the Santa Clara River Valley groundwater basins.

The South Lahontan Hydrologic Region contains 77 alluvial groundwater basins and 2 subbasins. The most heavily used groundwater basin in the region is the Antelope Valley Groundwater Basin, which is bordered by the Garlock Fault Zone and the Tehachapi Mountains to the northwest and the San Andreas Fault Zone and the San Gabriel Mountains to the southwest (DWR 2013).

The Colorado River Hydrologic Region contains 64 alluvial groundwater basins and subbasins. The most heavily used groundwater basins in the region include Borrego Valley, Warren Valley, Lucerne Valley, and Coachella Valley groundwater basins (DWR 2013).

Groundwater makes up approximately 34 percent of total water supply in the South Coast Hydrologic Region. Approximately 76 percent of the groundwater supplies in the South Coast Hydrologic Region are used to meet urban demand while the rest is used to meet agricultural demand (DWR 2013). The estimated average annual total water

supply for the South Coast Hydrologic Region from 2005 through 2010 was 4.7 maf, of which 1.6 maf was met with groundwater supplies. Metropolitan Los Angeles and Santa Ana planning areas account for approximately 40 percent of the South Coast Hydrologic Region's total groundwater supply for the region, with an average annual groundwater use of 637 and 623 taf, respectively (DWR 2013).

Groundwater makes up approximately two-thirds of the South Lahontan Hydrologic Region's total water supply, with approximately 61 percent used to meet agricultural demand and 39 percent used to meet urban demand. The estimated average annual total water supply for the South Lahontan Hydrologic Region from 2005 through 2010 was 668 taf, of which 441 taf was met with groundwater supplies.

Groundwater supplies less than 10 percent of the Colorado River Hydrologic Region's total water supply, with approximately 87 percent used to meet urban use and 13 percent to meet agricultural use. The estimated average annual 2005–2010 total water supply for the region was about 4.27 maf, of which 380 taf was met with groundwater supplies (DWR 2013). The majority of the State's groundwater adjudications are located within this region (DWR 2015).

5.10.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on groundwater resources.

5.10.3.1 Federal

Clean Water Act

The CWA is the major Federal legislation governing the water quality for surface water, which in turn can affect groundwater quality. The CWA is described further in Section 5.5, Biological Resources.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was passed by Congress in 1974, and amended in 1986 and 1996, to protect public health by regulating the nation's public drinking-water supply. The SDWA requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. The law authorizes the USEPA to set national health-based standards for drinking water to protect against both naturally occurring and human-made contaminants that may be found in drinking water. Drinking water standards that include MCL and treatment requirements are set for approximately 90 contaminants in drinking water. Water suppliers may not provide water that does not meet these standards. Every state must assess its sources of

drinking water to identify important potential sources of contamination and determine the susceptibility of the sources to these threats.

5.10.3.2 State

Water Rights

The State Watermaster Program's main purpose is to ensure that water is allocated according to established water rights (riparian or appropriative), or as determined by court adjudications or agreements by an unbiased, qualified person, thereby reducing court litigation, civil lawsuits, and enforcement workload. Some groundwater rights in California have been settled by the courts after landowners or other parties have appealed to the courts to settle disputes over how much groundwater can rightfully be extracted. In these "adjudicated groundwater basins," the courts have determined an equitable distribution of water that will be available for extraction each year. In adjudicated groundwater basins, the courts typically appoint a watermaster to administer the court judgment. Counties have also enacted laws to prevent wells developed on one property from interfering with the use of adjacent wells.

Area-of-Origin Statute Limitations

Section 1220 of the California Water Code prohibits pumping groundwater for export from within the combined Sacramento and Delta–Central Sierra basins, as defined in DWR Bulletin 160-74, unless the pumping complies with a groundwater management plan that is adopted by ordinance.

Groundwater Quality and Supply

The State requires counties to enact regulations covering well design to protect groundwater quality from surface contamination, and to properly construct and develop wells for domestic use. The Sustainable Groundwater Management Act provides a systematic procedure for groundwater management planning at the county and city levels (see below).

Sustainable Groundwater Management Act

SGMA builds upon the historical and non-regulatory groundwater management framework of legislative bills AB 3030 (1992), SB 1938 (2002), and AB 359 (2011). Under the SGMA, DWR is responsible for (1) developing regulations related to local agency requests to modify groundwater basin boundaries; (2) adopting regulations for evaluating and implementing Groundwater Sustainability Plans (GSPs) and coordination agreements; (3) identifying basins subject to critical conditions of overdraft; (4) identifying water available for groundwater replenishment; and (5) publishing best management practices for the sustainable management of groundwater.

The Act gives local agencies the authority to develop a GSP in groundwater basins defined in DWR Bulletin 118, and to raise revenue to pay for facilities to manage the basin (extraction, recharge, conveyance, quality). Those basins that are designated high and medium priority in Bulletin 118 are required to develop a GSP. Those basins that are low and very low priority are not required to develop a GSP but are authorized and encouraged to do so. The intent of the Act is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions and to provide a methodology for developing a GSP. GSPs developed in compliance with SGMA will consist of similar technical components.

2018 SGMA Basin Prioritization findings indicate that 109 of California's 517 groundwater basins and subbasins are high and medium priority (DWR 2018a). SGMA required the formation of GSAs which must develop GSPs or alternatives to GSPs in the groundwater basins (or subbasins) that were designated by DWR as medium or high priority by June 2017 (DWR 2016).

SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040 (GSPs implemented by 2020). For the remaining high and medium priority basins, 2042 is the deadline (GSPs implemented by 2022) (DWR 2018b).

The GSP must have measurable objectives to show how the plan will meet the Sustainability Goal in the basin within 20 years. (Water Code section 10727.2 (b) (1).) The GSP must also include interim milestones in increments of five years that demonstrate how the GSP is moving towards the sustainability goal. (Water Code section 10727.2 (b) (1).) Importantly, SGMA's sustainability goal definition requires basins to be managed to within their sustainable yield. (Water Code section 10721 (t).) Sustainable yield is defined to be the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus that can be withdrawn annually from a groundwater supply without causing an undesirable result. (Water Code section 10721 (v).) Undesirable impacts include: (1) a chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply; (2) significant and unreasonable reduction of groundwater storage; and (3) significant and unreasonable land subsidence that substantially interferes with surface land uses. (Water Code section 10721 (w).) Thus, GSP's must show that they will meet the sustainability goals in twenty years and show interim five year milestones to chart their progress.

If GSP's are failing to accomplish the above there is state intervention to address the deficiencies in the GSP. DWR must periodically review the GSPs and determine whether the plan meets the requirements and is likely to achieve the sustainability goal for the basin. (Water Code section 10733.) DWR also must review the GSP to see if it is achieving the sustainability goals at least every five years and issue an assessment for each basin reporting on the progress in achieving the sustainability goal. (Water Code section 10733.7.) Furthermore, if DWR in consultation with the State Water Resources Board, determines that a GSP is inadequate or not likely to meet the sustainability goal then there may be state intervention. (Water Code section 10735.2(a)(3).) SGMA directed DWR to provide assistance to local agencies, including the preparation of a report "...that presents the department's best estimate, based on available information, of water available for replenishment of groundwater in the state" (California Water Code section 10729(c)). The Water Available for Replenishment (WAFR) report provides DWR's estimates of WAFR in the State, which are provided to indicate the scale of planned water development by urban retailers for each region during this decade. GSAs can and should consider the provided information on water available from other methods and estimates of potential water development by urban retailers using other methods (recycled water, desalination, and water conservation) (DWR 2018c).

SGMA also established a process for local public agencies to develop an "Alternative in lieu of a GSP" (Water Code Section 10733.6) for evaluation to DWR. The Alternative was required to be submitted to DWR for review no later than January 1, 2017, and every 5 years thereafter.

Assembly Bills 91 and 92

In March 2015, in response to the fourth consecutive year of extreme drought in California, the California Legislature adopted two appropriations bills (AB 91 and SB 75) and two policy trailer bills (AB 92 and SB 76). As described in more detail in Section 5.20, Water Supply, this legislation includes monitoring and mitigation for drought conditions and continued evaluation of groundwater conditions by DWR.

5.10.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address groundwater quantity and quality.

In addition, more than 100 GMPs have been developed, implemented, and updated under the Groundwater Management Acts, described above within the study area.

Projects implemented in areas covered by GMPs, or within areas to be addressed by GSPs, should be consistent with those plans. Many GMPs were developed under SB 1938 (Groundwater Management Act of 2002). Under SB 1938, local agencies developing GMPs under certain provisions of law or seeking state funds for groundwater projects or groundwater quality projects were required to include in those plans certain basin management objectives, adopt certain monitoring protocols, and use sound geologic and hydrogeologic practices to effectively manage groundwater in the relevant management area. In addition, the SGMA requires the development of GSPs or alternatives to GSPs (such as GMPs) in the groundwater basins (or subbasins) that were designated by DWR as medium or high priority.

5.10.4 Impact Analysis

5.10.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Some of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing groundwater resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration and timing of Table A and/or Article 21 water moving among the PWAs that may impact groundwater resources. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this groundwater analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation and all applicable laws, including SGMA.

5.10.4.2 Standards of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to groundwater resources is considered significant if the proposed project would do any of the following:

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Otherwise substantially degrade water quality.

5.10.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no increase in impervious surface cover, and therefore, no change in groundwater recharge potential or effect to or groundwater quality. Because no new facilities would be constructed or existing facilities modified, there would be no construction-related discharge of pollutants that could travel to underlying aquifers and degrade local groundwater quality. There would be no construction-related dewatering activities, including groundwater collection and disposal systems, which would be subject to waste discharge requirements.

Because no new or modified facilities would be operated, long-term impacts of operating and maintaining these facilities would not occur and there would be no release of pollutants into groundwater that could violate any water quality standards or waste discharge requirements or substantially degrade groundwater quality in the long-term.

While there could be changes in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs, it is anticipated that the increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could influence the distribution of contaminant plumes but would not introduce any additional contaminants that could affect groundwater quality.

In addition, increased flexibility for water management due to changes in transfers and exchanges could potentially increase groundwater recharge in the study area, which would be a benefit to groundwater levels.

As a result, no impacts to groundwater levels or quality in the study area associated with construction and operation of new or modified facilities would occur and no mitigation measures are required. In addition, impacts to groundwater quality due to groundwater pumping as a result of transfers and exchanges would not occur. Therefore, these impacts are not further evaluated in this DEIR.

5.10.4.4 Impacts and Mitigation Measures

Table 5.10-1 summarizes the impact conclusions presented in this section by for easy reference.

**TABLE 5.10-1
SUMMARY OF IMPACTS CONCLUSIONS – GROUNDWATER AND WATER QUALITY**

Impact Statement	Transfers	Exchanges
5.10-1: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could substantially deplete groundwater supplies in some areas of the study area.	SU	SU
5.10-2: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could result in subsidence in some of the study area.	SU	SU

SU: Significant and Unavoidable

Impact 5.10-1: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could substantially deplete groundwater supplies in some areas of the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval and in compliance with all applicable laws. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning and management of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs in the SWP service area than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts and most water transfers would occur south of the Delta and would not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the south of Delta agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs

for additional water transfers under the provisions of the proposed project. This could result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers and exchanges that could occur due to the proposed project could then use the California WaterFix facilities. These facilities have undergone separate CEQA review and other required environmental permitting.

Because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers implemented by PWAs are not known, it is possible that transfers among the PWAs could result in changes to groundwater levels (either increases or decreases), if additional pumping were available in that area. One possibility is that agricultural PWAs could temporarily transfer surface water supply to other PWAs (likely for M&I supply), and these agricultural PWAs would then increase groundwater pumping as a replacement water source for transferred water supplies. This could potentially result in an increase in groundwater pumping in the study area and the potential for a net deficit in aquifer volume or lowering of the local groundwater table. Alternatively, some PWAs may transfer excess water beyond their demands and PWAs that receive this transferred surface water may use this additional source instead of groundwater. This could result in benefits to groundwater in certain service delivery areas because these PWAs would not be pumping groundwater (thereby not impacting aquifer levels nor lowering the groundwater table). Another possibility is that some PWAs that receive transferred water could use this additional source for groundwater recharge within the study area, which would be beneficial to local groundwater levels and aquifer volume. Therefore, in some areas of the study area, while there is the potential for the proposed project to be beneficial to groundwater levels, there is also the potential for the proposed project to result in a net deficit in aquifer volume or lowering the local groundwater table.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

Because the extent, location, and implementation timing of groundwater pumping associated with changes in exchanges implemented by PWAs are not known, it is possible that exchanges among the PWAs could result in decreases or increases in groundwater levels in the study area. One possibility is that agricultural PWAs could temporarily exchange surface water supply to other PWAs (likely for M&I supply), and these agricultural PWAs would then increase groundwater pumping as a replacement water source for exchanged water supplies. This could result in an increase in groundwater pumping in the study area and the potential for a net deficit in aquifer volume or lowering of the local groundwater table. Alternatively, some exchanged (or returned) water may be used by PWAs instead of groundwater or this water may be used for groundwater recharge; both of these options could be beneficial to local groundwater levels and aquifer volume. Therefore, in some areas of the study area, while there is the potential for the proposed project to be beneficial to groundwater levels, there is also the potential for the proposed project to result in a net deficit in aquifer volume or lower the local groundwater table.

Impact Conclusion

It is possible that transfers and exchanges of SWP water among the PWAs could result in benefits to groundwater levels, as transferred or exchanged water could be used instead of groundwater supplies or this water could be used for groundwater recharge. However, it is also possible that transfers and exchanges from agricultural to M&I PWAs could result in an increase in groundwater pumping resulting in a net deficit in aquifer volume or lowering the local groundwater table in some areas of the study area. DWR's conclusion is based on a program-level analysis, as there is uncertainty in the amount of groundwater use that may occur, and the lack of DWR's authority to provide any necessary mitigation even though PWAs may provide this information and mitigation in their project-level analysis for exchanges and transfers. Because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, it is concluded that the potential increase in groundwater pumping could result in a net deficit in aquifer volume or lowering the local groundwater table, and these impacts would be **potentially significant**.

Mitigation Measures

Projects would be subject to federal, State, and/or local groundwater pumping regulations that could reduce impacts to groundwater supplies and groundwater levels. However, the extent, location, and timing of groundwater pumping associated with changes in transfers and exchanges from the proposed project implemented by PWAs are not known along with any necessary mitigation required to address potential

impacts. Below is a discussion of circumstances, legal obligations, and possible mitigation measures that PWAs might implement that may affect the degree of potential impacts to groundwater.

Some groundwater basins in the State are adjudicated. These are basins, or portions of basins, where a lawsuit is brought to adjudicate the groundwater rights of all the overlayers and appropriators and the court determines how much groundwater well owners can extract and assigns a watermaster to manage the basin, or portion of the basin, in accordance with the court's decree. The ability of adjudication to strive for safe yield of a basin would likely have the effect of managing impacts to groundwater levels associated with the proposed project. In these areas, the impact of the proposed project may not cause significant impacts to groundwater levels, however not all areas within the study area are adjudicated basins and areas that are not adjudicated have potential for significant impacts.

In addition, it is anticipated that the implementation of the 2014 SGMA will result in changes to how groundwater is managed in the PWA service areas to meet future groundwater sustainability goals, which could potentially lessen or mitigate impacts associated with an increase in groundwater pumping due to changes in transfers and exchanges implemented by PWAs. SGMA requires governments and water agencies of high and medium priority basins to meet sustainability goals, including but not limited to bringing groundwater basins into balanced levels of pumping and recharge. Under SGMA, high, and medium priority basins should reach sustainability within 20 years of implementing their sustainability plans, which are to be implemented in 2020 for critically over-drafted basins and 2022 for the remaining high and medium priority basins. With the full implementation of SGMA it is anticipated that the proposed project would not cause impacts to the groundwater table in areas that are managed under SGMA. However, GSPs are not due until at least 2020 and have not yet been submitted to DWR. Some PWAs have submitted an "Alternative in lieu of a GSP" to DWR for review. Therefore, DWR cannot be sure the GSPs would be likely to achieve the sustainability goal, which would prohibit the withdrawal of water if it caused undesirable results. DWR anticipates that due to the SGMA's incremental milestones coupled with DWR's periodic review of the GSPs to ensure they are implementing the GSP in a manner to reach the sustainability goals that in the long term there would be no impacts to the groundwater table in the study area. A 2018 economic analysis of California WaterFix, which incorporated SGMA in the agricultural analysis, found groundwater-related agricultural benefits which could include drought resiliency reductions in groundwater pumping and cost, decreases in fallowing, and increases in net returns from crop production (Sunding 2018). However, because SGMA is in the process of

being implemented and because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, assumptions related to the ability of SGMA to mitigate any changes in groundwater levels are speculative. SGMA is discussed in more detail in the State Regulatory Setting of this Groundwater Hydrology and Water Quality section, see Section 5.10.3.2 and is evaluated as part of the cumulative analysis in Section 6.1, Cumulative Analysis. The PWAs would, however, address project-level impacts in future site-specific environmental analysis conducted by lead agencies at the time such actions are proposed. PWAs could propose feasible mitigation measures to reduce significant impacts to less than significant in some cases, although it is not possible for DWR to conclude that feasible mitigation measures would be available to avoid or mitigate significant groundwater effects in all cases. Furthermore, because implementation and enforcement of mitigation would be within the responsibility and jurisdiction of public agencies other than DWR, the results at the local level could be less than significant.

Therefore, because DWR has no information on specific implementation of the transfers and exchanges from the proposed project and it has no authority to implement mitigation measures in the PWA service area, this impact would remain **significant and unavoidable**.

Impact 5.10-2: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could result in subsidence in some of the study area.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and would not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish how the allocation of costs to the South of Delta PWAs for California WaterFix. Some of the south of Delta agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs

for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

As discussed above, because the extent, location, and implementation timing of groundwater pumping associated with changes in exchanges implemented by PWAs are not known, it is possible that transfers between PWAs could result in changes to groundwater levels (either decreases or increases) in the study area. Therefore, while there is the potential for the proposed project to be beneficial for groundwater levels, there is also the potential for the proposed project to cause subsidence due to a net deficit in aquifer volume or lower the local groundwater table.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

As discussed above, because the extent, location, and implementation timing of groundwater pumping associated with changes in exchanges implemented by PWAs are not known, it is possible that exchanges between PWAs could result in decreases or increases in groundwater levels in the study area. Therefore, while there is potential for the proposed project to be beneficial for groundwater levels, there is also the potential for the proposed project to cause subsidence due to a net deficit in aquifer volume or lower the local groundwater table.

Impact Conclusion

It is possible that transfers and exchanges among the PWAs could result in benefits to groundwater levels, as transferred or exchanged water could be used instead of groundwater supplies or this water could be used for groundwater recharge. However, it is also possible that transfers and exchanges from agricultural to M&I PWAs could result in an increase in groundwater pumping in some areas of the study area causing

subsidence due to a net deficit in aquifer volume or lowering the local groundwater table. Because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, it is concluded that groundwater pumping in some areas of the study area would cause subsidence due to a net deficit in aquifer volume or lowering the local groundwater table and the impact would be **potentially significant**.

Mitigation Measures

As described above, projects would be subject to federal, State, and/or local groundwater pumping regulations that could reduce impacts to subsidence including requirements associated with adjudicated basins and SGMA. However, the extent, location, and timing of groundwater pumping associated with changes in transfers and exchanges from the proposed project implemented by PWAs are not known along with any necessary mitigation required to address potential impacts. Below is a discussion of circumstances, legal obligations, and possible mitigation measures that PWAs might implement that may affect the degree of potential impacts to groundwater. However, because of the uncertainty of when and where groundwater pumping may occur from the proposed project and DWR's lack of authority to implement mitigation, the impact is considered significant.

Some groundwater basins in the State are adjudicated. The ability of adjudication to strive for safe yield of a basin would likely have the effect of managing subsidence impacts of the groundwater pumped associated with the proposed project. In these areas, the impact of the proposed project may not cause significant impacts to groundwater levels and subsidence, however not all areas within the study area are adjudicated basins and areas that are not adjudicated have potential for significant impacts.

In addition, it is anticipated that the implementation of the 2014 SGMA will result in changes to how groundwater is managed in the PWA service areas to meet future groundwater sustainability goals, which could potentially lessen or mitigate impacts associated with an increase in groundwater pumping and related subsidence due to changes in transfers and exchanges implemented by PWAs. SGMA requires governments and water agencies of high and medium priority basins to meet sustainability goals, including but not limited to bringing groundwater basins into balanced levels of pumping and recharge. Under SGMA, high, and medium priority basins should reach sustainability within 20 years of implementing their sustainability plans, which are to be implemented in 2020 for critically over-drafted basins and 2022 for the remaining high and medium priority basins. With the full implementation of SGMA by 2040 or 2042 it is anticipated that the proposed project would not cause

subsidence-related impacts in areas that are managed under SGMA. However, GSPs are not due until at least 2020 and have not yet been submitted to DWR. Some PWAs have submitted an “Alternative in lieu of a GSP” to DWR for review. Therefore, DWR cannot be sure the GSPs would be likely to achieve the sustainability goal, which would prohibit the withdrawal of water if it caused undesirable results, including land subsidence. In the long-term by 2040 or 2042, DWR anticipates that due to the SGMA’s incremental milestones coupled with DWR’s periodic review of the GSPs to ensure they are implementing the GSP in a manner to reach the sustainability goals there would be no impacts to subsidence in the study area. A 2018 economic analysis of California WaterFix, which incorporated SGMA in the agricultural analysis, found groundwater-related agricultural benefits which could include drought resiliency reductions in groundwater pumping and cost, decreases in fallowing, and increases in net returns from crop production (Sunding 2018). However, because SGMA is in the process of being implemented and because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, assumptions related to the ability of SGMA to mitigate any changes in groundwater levels or related subsidence are speculative. SGMA is discussed in more detail in the State Regulatory Setting of this Groundwater Hydrology and Water Quality section, see Section 5.10.3.2 and is evaluated as part of the cumulative analysis in Section 6.1, Cumulative Analysis.

The extent, location, and timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known. Therefore, DWR cannot currently conclude that feasible mitigation measures will be implemented to avoid significant impacts in all cases. PWAs would address project-level impacts in future site-specific environmental analysis conducted by lead agencies at the time such facilities or actions are proposed. PWAs could implement feasible mitigation measures such as increased monitoring and limiting groundwater pumping, requiring a return of the exchanged water to limit changes in groundwater levels, or rotating areas and timing of pumping to reduce significant impacts to less than significant. However, such implementation and enforcement of mitigation would be within the responsibility and jurisdiction of public agencies other than DWR and it is not possible for DWR to conclude that feasible mitigation measures would be available to avoid or mitigate significant groundwater effects in all cases.

Therefore, because DWR has no information on specific implementation of the transfers and exchanges from the proposed project and it has no authority to implement mitigation measures in the PWA service area, this impact would remain **significant and unavoidable**.

5.10.5 References

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5.11 HAZARDS AND HAZARDOUS MATERIALS

5.11.1 Introduction

This section addresses impacts associated with both natural- and human-caused hazards and hazardous substances and the potential changes that could occur as a result of implementing the proposed project. No comments addressing hazards and hazardous materials were received in response to the NOP (see Appendix B).

For a discussion of hazards related to flooding, please see Section 16, Surface Water Hydrology and Water Quality. For a discussion of geologic hazards such as earthquakes and liquefaction see Section 5.8, Geology, Soils, and Mineral Resources. For discussion of hazards associated with subsidence see also Section 5.10, Groundwater Hydrology and Water Quality, and Section 5.20, Water Supply.

5.11.2 Environmental Setting

Hazards and hazardous materials within the study area include natural-caused hazards, such as wildland fires, and human-caused hazards, such as traffic patterns. Hazardous materials include substances and waste that by their nature and reactivity, have the capacity of causing harm or a health hazard during normal exposure or an accidental release or mishap, and are characterized as being toxic, corrosive, flammable, reactive, an irritant or strong sensitizer. Activities and operations that use or manage hazardous or potentially hazardous materials can create a hazardous situation if released into the environment. The following discussion summarizes the characteristics of potential hazards associated with land uses in the study area. DWR has hazardous materials management plans at each of the five SWP Field Division Offices.

5.11.2.1 Agricultural Land Uses

Much of the study area is and has historically been used mainly for agricultural purposes. Hazards associated with agricultural land use are associated with the use of pesticides and herbicides and the use of fuels, lubricants, and other fluids associated with the operation and maintenance of agricultural equipment. Pesticides that are no longer used due to the hazards they pose may remain in soils throughout the study area. In addition, agricultural land uses often include underground piping and other infrastructure that may contain hazardous substances. Ground disturbance of contaminated soil, surface water, or groundwater in these areas can lead to human exposure to hazardous substances.

Irrigation and flooding practices for agricultural production may influence the level of mosquito production associated with standing water, as the mosquito life cycle requires

standing water. Mosquitoes can transmit diseases such as West Nile virus, Zika, St. Louis encephalitis, malaria, dengue, and chikungunya (CDPH 2018).

5.11.2.2 Urban Land Uses

Urban land uses, including municipal, industrial, and commercial land uses, are found throughout the study area, and are most heavily concentrated in the San Francisco Bay Area and Southern California. Urban hazards can vary widely depending on the population density, materials in use by various industries and business, traffic patterns, and other factors. Additionally, aboveground and underground utility infrastructure located in urban areas, such as pipelines (e.g., water, gas, and fuels), transmission lines, and gas and oil wells, may contain hazardous materials and/or could result in hazardous conditions. Hazards associated with wastewater and stormwater runoff are also associated with urban land use.

Some hazards, such as mosquito-transmitted diseases and exposure to contaminated soils and surface or groundwater, transcend land use, but can be magnified with increased development and population density, such as occurs in urban areas. As with agricultural land use, ground disturbance of contaminated soil, surface water, or groundwater in urban areas can lead to human exposure to hazardous substances. Increased populations found in urban areas also increase the risk of human exposure to the same mosquito-borne illnesses listed above.

5.11.2.3 Wildland Fire Hazards

Wildland fires pose a hazard to both persons and property in much of the study area. The severity of wildland fires is influenced primarily by vegetation, topography, and weather (temperature, humidity, and wind). California Department of Forestry and Fire Protection (CAL FIRE) developed a fire hazard severity scale that considers vegetation, climate, and slope to evaluate the level of wildfire hazard, and identifies three levels of fire hazard severity (moderate, high, and very high) to indicate the severity of fire hazard in a particular geographic area. Areas of high and very high risk are located within the water service areas of some PWAs where wildlands are within or near service area boundaries; these include the foothills of the Sierra Nevada, Coast, Transverse and Peninsular ranges. PWAs whose water service areas are located entirely on the floor of the Central Valley (such as County of Kings, Empire West Side ID, and Tulare Lake Basin WSD) are typically not impacted by wildland fire hazards (CAL FIRE 2007a and 2007b).

5.11.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on hazards and hazardous materials.

5.11.3.1 Federal

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC 136 et seq. 1996) provides for Federal regulation of pesticide distribution, sale, and use. All pesticides distributed or sold in the United States must be registered (licensed) by USEPA. The primary object of FIFRA is to ensure that pesticides, if used in accordance with specifications, will not cause unreasonable risk to human health or the environment (USEPA 2018).

5.11.3.2 State

Control of Pesticides

Food and Agricultural Code sections of the CCR are implemented by the California Environmental Protection Agency (CEPA), Department of Pesticide Regulation (DPR). The mission of the DPR is "to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pesticide management" (DPR 2018).

Fire Hazard Severity Zones

CAL FIRE maps areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors, in accordance with PRC sections 4201 to 4204 and Government Code sections 51175 to 51189. The zones, referred to as Fire Hazard Severity Zones, are based on the likelihood that an area will burn over a 30 to 50-year period (without considering modifications such as fuel reduction efforts). Fire Hazard Severity Zone maps are intended to be used for implementing wildland-urban interface building standards for new construction, natural hazard real estate disclosure at time of sale, 100-foot defensible space clearance requirements around buildings, consideration in city and county General Plans, and property development standards such as road widths, water supply, and signage (CAL FIRE 2007c).

5.11.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes

unique goals and policies that address a variety of natural and human-caused hazards. At a minimum, the safety element must adopt policies related to fire safety, flooding, and geologic and seismic hazards (California Government Code, section 65302(g)).

5.11.4 Impact Analysis

5.11.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes associated with natural- and human-caused hazards and hazardous substances.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to natural- and human-caused hazards and hazardous substances. However, the timing of the available Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.11.4.2 Standards of Significance

Based on Appendix G of the CEQA Guidelines, an impact is considered significant if implementation of the proposed project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- 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, would it 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, would the project result in a safety hazard for people residing or working in the project area.
- For a project within the vicinity of a private airstrip, would the project result in a safety hazard 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 to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

5.11.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur as there would be no increase in the use of hazardous materials and no associated hazards to the public or the environment through the release of hazardous material, emission of hazardous emissions, handling of hazardous or acutely hazardous materials, substances, or waste.

Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, there would not be an increase in risk of exposure due to encountering previously unidentified contaminated soil and/or groundwater conditions or identified hazardous materials sites. In addition, because the proposed project would operate within the existing bounds of the SWP operations, it would not involve a change in the transport, use, or disposal of hazardous materials compared to existing conditions. Therefore, in the short-term and long-term, it is anticipated that there would be no change in hazards to the public or the environment through the release of hazardous material, emission of hazardous emissions, handling of hazardous or acutely hazardous materials, substances, or waste in study area as compared to existing conditions.

Because no new facilities would be built or existing facilities modified, the proposed project would not expose new uses or persons to hazards associated with wildfires, airport operations, or interfere with emergency response. Therefore, in the short-term and long-term, it is anticipated that there would be no change in safety hazards for people or structures in the project area due to airport operations or wildland fires, or interfere with an adopted emergency response plan or emergency evacuation plan in the study area over existing conditions.

As noted above, portions of the proposed amendments related to water transfers and water exchanges may result in changes to the frequency and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to natural- and human-caused hazards and hazardous substances.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in transfers there would be no in changes to natural- and human-caused hazards and hazardous substances.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. However, because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in exchanges there would be no changes to natural- and human-caused hazards and hazardous substances.

As a result, **no impacts** related to hazards or hazardous materials would occur and no mitigation measures are required.

5.11.5 References

- CAL FIRE (California Department of Forestry and Fire Protection). 2007a. Guidelines for Fire Hazard Zoning Review and Validation. Available: http://frap.fire.ca.gov/webdata/maps/statewide/fhszl06_1_map.pdf. Accessed August 28, 2018.
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5.12 LAND USE AND PLANNING

5.12.1 Introduction

This section addresses land use and planning documents in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments related to land use and planning were received in response to the NOP (see Appendix B).

5.12.2 Environmental Setting

The study area covers a broad area of California with widely varying topography, vegetation, and weather. As a result, the land uses in the study area are numerous and varied. Land uses include urban and suburban development of varying densities, commercial uses, industrial uses, transportation, institutional uses, agriculture, recreational, and natural habitat/open space.

SWP facilities in the study area include small reservoirs in northern part of the State which are primarily used for recreation (Lake Davis, Frenchman Lake and Antelope Lake) and downstream reservoirs that are primarily used for storage but are also accessed for recreation including, but not limited to, Lake Oroville, San Luis Reservoir, Lake Perris and Castaic Lake. Public use of these reservoirs includes picnic areas, camping, fishing, and boating.

SWP conveyance facilities include the use of natural stream channels in Northern California (Sacramento River and Feather River) which deliver water to the Delta, where it is pumped to the California Aqueduct system for delivery to the PWAs located south of the Delta. Surrounding land uses include agricultural, residential, commercial, industrial, and open space uses.

5.12.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on land use and planning.

5.12.3.1 Federal

There are no applicable federal regulations pertaining to land use.

5.12.3.2 State

State General Plan Guidelines and Zoning Law

The California Governor's Office of Planning and Research provides a statewide regulatory document, *State of California General Plan Guidelines*, for preparing long-

term General Plan documents, per State law. (Government Code section 65040.2). All cities and counties within the State of California are required to have a comprehensive General Plan that guides planning and development decisions, and must consider a long-term perspective (Government Code section 65300). Generally, the General Plan must also cover all territory within the boundaries of the affected jurisdiction; for cities, all public and private land within the city limits must be covered, while all counties must include all unincorporated areas (OPR 2003). The General Plan Guidelines document also explains the components that are necessary for a General Plan across a range of categories. Text in General Plans consists of goals that set the direction of a General Plan concept and express values held within the community. These goals are shaped by objectives, principles, standards, and, in some cases, plan proposals, which in turn prepare specific policies to develop the changes that a jurisdiction seeks to achieve (OPR 2003).

The State Zoning Law (Gov. Code section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses in a specific zone district, must be consistent with the applicable General Plan and any applicable specific plans.

Habitat Conservation Plan/Natural Community Conservation Planning

Across the State, as of October 2017, there are a total of 9 HCPs in the implementation stage, 10 NCCPs in the implementation stage, 7 HCPs in the planning stage, and 8 HCP/NCCPs in the planning stage (CDFW 2017) that have been developed in accordance with CDFW. HCPs generally provide a regional approach to managing urban development vis-à-vis habitat conservation and, in some cases, also involves agricultural protection. Typically, an HCP identifies species that are listed as State or federally threatened or endangered, and determines the limits of development for jurisdictions to ensure that these habitats and species are appropriately protected. In addition, per Fish and Game Code sections 2800-2835, the Natural Community Conservation Planning Act sets the standards for developing NCCPs. Section 2805 defines a NCCP as a plan prepared pursuant to a planning agreement entered into in accordance with section 2810 of the Fish and Game Code. The plan is required to identify and provide for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible and appropriate economic development, growth, and other human uses.

5.12.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of

that county or city. Each General Plan addresses a broad range of topics, including; but not limited to, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, each General Plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. In addition, each jurisdiction has zoning ordinances that define allowable land uses in specific zone district which are consistent with the applicable General Plan.

5.12.4 Impact Analysis

5.12.4.1 Methods of Analysis

Inconsistency with local land use regulation is not in and of itself considered an adverse effect on the environment. Therefore, this analysis describes generally the potential for implementation of the proposed amendments to result in land use conflicts and/or division of established communities. As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes that could result in land use conflicts or divide an established community.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to existing land uses. However, the timing of available Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.12.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to land use and planning is considered significant if the proposed project would do any of the following:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the General Plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

Appendix G also sets out a threshold regarding consistency with habitat conservation plans or natural community conservation plans. Section 5.5, Biological Resources, discuss whether the proposed project would conflict with any such plan.

5.12.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no potential for construction activities to potentially result in a conflict (noise, dust, staging of equipment) with on-site or adjacent land uses. Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent change in land use; therefore, there would be no potential for conflicts with adjacent land uses. There would also be no new facilities that could physical divide an established community. As a result, no impacts associated with construction and operation of new or modified facilities would occur and no mitigation measures are required. Therefore, these impacts are not further evaluated in this DEIR.

5.12.4.4 Impacts and Mitigation Measures

Table 5.12-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.12-1
SUMMARY OF IMPACTS CONCLUSIONS – LAND USE AND PLANNING**

Impact Statement	Transfers	Exchanges
5.12-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in changes in existing land use practices that could conflict with applicable land use plans, policies, or regulations.	LTS	LTS
LTS: Less than Significant		

Impact 5.12-1: The fallowing of agricultural land or changes in cropping patterns associated with increased transfers and exchanges implemented by PWAs could result in changes in existing land use practices that could conflict with applicable land use plans, policies, or regulations.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

It is possible that transfers of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water transfers are not expected to substantially affect the

acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing of agricultural land or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water exchanges are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Impact Conclusion

It is possible that transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in cropping patterns in the study area; however, this would not change the existing agricultural land use designations in the study area because the land would remain agricultural. Therefore, the fallowing of agricultural land and/or change in crop patterns as a result of the proposed amendments would not result in changes to land use practices that could conflict with a land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect in the study area and these impacts would be **less than significant**.

Mitigation Measures

None required.

5.12.5 References

CDFW (California Department of Fish and Wildlife), 2017. California Regional Conservation Plans. October, 2017.

OPR (California Governor's Office of Planning and Research). 2003. State of California General Plan Guidelines. October 2003. pp. 10 and 14.

5.13 NOISE

5.13.1 Introduction

This section addresses the impacts of noise and vibration in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments related to noise were received in response to the NOP (see Appendix B).

5.13.2 Environmental Setting

5.13.2.1 Fundamentals of Sound and Environmental Noise

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound. A typical noise environment consists of a base of steady “background” noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. **Table 5.13-1** lists representative noise levels for the environment.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

L_{eq} —The equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

L_{dn} —The Day-Night Average Noise Level, is a 24-hour average L_{eq} with a 10 dBA “penalty” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for

noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.4 dBA L_{dn} .

CNEL—The Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 10 dBA “penalty” added to noise during the hours of 10:00 p.m. to 7:00 a.m., and an additional 5 dBA penalty during the hours of 7:00 p.m. to 10:00 p.m. to account for noise sensitivity in the evening and nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.7 dBA CNEL.

L_{50} —A statistical noise level, is the noise level which is exceeded 50 percent of the time during which the noise is measured.

**TABLE 5.13-1
REPRESENTATIVE ENVIRONMENTAL NOISE LEVELS**

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock Band
Jet Fly-over at 100 feet		
	—100—	
Gas Lawnmower at 3 feet		
	—90—	
		Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	
		Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	—30—	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

Source: California Department of Transportation (Caltrans). *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September 2013

When evaluating changes in 24-hour community noise levels, a difference of 3 dBA is a barely-perceptible increase to most people. A 5 dBA increase is readily noticeable, while a difference of 10 dBA would be perceived as a doubling of loudness. Except in a carefully controlled laboratory condition, a change of 1 dBA is very difficult to perceive.

Noise levels from a particular source generally decline as distance to the receptor increases. Other factors such as the weather and reflecting or shielding also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically “hard” locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically “soft” locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels are also generally reduced by 1 dBA for each 1,000 feet of distance due to air absorption. Noise levels may also be reduced by intervening structures—generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 dBA with closed windows. The exterior-to-interior reduction of newer homes is generally 30 dBA or more.

5.13.2.2 Fundamentals of Environmental Groundborne Vibration

Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and in the United States is referenced as vibration decibels (VdB).

The background vibration velocity level in residential and educational areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, and 100 VdB, which is the

general threshold where minor damage can occur in fragile buildings. The general human response to different levels of groundborne vibration velocity levels is described in **Table 5.13-2**.

**TABLE 5.13-2
HUMAN RESPONSE TO DIFFERENT LEVELS OF GROUNDBORNE VIBRATION**

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*. May 2006.

5.13.2.3 Sensitive Land Uses and Receptors

A noise-sensitive receptor is a land use that is sensitive to loud noises. Sensitive receptors include residences, hospitals, places of worship, libraries and schools, nature and wildlife preserves, and parks where the mode of recreation requires low noise levels.

Residences, hospitals, places of worship, libraries, and schools are also vibration-sensitive receptors because people can experience annoyance and fragile buildings may experience damage from groundborne vibration. Buildings that are normally occupied by people are considered sensitive to groundborne vibration. Historic or lightweight buildings are considered most vulnerable to vibration damage. Buildings used for research, manufacturing, or health care operations that are sensitive to very low thresholds of vibration to function effectively (e.g., magnetic resonance imaging or microelectronics manufacturing facilities) are also considered vibration sensitive; groundborne vibration can result in structural damage and/or interfere with the intended functions of such buildings (FTA 2006).

Existing Noise Environment

As discussed in Section 5.12, Land Use and Planning, the study area covers a broad area of California and as a result, the land uses in the study area are numerous and varied. Land uses include urban and suburban development of varying densities, commercial uses, industrial uses, transportation, institutional uses, agriculture, recreational, and natural habitat/open space. As a result, the study area is characterized by a wide range of noise profiles, including urban and rural roadways, rural agricultural noise, residential traffic, airports. These include low-volume traffic noise from tractors, large trucks, and other farm equipment, both on and off-road passenger vehicles, and

high-volume traffic noise in the more urban parts of the study area. Typical ambient noise levels in more urbanized areas related to population densities is presented in **Table 5.13-3**. Noise is generally less prevalent in agricultural, rural, and rural-residential areas than in suburban and urban areas.

**TABLE 5.13-3
TYPICAL AMBIENT NOISE LEVELS IN A SUBURBAN AND URBAN ENVIRONMENT**

Description	Typical Range L _{dn} , dBA	Average L _{dn} , dBA	Average Census Tract Population Density, Number of People per Square Miles
Quiet Suburban Residential	48 - 52	50	630
Normal Suburban Residential	53 - 57	55	2,000
Urban Residential	58 - 62	60	6,300
Noisy Urban Residential	63 - 67	65	20,000
Very Noisy Urban Residential	68 - 72	70	63,000

Source: USEPA. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. March 1974.

Numerous freeways and expressways serve portions of the study area. Several major arterials run north-south, generally parallel to the Sacramento River. State Route -99 and SR-70 run north-south in the Central Valley. SR-273 runs north-south from Redding, generally paralleling the Sacramento River before it intersects with I-5 several miles north of the Shasta/Tehama county line. Major east-west routes in the study area on the east side of the Sacramento Valley include SR-70, SR-49, and SR-88, US 50, and I-80. U.S. 101 extends north and south near the coast from San Luis Obispo south to Los Angeles, and I-5 runs north-south through the Central Valley to Los Angeles and on to San Diego.

The Union Pacific Railroad (UPRR) and Western Pacific Railroad have rail lines serving the study area. The alignments of these rail lines generally follow the I-5 alignment through the San Joaquin Valley. The UPRR line runs north-south near the coast, from the San Francisco Bay Area through Los Angeles, then southeast toward the Arizona/Mexico border.

A number of airports with various facility sizes and frequency of daily flights are also located in study area.

5.13.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on noise.

5.13.3.1 Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

5.13.3.2 State

The California Department of Health Services' Office of Noise Control studied the correlation of noise levels and their effects on various land uses and published land use compatibility guidelines for the noise elements of local General Plans (see the regulatory setting section of Section 5.12, Land Use and Planning for information on General Plan guidelines). The guidelines are the basis for most noise element land use compatibility guidelines in California.

The land use compatibility for community noise environment chart identifies the normally acceptable range for several different land uses, as shown in **Table 5.13-4**. Persons in low-density residential settings are most sensitive to noise intrusion, with noise levels of 60 dBA CNEL and below considered "acceptable." For land uses such as schools, libraries, churches, hospitals, and parks, acceptable noise levels go up to 70 dBA CNEL. Industrial areas (including solid waste facilities) are land uses that can tolerate higher ambient noise level, with conditionally acceptable noise levels being up to 80 dBA CNEL.

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

5.13.3.3 Local

Government Code section 65302(f) requires City and County General Plans to include a Noise Element. Noise Elements typically establish acceptable noise level criteria for transportation and stationary noise sources to guide future development and reduce land use conflicts. Noise ordinances establish limits that may be enforced by assigning penalties or taking other actions. A noise ordinance generally must not be exceeded, whereas General Plan limits are to be considered during the development of a project and may not be strictly applied depending on the particular circumstances of the project.

**TABLE 5.13-4
LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENT**

Land Use Category	Community Noise Exposure - Ldn or CNEL (dBA)							
	50	55	60	65	70	75	80	
Residential – Low Density Single Family, Duplex, Mobile Home	█	█	█	█	█	█	█	
Residential – Multi-Family	█	█	█	█	█	█	█	
Transient Lodging – Motel/Hotel	█	█	█	█	█	█	█	
Schools, Libraries, Churches, Hospitals, Nursing Homes	█	█	█	█	█	█	█	
Auditorium, Concert Hall, Amphitheaters	█	█	█	█	█	█	█	
Sports Arena, Outdoor Spectator Sports	█	█	█	█	█	█	█	
Playgrounds, Neighborhood Parks	█	█	█	█	█	█	█	
Golf Courses, Riding Stables, Water Recreation, Cemeteries	█	█	█	█	█	█	█	
Office Buildings, Business, Commercial and Professional	█	█	█	█	█	█	█	
Industrial, Manufacturing, Utilities, Agriculture	█	█	█	█	█	█	█	
Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.							
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.							
Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.							
Clearly Unacceptable	New construction or development generally should not be undertaken.							

SOURCE: OPR (California Governor's Office of Planning and Research). 2003. State of California General Plan Guidelines. October 2003.

The study area extends into multiple counties within the State (see Section 5.1 for a list of counties). Each of these counties has their own General Plan policies and ordinances that address noise within each respective jurisdiction. Most of these noise policies and ordinances address issues related to exempting noise generated by construction activities during daytime hours (e.g., 7:00 a.m. to 7:00 p.m.) and/or establishes maximum noise levels allowable during certain times of the day (e.g., 65 dBA L_{dn} during daytime, 55 dBA L_{dn} during evening, 45 dBA L_{dn} during nighttime).

Many of the local county and city noise ordinances within the area either have exemptions or include special provisions for construction-related noise, which would be similar to O&M activities because of the short-duration of the activity and the type of equipment used. These exemptions or special provisions consider construction noise to be in compliance with the ordinance even if the noise generated exceeds the standards applied to other activities. Some jurisdictions also make special provisions to allow nighttime construction or O&M activities to occur without considering noise generated by the activity a violation of applicable noise regulations.

5.13.4 Impact Analysis

5.13.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing noise and vibration levels.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to existing noise and vibration levels. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for

specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.13.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to noise and vibration is considered significant if the proposed project would do any of the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- 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, expose people residing or working in the project area to excessive noise levels.
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

5.13.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no short-term increase in noise or vibration levels over existing levels. Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent increase in noise or vibration levels over existing levels. As a result, there would be no exposure of persons to temporary or permanent increases in noise or vibration levels above established standards. In addition, because the proposed project would not result in the development of residential or other occupied uses, there would be no exposure to excess noise associated with airports.

As noted above, portions of the proposed amendments related to water transfers and water exchanges may result in changes to the frequency and timing of Table A and/or

Article 21 water moving among the PWAs that could result in changes to existing noise and vibration levels.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would, result in an increase in transfer from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in transfers there would be no increase in noise or vibration levels over existing levels.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. However, because it is assumed that no new facilities would be constructed and

operated, or existing facilities modified to accommodate the increases in exchanges there would be no increase in noise or vibration levels over existing levels.

Therefore, **no impacts** related to increase in noise and vibration levels would occur and no mitigation measures are required.

5.13.5 References

Caltrans (California Department of Transportation). 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September 2013.

FTA (Federal Transit Administration). 2006. *Transit Noise and Vibration Impact Assessment*. May 2006.

OPR (California Governor's Office of Planning and Research). 2003. *State of California General Plan Guidelines*. October 2003.

USEPA (U.S. 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.

5.14 POPULATION, EMPLOYMENT, AND HOUSING

5.14.1 Introduction

This section addresses population, employment and housing in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments related to population and housing were received in response to the NOP (see Appendix B). The discussion of growth inducement is included in Chapter 6, Other CEQA Considerations.

5.14.2 Environmental Setting

As described in Chapter 2 State Water Project, SWP facilities deliver water through contracts between DWR and 29 PWAs throughout California. The PWAs include local water agencies and districts legislatively enabled to serve agriculture, municipal, and industrial water supply customers or retail water supply agencies throughout Northern California, San Joaquin Valley, San Francisco Bay Area, Central Coast Area, and Southern California (see Figure 2-1). As of 2017, there were an estimated 39.5 million people in the State of California (American Fact Finder 2018). More than 26 million Californians receive a portion of their drinking water supply from the SWP.

5.14.2.1 Population and Population Growth

Within the study area, the San Joaquin Valley region is expected to experience the largest population growth through 2050, outpacing the population growth rate in the State as a whole. The Central Coast is projected to experience the least population growth through 2050, lagging behind the population growth rate in the State as a whole.

5.14.2.2 Housing Units and Vacancy

Within the study area and in California for the 5-year period from 2010 to 2016 the data indicate that the number of housing units has increased during the 5-year period but that vacancy rates decreased during the same period. The data indicate increased availability of housing units is lagging behind increased demand for housing.

5.14.2.3 Employment

Within the study area unemployment has decreased substantially in the past 5 years, generally consistent with the trend in the unemployment rate for the State as a whole.

5.14.3 Regulatory Setting

The following text summarizes State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on population and housing.

5.14.3.1 State

State of California Housing Element Requirements

California Housing Element Law (Government Code 65580) requires cities and counties to include, as part of their General Plans, a housing element to address housing conditions and needs in the community. The housing element law requires the California Department of Housing and Community Development, in consultation with each regional council of governments, to determine each region's existing and projected housing need. The regional council of governments in turn develops a regional housing allocation plan that includes the actual allocation of housing need to the cities and counties within the region. Allocations are based on factors that consider existing employment, employment growth, household growth, and the availability of transit; need is determined for households in all income categories from very-low to above-moderate. The jurisdictions are required to plan for their allocated number of housing units within the housing elements of their General Plans. Housing elements are required to be updated every 5 to 8 years, following timetables adopted by the State. The housing element must identify and analyze existing and projected housing needs and "make adequate provision for the existing and projected needs of all economic segments of the community," among other requirements.

5.14.3.2 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes a housing element to address housing conditions and needs in the community.

5.14.4 Impact Analysis

5.14.4.1 Methods of Analysis

Population, employment and housing conditions frequently involve economic and social issues, which are not considered to have significant effects on the environment. However, CEQA requires analyses of environmental impacts that may result from a project's population and associated employment and housing needs. Consistent with CEQA Guidelines, the analysis of population, employment and housing impacts in this DEIR addresses the precursors of physical changes that could result from implementation of the proposed project.

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would

not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect changes to existing population levels and associated housing and employment.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) could result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that may support changes in population levels that could result in effects to employment and housing levels. The timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this population and housing analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation. Indirect impacts of population growth are discussed in the Growth Inducement section of Chapter 6 Other CEQA Considerations.

5.14.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to population and housing is considered significant if the proposed project would do any of the following:

- Induce substantial population growth in an area directly (for example, by proposing new homes and businesses).
- Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

5.14.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the

PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities would not occur and there would be no short-term increase in population to support construction activities. In addition, there would be no need to provide housing for construction workers. Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no need to provide housing for operators and there would be no displacement of people or housing to accommodate any new facilities.

As noted above, portions of the proposed amendments related to water transfers and water exchanges may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in transfers there would be no increase in population to support operations and maintenance activities. In addition, the proposed amendments do not propose new housing or employment uses that could directly induce population growth. Furthermore, because no new facilities would be

constructed there would be no displacement of people or housing to accommodate any facilities.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. However, because it is assumed that no new facilities would be built or existing facilities modified to accommodate the increases in exchanges, there would be no increase in population to support operation and maintenance activities. In addition, the proposed amendments do not propose new housing or employment uses that could directly induce population growth. Furthermore, because no new facilities would be constructed there would be no displacement of people or housing to accommodate any new facilities.

Therefore, **no impacts** related to population, employment and housing would occur and no mitigation measures are required.

5.14.5 References

American Fact Finder, 2018. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017 - 2017 Population Estimates. Available: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>. Accessed July 2, 2018.

5.15 PUBLIC SERVICES AND RECREATION

5.15.1 Introduction

This section describes the environmental and regulatory settings and analyzes the effects of the proposed project on public services, which include police and fire protection, schools, and parks and recreational facilities. This section specifically addresses recreation within the study area. Comments received on the NOP (see Appendix B) included concerns over the responsibility of PWAs to fund certain fish and wildlife and recreation requirements of the SWP with proposed project implementation.

5.15.2 Environmental Setting

Public services are those physical assets and community services that are important to maintaining a community's welfare and livability. Public services include police and fire protection, schools, and the provision of parks and recreation facilities.

As described in Section 5.12, Land Use and Planning, the study area covers a broad area of California. As a result, land uses in the study area are numerous and varied. Land uses include urban and suburban development of varying densities, commercial uses, industrial uses, transportation, institutional uses, agriculture, recreation, and natural habitat/open space.

Public services in the study area are typically provided by counties, cities, or community services/special districts, and in some cases by private entities under contract to local governments. The level of demand for public services depends on the population requiring such services. Additional factors that affect demand for services and the cost of delivering services include the development density and the economic circumstances of the region. Services are robust and readily available in densely populated and economically prosperous areas of study area (e.g., San Francisco Bay Area, Los Angeles Basin, Inland Empire, and San Diego). In sparsely populated areas (e.g., unincorporated portions of the southern San Joaquin Valley and Antelope Valley), core public safety services are provided by county sheriff's offices and local fire protection districts (including volunteer fire departments). In rural unincorporated areas fire response is often handled by local fire departments or through Memorandums of Understanding (MOUs) between departments and/or by CAL FIRE. Additional services such as schools and libraries typically require travel to nearby population centers. There are also numerous local and regional park and recreational facilities in the study area.

5.15.2.1 SWP Recreational Areas and Use

As described in Chapter 2, State Water Project, the SWP is a complex system of reservoirs, dams, power plants, pumping plants, pipelines, and aqueducts that delivers

water to PWAs throughout Northern California, the San Joaquin Valley, the San Francisco Bay Area, the Central Coast Area, and Southern California. The SWP is a multipurpose project that provides recreational benefits including sightseeing, fishing, hunting, picnicking, camping, boating, water skiing, bicycling, hiking, and swimming. The SWP has 37 developed recreation areas, or sites, throughout the State. Since the SWP began delivering water in 1962, approximately 243 million recreation days¹ have been recorded at SWP recreation facilities. Most SWP recreation use is concentrated at the lakes and major reservoirs (DWR 2017).

5.15.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on public services. While there are no federal regulations that specifically pertain to public services, State and local regulations do exist to regulate development decisions.

5.15.3.1 Federal

There are no applicable federal regulations pertaining to public services.

5.15.3.2 State

Davis-Dolwig Act

The Davis-Dolwig Act, found in Water Code section, 11900 et seq. is a State statute that requires that features for recreation and fish and wildlife preservation and enhancement be incorporated in the planning and construction of State water projects, including the SWP. This Act further sets forth the Legislature's intent to provide funds to DWR for the enhancement of fish and wildlife and for recreation in connection with such projects. In 2012, the State Legislature enacted an additional statute to create the Davis-Dolwig Account in the California Water Resources Development Bond Fund and to provide a continuous annual appropriation of \$7.5 million to DWR for the payment of SWP recreation and fish and wildlife enhancement costs (Water Code section 11913.1). In addition, this same 2012 legislative action provides another \$2.5 million annual continuous appropriation to pay for recreation and fish and wildlife enhancement costs incurred prior to December 31, 2011.

California Code of Regulations

The CCR, Title 5 Education Code, regulates all aspects related to the provision of education within the State of California.

¹ A recreation day is defined as one individual user visiting a recreation site along the SWP within all or part of a one-day period.

Department of Education Standards

The California Department of Education published the Guide to School Site Analysis and Development to establish a valid technique for determining acreage for new school development. Rather than assigning a strict student/acreage ratio, this guide provides flexible formulas that permit each district to tailor its ratios as necessary to accommodate its individual conditions. The Department of Education also recommends that a site utilization study be prepared for the site, based on these formulas.

California Department of Forestry and Fire Protection

CAL FIRE provides fire protection services for areas within the State Responsibility Areas as well as some local jurisdictions with which CAL FIRE maintains contracts to provide services, which are largely unincorporated portions of the State. In addition, CAL FIRE also provides assistance to local fire departments through mutual and automatic aid agreements, providing wildfire protection services for incidents occurring within incorporated jurisdictions. CAL FIRE is responsible for the implementation of state-legislated fire safety standards and conducts fuel management activities and also performs annual inspections. By law, CAL FIRE policy requires that CAL FIRE will respond to and abate any uncontrolled fire that threatens to destroy life, property, or natural resources.

California Fire Code

The California Fire Code provides specialized regulations related to the construction, maintenance, and use of buildings as they relate to fire and safety. The extent of the code coverage encompasses fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions to aid fire responders, industrial processes, and other fire-safety requirements for existing and new buildings.

Quimby Act

California Government Code 66477, Subdivision Map Act, referred to as the Quimby Act, permits local jurisdictions to require the dedication of land and/or the payment of in-lieu fees solely for parks and recreation purposes. The required dedication and/or fee is/are based on factors such as residential density and parkland cost, among others. Land dedicated and fees collected pursuant to the Quimby Act may only be used for developing new, or rehabilitating existing, park or recreational facilities.

5.15.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study

area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address public services.

5.15.4 Impact Analysis

5.15.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect changes to existing population levels that could affect providing public services or recreational facilities.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that may support changes in population levels that could affect providing public services or recreational facilities. The timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this public services and recreation analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.15.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to public services and recreation resources is considered significant if the proposed project would do any of the following:

- Result in substantial 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 police protection, fire protection, schools, and/or parks and recreational facilities.

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

5.15.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities would not occur and there would be no short-term effects to public services resulting from construction activities that could impair response times or add demands for fire protection, law enforcement, and emergency medical services in their service areas. Furthermore, because no new facilities would be built or existing facilities modified, as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no increase in population to support operations and maintenance activities. As a result, there would be no associated need for new or modified public services that could impair response times or add demands for fire protection, law enforcement, and emergency medical services in the PWA service areas. Because there would be no change in population, there would also be no change in use or demand for recreational facilities.

As noted above, portions of the proposed amendments related to water transfers and water exchanges may result in a changes to the amount of Table A and/or Article 21 water moving among the PWAs.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers between PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in transfers there would be no increase in population to support operations and maintenance activities. As a result, there would be no associated need for new or modified public services that could impair response times or add demands for fire protection, law enforcement, and emergency medical services in the PWA service areas. Because there would be no change in population, there would also be no change in use or demand for recreational facilities.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. However, because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in exchanges no increase in population to support operations and maintenance activities. As a result, there would be no associated need for new or modified public services that could impair response times or add demands for fire protection, law enforcement, and emergency medical services in the PWA service areas. Because there would be no change in population, there would also be no change in use or demand for recreational facilities.

The Davis-Dolwig Act declares the Legislature's intent that annual appropriations be made to DWR for fish and wildlife enhancement and recreation. The Act further states that costs incurred for the enhancement of fish and wildlife and the development of

public recreation not be included in the prices, rates and charges for water and power. Implementation of the proposed project would continue DWR's contract administration, consistent with the Act, that the development of public recreation includes both capital and O&M costs. Further, operation of the SWP would not change from existing operations as they relate to recreational use.

Therefore, **no impacts** related to public services, including recreation would occur and no mitigation measures are required.

5.15.5 References

DWR (California Department of Water Resources). 2017. Bulletin 132-16: Management of the California State Water Project, p. 257.

5.16 SURFACE WATER HYDROLOGY AND WATER QUALITY

5.16.1 Introduction

This section addresses surface water hydrology (including drainage and flooding) and quality in the study area changes that could occur as a result of implementing the proposed project. No comments related to surface water hydrology and quality were received in response to the NOP (see Appendix B).

The environmental and regulatory setting and impacts related to groundwater hydrology and quality are described in Section 5.10, Groundwater Hydrology and Water Quality.

5.16.2 Environmental Setting

This section includes discussion of existing surface water hydrology and quality conditions. The discussion is organized by region, including the Sacramento River Hydrologic Region, San Joaquin River Hydrologic Region, the Tulare Lake Hydrologic Region, the Delta Region (including the San Francisco Bay area watersheds), Central Coast Hydrologic Region, and Southern California region (including the Colorado River, Lahontan, and South Coast hydrologic regions). The complex system of reservoirs, dams, power plants, pumping plants, pipelines, and aqueducts of the SWP is described in Chapter 2, State Water Project. Also discussed in Chapter 2 is the role that SWP facilities perform in flood management in California, including operating SWP facilities to manage flood flows. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. Water body and pollutants that exceed protective water quality standards are placed on the State's 303(d) List. For waters on this list, the states develop total maximum daily loads (TMDLs) to account for all sources of the pollutants that caused the water to be listed. The nine regional water quality control boards (Regional Water Boards) prepare and periodically update basin plans (also known as water quality control plans), which set forth water quality standards for surface water and groundwater within their regions, and actions (including TMDLs) to control nonpoint and point sources of pollution to achieve and maintain these standards (DWR 2015a). Relevant basin plans include those developed for the Central Valley, San Francisco Bay, Central Coast, Lahontan, Colorado River, Santa Ana, and San Diego regions. The CWA section 303(d) listings informed the following discussion.

5.16.2.1 Sacramento River Hydrologic Region

Surface Water Hydrology

The Sacramento River flows generally north to south from its source near Mount Shasta to the Delta near Freeport. Upstream from Shasta Dam and Lake, the Sacramento River receives flows from the Pit River, McCloud River, Squaw Creek, and the

headwaters of the Sacramento River, as well as many minor tributary creeks and streams. Flows in the Sacramento River in the 65-mile reach between Shasta Dam and Red Bluff are regulated by Shasta Dam and are reregulated downstream at Keswick Dam. In this reach, flows are influenced by tributary inflow. Major west-side tributaries to the Sacramento River in this reach of the river include Clear and Cottonwood creeks. Major east side tributaries to the Sacramento River in this reach of the river include Battle, Bear, Churn, Cow, and Paynes creeks (Reclamation 2013).

The Sacramento River enters the Sacramento Valley about five miles north of Red Bluff. The Sacramento Valley contains the Sacramento, Feather, and American river basins; and major and minor streams and rivers that drain the east and west sides of the valley, covering an area of more than 24,000 square miles. On average, more than 22 maf of water, approximately one-third of the total runoff in California, flows through the Sacramento Valley (Water Years 1922–2003). The operation and capacity of reservoirs in the Sacramento Valley are affected by precipitation, agricultural diversions, water supply releases, hydroelectric power generation, and flood management (Reclamation 2013, DWR 2012).

From Red Bluff to Chico Landing (52 miles), the river receives flows from Antelope, Mill, Deer, Big Chico, Rock, and Pine creeks on the east side and Thomes, Elder, Reeds, and Red Bank creeks on the west side. From Chico Landing to Colusa (50 miles), the only major tributary is Stony Creek. No tributaries enter the Sacramento River between Stony Creek and its confluence with the Feather River (Reclamation 2013). The Colusa Basin to the west receives flow of several minor tributaries. The natural overflow basin to the east, Butte Basin, receives flow from several minor tributaries and the Sacramento River, and overflow from the Moulton and Colusa weirs (DWR 2012). Outflow from Butte Basin discharges through the Sutter Bypass; reentering the Sacramento River directly across and downstream from Fremont Weir.

The Feather River is the largest tributary to the Sacramento River below Shasta Dam. The Feather River flows from the east into the Sacramento River immediately upstream of Verona. Major tributaries to the Feather River include the Yuba and Bear rivers. Flows in the lower Feather River are regulated by operations of the Oroville-Thermalito Complex and diversions by Western Canal, Richvale Canal, the PG&E Lateral, and the Sutter-Butte Canal (DWR 2013). Flow from the Yuba and Bear rivers combines with Feather River flow and enters the Sacramento River near the Fremont Weir.

The Sacramento River is joined by the American River at the City of Sacramento, and continues downstream to the Delta. During high-flow events, the bulk of Sacramento River flows pass over the Fremont Weir to continue through the Yolo Bypass for

approximately 72 miles south then ultimately discharge in the north Delta. Flow from the Coast Ranges to the west is captured by the Colusa Basin Drain, which discharges directly to the Sacramento River, and into the Knights Landing Ridge Cut which empties into the Yolo Bypass, and by Cache, Willow Slough Bypass and Putah creeks, which discharge into the Yolo Bypass (DWR 2012).

Surface Water Quality

Surface water in the Sacramento River Hydrologic Region is of generally high quality, and most water bodies in the region are suitable for most designated beneficial uses. Water quality issues in the region are largely associated with mercury and other metals, PCBs, pesticides, and toxicity from unknown origin included in the CWA 303(d) listings on the Sacramento River and its immediate tributaries.

Metals in the Sacramento River watershed, including mercury, cadmium, zinc, and copper, are generally associated with historic mining activities in the watershed. Copper, cadmium, zinc, and lead are metals that are naturally found in high concentrations in the “Copper Crescent” in Shasta County. Copper mining in the Upper Feather River watershed has also caused copper, cadmium, and zinc impairments in several of the Upper Feather River tributaries. These metals are toxic to aquatic life at elevated concentrations, and at higher concentrations may cause human health impacts (DWR 2013).

Cinnabar ore (mercury sulfide) was mined in the Inner Coast Ranges for elemental mercury (quicksilver), and used for gold recovery in the Sierra Nevada during California’s gold rush. Several million pounds of mercury entered the environment during this period. Inorganic mercury also enters waterways when soils erode, atmospheric dust falls to the ground, and mineral springs discharge (DWR 2013). In aquatic environments, inorganic mercury can be converted to methylmercury which is a potent neurotoxin (Wentz, et al. 2014). The Sacramento River and many of its tributaries are impaired by mercury. Cache Creek alone accounts for 60 percent of the mercury discharged within the Central Valley, as it transports mercury from abandoned mercury mines in the Coast Ranges to the Cache Creek Settling Basin and eastward to the Yolo Bypass (DWR 2013). SWP facilities impaired by mercury include Davis Creek Reservoir in the upper Feather River watershed, Lake Oroville, and the Thermalito Afterbay (part of the Oroville-Thermalito complex) (State Water Board 2010).

Pesticides, including legacy compounds such as DDT and chlordane, are present in the Sacramento River watershed due to both urban and agricultural applications. The Sacramento River, below Red Bluff, as well as the Feather and Bear Rivers and Stony Creek are listed as impaired by pesticides.

Polychlorinated biphenyls (PCB) are legacy compounds of industrial origin. Although no longer manufactured in the United States, PCBs persist in the environment, where they can bioaccumulate. The Sacramento, Feather, and American rivers; Lake Oroville; and the Thermalito Afterbay and Forebay are listed as impaired by PCBs (State Water Board 2010).

5.16.2.2 San Joaquin River Hydrologic Region

Surface Water Hydrology

Originating high in the Sierra Nevada, the San Joaquin River carries snowmelt and rainfall runoff from mountain meadows south of Yosemite National Park to the valley floor near Fresno, then northwest through the valley to the Delta.

The SWP does not deliver SWP water to the San Joaquin River hydrologic region, and this region will not be discussed further. However, local flood flows are taken into the California Aqueduct at specified locations through drain inlets in the San Joaquin Valley in order to maintain the integrity of the Aqueduct (see Chapter 2, State Water Project for more information).

5.16.2.3 Tulare Lake Hydrologic Region

Surface Water Hydrology

The Tulare Lake region is divided into several main hydrologic subareas: the alluvial fans from the Sierra foothills and the basin subarea (in the vicinity of the Kings, Kaweah, and Tule rivers and their distributaries); the Tulare Lake bed; and the southwestern uplands. The alluvial fan/ basin subarea is characterized by southwest to south flowing rivers, creeks, and irrigation canal systems that convey surface water originating from the Sierra Nevada. The dominant hydrologic features in the alluvial fan/basin subarea are the Kings, Kaweah, Tule, and Kern rivers and their major distributaries from the western flanks of the Sierra. Los Gatos Creek is the one substantial creek entering from the Coast Ranges, flowing southeast. The largest river in terms of runoff is the Kings River, which originates high in Kings Canyon National Park and generally trends southwest into Pine Flat Lake. Downstream of Pine Flat Dam, the river flows south and west toward Tulare Lake. During flood release events from Pine Flat Reservoir, the majority of the Kings River flow is diverted northwest into the Fresno Slough/James Bypass system (along the historically high-water outlet of Tulare Lake), emptying first into the Mendota Pool, and from there, into the San Joaquin River. The Kaweah River begins in Sequoia National Park, flows west and southwest, and is impounded by Terminus Dam. It subsequently spreads into many distributaries around Visalia and Tulare trending toward Tulare Lake. The Tule River begins in Sequoia National Forest and flows southwest through Lake Success toward Tulare Lake (DWR 2013).

The Kern River has the largest drainage basin area and produces the second highest runoff. It originates in Inyo and Sequoia National Forests and Sequoia National Park, flowing southward into Lake Isabella. The river downstream of Isabella Dam flows southwest. In high-discharge years, water will spill into the ancient Buena Vista/Kern Lake bed. In very-high-discharge years, Buena Vista Lake historically spilled into Tulare Lake via sloughs and floodwater channels. In addition, some Kern River water may be allowed to flow into the SWP via the Kern River Intertie. There are many smaller creeks that feed into the main rivers, which can present a localized flooding threat during specific storm conditions (DWR 2013).

Surface Water Quality

Due to the essentially closed nature of the Tulare Lake Basin, the impact of contaminants on water quality will be a continuing threat to beneficial uses of surface water and groundwater. Generally, flows from the east side of the basin are considered to be excellent quality, fed by Sierra snowmelt and springs from granitic bedrock. Flows from the west side are considered to be poor quality due to naturally occurring constituents such as selenium and salinity from the marine sediments (DWR 2013). Water quality issues for the Tulare Lake Hydrologic Region include: salinity, pesticides (chlorpyrifos, dimethoate, and toxaphene) from agriculture, metals (mercury, selenium, and molybdenum), and erosion and sediment (State Water Board 2010).

Salinity is the primary contaminant affecting water quality and habitat in the Tulare Lake region. When water is used, salts are left behind. Sometimes this salt is intentionally added (e.g., home water softeners, plant fertilizers), but even when no salts are added to the system, evaporation and consumptive use act to concentrate unused salts. Additionally, salts move with water so salts originating in one basin will turn up in another. This is a significant problem when the receiving basin has no reliable way of disposing the salt, as is the case in the Tulare Lake region. Salinity increases can affect municipal, agricultural, and industrial beneficial uses of water and the ability to recycle and reuse municipal wastewater.

In the Tulare Lake region, pesticide impairments due to chlorpyrifos, dimethoate, and toxaphene (a legacy pesticide) have been identified in areas of agricultural production (State Water Board 2010). A fraction of the applied pesticides can enter surface waters during rainfall or irrigation events when residual pesticides migrate in stormwater runoff or irrigation return water or migrate with sediment carried in stormwater runoff or irrigation return water and cause unintended toxicity to aquatic life. In this region, mercury impairments are found downstream of New Idria Mine, which was the second most productive mercury mine in North America, and in Pine Flat Reservoir and

Kaweah Lake (State Water Board 2010; USEPA 2018). Inorganic mercury enters reservoirs and other water bodies through a variety of sources including atmospheric deposition; through tributary streams carrying runoff from mercury and gold mining sites; from urban and industrial discharges; and from erosion of soils naturally enriched with mercury. Methylmercury is a concern because it bioaccumulates through the aquatic food web to potentially harmful amounts found in larger fish that can be consumed by humans and wildlife (State Water Board 2016).

Molybdenum was found in the Kings River at levels high enough to cause concern for agricultural use. Selenium is a highly bioaccumulative trace element, which, under certain conditions, can be mobilized through the food chain and cause both acute and chronic toxicity to waterfowl (Central Valley RWQCB 2001).

Erosion is one of the greatest problems in the foothills and mountain areas of this region. Erosion is a natural occurrence, but most human activities accelerate the process. Erosion causes discoloration of streams, and the suspended matter settles to form a smothering blanket on the streambed. Sedimentation impairs fisheries; and, by virtue of the characteristics of many organic and inorganic compounds to bind to soil particles, it serves to distribute and circulate toxic substances through the riparian, estuarine, and marine systems. Erosion is accelerated by poor drainage and soil stabilization associated with road building, clearing land, leveling land, construction, logging, brush clearing, off-road vehicle use, agriculture, overgrazing, and fires (Central Valley RWQCB 2004).

5.16.2.4 Delta Region, Including San Francisco Bay Area Watersheds

Surface Water Hydrology

The hydraulics of the Delta are complicated by tidal influences, a multitude of agricultural and M&I diversions for use within the Delta itself, and by CVP and SWP operations and exports. Principal factors affecting Delta hydrodynamics are (1) river inflow from the Sacramento River system including the Yolo Bypass, San Joaquin River, Mokelumne, Cosumnes, and Calaveras rivers and other smaller eastside tributaries; (2) daily tidal inflow and outflow through San Francisco Bay; and (3) export pumping including from the south Delta, primarily through the SWP Banks and CVP Jones pumping plants, and in-Delta water diversions for agriculture (DWR 2012; Reclamation et al. 2013).

Average winter outflow from the Delta is about 32,000 cfs, while the average summer outflow is 6,000 cubic feet per second (cfs) (Water Years 1956–2012). Because of tidal factors and changing channel geometry, Delta outflow is typically calculated rather than a directly measured (Reclamation 2014). The Sacramento and San Joaquin rivers are

the main tributaries to the Delta. The streams in the northern portion of the San Joaquin River Basin, generally between the American and Stanislaus rivers, are commonly referred to as the eastside tributaries to the Delta. These rivers flow into the San Joaquin River within the boundaries of the Delta. The three main eastside tributaries to the Delta are the Cosumnes, Mokelumne, and Calaveras rivers.

On average, tidal inflows to the Delta are approximately equal to tidal outflows. However, tidal flows vary with the gravitational effects of the moon. The spring tide, where the maximum tidal range occurs, coincides with full and new moon. The neap tide, where the minimum tidal range occurs, coincides with the quarter phases of the moon. At Martinez, the tidal range can vary by about 30 percent between the spring and neap conditions. Tidal flows at Martinez can be as high as 600,000 cfs. Pacific Ocean tides move into and out of the Delta, ranging from less than 1 foot in the eastern Delta to more than five feet in the western Delta. At inland locations, such as near Freeport and Vernalis, riverine conditions dominate the tidal effects (Reclamation et al. 2013, DWR 2013).

The San Joaquin River enters the Delta downstream from Vernalis and splits into several channels including the main river channel, Middle River, and Old River. In the southern Delta, CVP and SWP export pumping in Middle and Old Rivers can reduce the minimum water levels such that sufficient pump draft for in-Delta diversions for agriculture cannot be maintained. During the summer of most years, DWR installs barriers in the Old and Middle Rivers and in the Grant Line Canal to maintain water levels for agricultural diversions (DWR 2015b).

The San Francisco Bay area receives outflow from the Delta, as well as runoff from numerous small tributaries, and includes the watersheds of Suisun Marsh, Suisun Bay, San Pablo Bay, and San Francisco Bay. Delta outflow enters Suisun Marsh and Bay (including Grizzly Bay). Flows exit Suisun Bay via the Carquinez Strait, entering San Pablo Bay at the confluence with the Napa River. Other major tributaries to San Pablo Bay include Petaluma River, San Rafael Creek, and, indirectly, Sonoma Creek. As in the Delta, water levels in the San Francisco Bay area are influenced by the tides.

Surface Water Quality

The San Francisco Bay Estuary lies within the jurisdictions of two regional water boards: the Central Valley Regional Water Board and the San Francisco Bay Regional Water Board. Both water boards have adopted water quality control plans that establish water quality objectives for the Delta and Suisun Marsh based on the identified beneficial uses of Delta waters, while the State Water Board adopted the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Bay-Delta Plan).

The 2006 Bay-Delta Plan supersedes the water board basin plans to the extent of any conflict (State Water Board 2006). The Bay-Delta Plan is currently being updated through two separate processes (Plan amendments). The first Plan amendment is focused on San Joaquin River flows and southern Delta salinity. The second Plan amendment is focused on the Sacramento River and its tributaries, Delta eastside tributaries (including the Calaveras, Cosumnes, and Mokelumne rivers), Delta outflows, and interior Delta flows (State Water Board 2018).

CWA section 303(d) listings and concerns are similar throughout the various regions of the Delta. The following discussion broadly covers water quality issues of concern throughout the Delta, including those constituents and parameters identified on the CWA Section 303(d) list. Delta waterways are impaired due to pesticides, mercury and other metals, PCBs, salinity, pathogens, nutrients, invasive species, organic enrichment/low dissolved oxygen, sediment, water temperature, and unknown toxicity. Surface water in the Carquinez Strait, Suisun Marsh and Suisun Bay, San Pablo Bay, San Francisco Bay, and Del Valle Reservoir are impaired by some or all of the following: pesticides, mercury and other metals, PCBs, salinity, selenium, nutrients, invasive species, and trash (State Water Board 2010).

Water quality in the Delta is highly variable temporally and spatially. It is a function of complex circulation patterns affected by inflows, pumping for agricultural operations and exports, operation of flow management structures, and tidal action. Water quality is generally better in the northern Delta, where inflows from the Sacramento River dominate water quality conditions. In the southern Delta, poor quality water entering from the San Joaquin River and the ocean contribute to degraded conditions. Actions within the Delta including agricultural and urban land use, dredging, and diversions further contribute to water quality challenges.

The northern Delta tends to have better water quality primarily because of inflow from the Sacramento River, though some water quality parameters, such as mercury, may be more impaired than in other portions. The quality of water in the western Delta is strongly influenced by tidal exchange with San Francisco Bay; during low-flow periods, seawater intrusion results in increased salinity. In the southern Delta, water quality tends to be poorer because of the combination of inflows of poorer water quality from the San Joaquin River, discharges from Delta islands, and effects of diversions that can sometimes increase seawater intrusion from San Francisco Bay.

The Sacramento River and San Joaquin River contribute approximately 61 percent and 33 percent, respectively, to tributary inflow TDS concentrations within the Delta. TDS concentrations are relatively low in the Sacramento River, but because of its large

volumetric contribution, the river provides the majority of the TDS load supplied by tributary inflow to the Delta (DWR 2001). Although actual flow from the San Joaquin River is lower than from the Sacramento River, TDS concentrations in San Joaquin River water average approximately seven times those in the Sacramento River. The influence of this relatively poor San Joaquin River water quality is greatest in the southern Delta channels and in CVP and SWP exports. Water temperature in the Delta is only slightly influenced by water management activities (e.g., dam releases) (Reclamation and DWR 2005).

Delta exports contain elevated concentrations of disinfection byproduct precursors (e.g., dissolved organic carbon), and the presence of bromide increases the potential for formation of brominated compounds in treated drinking water. Organic carbon in the Delta originates from runoff from agricultural and urban land, drainage water pumped from Delta islands that have soils with high organic matter, runoff and drainage from wetlands, wastewater discharges, and primary organic carbon production in Delta waters. Delta agricultural drainage can also contain high levels of nutrients, suspended solids, organic carbon, minerals (salinity), and trace chemicals such as organophosphate, carbamate, and organochlorine pesticides (Reclamation 2014).

Water quality issues in the San Francisco Bay area watersheds are similar to those in the Delta, though urban and industrial runoff and tidal influences play a larger role. Emerging pollutants in the region include flame retardants, perfluorinated compounds, nonylphenol fipronil, and pharmaceuticals. The San Francisco Regional Water Board monitors these pollutants through its Regional Monitoring Program; develops management strategies; and implements actions, including pollution prevention, to reduce them. Sanitary sewer spills can occur because of aging collection systems and treatment plants. Non-native invasive species are a growing water quality threat. Erosion is a water quality issue on streams in the San Francisco Bay area watersheds. Stream erosion is accelerated by urbanization and additional impervious surfaces, land use conversion, rural development, and grazing (DWR 2013).

5.16.2.5 Central Coast Hydrologic Region

Surface Water Hydrology

South of the San Francisco Bay area from southern San Mateo County to Santa Barbara County, are the watersheds of the Central Coast. Among all of California's hydrologic regions, the Central Coast Hydrologic Region is the most reliant on groundwater for its water supply. The main watersheds in the region are the San Lorenzo River, Pajaro River, Elkhorn Slough, Salinas River, Carmel River, Chorro Creek, Santa Maria River, San Antonio Creek, San Luis Obispo Creek, Santa Ynez

River, and Carrizo Plain watersheds. Coastal watersheds west of the northern Santa Lucia Range include the Little Sur and Big Sur rivers and numerous coastal streams, many of which are ephemeral (DWR 2013).

Surface Water Quality

The Central Coast Hydrologic Region is under jurisdiction of the Central Coast Regional Water Board. Screening conducted by the Central Coast Regional Water Board indicated that the most severely impacted areas of the Central Coast are those watersheds affected by intensive agricultural activity, including watersheds of the Moso Cojo, Tembladero Slough-Salinas Reclamation Canal, Salinas River, Oso Flaco Creek, and Santa Maria River (DWR 2013).

Water quality issues in the Central Coast Hydrologic Region are largely associated with sediment, pathogens, nutrients, pesticides, salinity, and metals. Agriculture is the main source of pollutants, although CWA 303(d) listings also note urban runoff, natural sources, habitat modification, and hydromodification as important sources, with unknown sources and unspecified nonpoint source pollution also contributing many listings (State Water Board 2010). A total of 3,302 water bodies in the Central Coast Hydrologic Region are listed as impaired on the CWA 303(d) list.

5.16.2.6 Southern California Region

Surface Water Hydrology

The hydrologic regions in Southern California include the South Coast, Colorado River, and South Lahontan hydrologic regions.

The South Coast Hydrologic Region is the most urbanized and populous region in the State. There are 19 major rivers and watersheds in the South Coast Hydrologic Region. Many of these watersheds have densely urbanized lowlands, with concrete-lined channels and dams controlling flood flows. The headwaters for many rivers, however, are within coastal mountain ranges and have remained largely undeveloped. The watersheds include the Ventura River, Santa Clara River, Calleguas Creek, Santa Monica Bay, Los Angeles River, Malibu Creek, Ballona Creek, Dominguez Channel, San Gabriel River, Santa Ana River, San Diego Creek, San Jacinto River, San Juan Creek, San Margarita River, San Luis Rey, Carlsbad, San Dieguito River, San Diego River, Sweetwater River, Otay River, and the Tijuana River watersheds (DWR 2013).

Many of the prominent watersheds in the Colorado River Hydrologic Region offer combinations of native vegetation and human-made environmental, urban, and agricultural land and water uses. Included are the Salton Sea, Whitewater River, Alamo River, New River, San Felipe Creek, Fish Creek, Vallecito Creek, Carrizo Creek,

Havasu-Mohave Lakes, Piute Wash, Imperial Reservoir, Lower Colorado River, and Southern Mojave watersheds (DWR 2013).

The South Lahontan Hydrologic Region is characterized by closed basins, deserts, and ephemeral streams and rivers. Major watersheds in the South Lahontan Hydrologic Region include the Antelope Valley, Mojave, Mono Basin, Owens River, Amargosa River, and Mojave River watersheds. The perennial flows in the Owens River and streams draining to Mono Lake reflect the wetter conditions and runoff from snowmelt found in the northern part of the region (DWR 2013).

Surface Water Quality

Five regional water boards have jurisdiction over the Southern California hydrologic regions, including the Los Angeles, Santa Ana, and San Diego regional water boards in the South Coast Hydrologic Region; the Lahontan Regional Water Board in the South Lahontan Hydrologic Region; and the Colorado River Basin Regional Water Board in the Colorado River Hydrologic Region. The water quality issues of concern are distinct between the three regions.

Specific water quality issues within the densely populated and heavily urbanized South Coast Hydrologic Region include beach closures, contaminated sediments, agricultural discharges, salinity management, and port and harbor discharges (DWR 2013). Water quality issues in the South Coast watersheds are largely associated with nutrients and pathogens. Agriculture is the main source of pollutants, although CWA 303(d) listings also note urban runoff, natural sources, habitat modification, and hydromodification as important sources, with unknown sources and unspecified nonpoint and point source pollution also contributing many listings. Some SWP facilities in this region (Pyramid Lake and Castaic Lake) are impaired by mercury. A total of 7,240 impaired water bodies are identified in the CWA 303(d) list for South Coast watersheds (State Water Board 2010).

In contrast to the South Coast Hydrologic Region, the Colorado River Hydrologic Region is largely agricultural, with less than 1,000,000 residents. It is landlocked, but has water bodies of statewide, national, and international significance such as the Salton Sea and the Colorado River. Water quality issues include the quality of imported water supplies, on-site wastewater treatment systems, nitrates, leaking underground storage tanks, and animal feeding and dairy operations (DWR 2013). Water quality issues in the Colorado River Hydrologic Region include sedimentation/siltation on the Alamo River and in Imperial Valley drains, selenium in Imperial Valley drains, nutrients and salinity in the Salton Sea, and nutrients and pathogens in the New River. All identified water quality impairments are due to agriculture (State Water Board 2010).

Water quality in SWP water service areas in the South Lahontan Hydrologic Region are influenced by geothermal activity, agricultural activities, and municipal and industrial waste disposal. Natural geothermal springs contribute fluoride and sulfates to the Mojave River, while the sources of water body impairments in this region by manganese and total dissolved solids are unknown (State Water Board 2010).

5.16.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on surface water hydrology and water quality.

5.16.3.1 Federal

Federal Clean Water Act

The CWA is the primary Federal legislation governing the water quality aspects of the study area. The objective of the act is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA establishes the basic structure for regulating discharge of pollutants into the waters of the United States and gives USEPA the authority to implement pollution control programs such as setting wastewater standards for industries. In certain states such as California, USEPA has delegated authority to state agencies. Relevant sections of the CWA include the following:

Section 303 – Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. The three major components of water quality standards are designated users, water quality criteria, and antidegradation policy. Under section 303(d) of the CWA, State and Regional Water Boards assess water quality monitoring data for California's surface waters every 2 years to determine if they contain pollutants at levels that exceed protective water quality standards for designated beneficial uses. Water body and pollutants that exceed protective water quality standards are placed on the State's 303(d) List. For waters on this list, the states develop TMDLs to account for all sources of the pollutants that caused the water to be listed. A TMDL is a plan to restore the beneficial uses of a stream or to otherwise correct impairment (USEPA 2002). See the Environmental Setting for a discussion of 303(d) listings for the relevant basins in the proposed study area.

Section 402 – Section 402 of the CWA creates the National Pollutant Discharge Elimination System (NPDES) permit program. This program covers point sources of pollution discharging into a surface water body.

Federal Antidegradation Policy

The federal antidegradation policy is designed to provide the level of water quality necessary to protect existing uses and provide protection for higher quality and national water resources.

5.16.3.2 State

Water Right Decision 1641

Decision (D)-1641 and Water Right Order 2001-05 contain the current water right requirements to implement the 1995 Water Quality Control Plan (WQCP). D-1641 incorporates water right settlement agreements between DWR, Reclamation and certain water users in the Delta and upstream watersheds regarding contributions of flows to meet water quality objectives. D-1641 assigns DWR and/or Reclamation the responsibility to meet certain water quality objectives in the Delta and also authorizes the CVP and SWP to use JPOD in the south Delta.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, “waters of the State” fall under the jurisdiction of the appropriate Regional Water Board. Under the act, the Regional Water Board must prepare and periodically update basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet the Regional Water Board’s waste discharge requirements, which may be issued in addition to a water quality certification under section 401 of the CWA.

Water Quality Control Plans

The CWA requires each state to institute a continuing planning process approved by the USEPA. The State and Regional water boards’ planning process includes adoption, review, and amendment of state-wide and basin water quality control plans and policies. The Regional Water Boards throughout the State adopt WQCPs, also known as basin plans, which include development and adoption of TMDLs and implementation plans to protect water quality in its region. The WQCPs designate the beneficial uses and establish an implementation program to achieve the water quality objectives and protect the beneficial uses (DWR 2015a). Relevant WQCPs include:

The WQCP for the Sacramento and San Joaquin River Basins (Central Valley RWQCB 2018) outlines several agricultural water quality control programs which aim to establish water quality objectives for specific pollutants and to develop strategies to meet those objectives by implementing monitoring programs and limiting pollutant discharges. The

WQCP for the Bay-Delta Estuary (State Water Board 2006) commits the CVP and SWP to Delta habitat objectives, with positive implications for Delta drinking water intakes.

The WQCP for the Central Coastal Basin (Central Coast RWQCB 2017), the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Los Angeles RWQCB 2014), the WQCP for the Santa Ana River Basin (Santa Ana RWQCB 2016), and the WQCP for the San Diego Basin (San Diego RWQCB 2016) include protections for coastal components of these watersheds, including bays and estuaries. Agricultural considerations are a main focus in the WQCP for the Colorado River Basin (Colorado River RWQCB 2017).

Sacramento-San Joaquin Delta Reform Act

In November 2009 the Sacramento-San Joaquin Delta Reform Act was passed. It established State policy of coequal goals for the Delta and created the Delta Stewardship Council as a new, independent State agency that will delineate how to meet these goals through development and implementation of the Delta Plan. The “coequal goals” are providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. Under the act, the Delta Stewardship Council adopted a Delta Plan and implementing regulations in May 2013.

Integrated Regional Water Management Planning Act of 2002

In 2002, the State of California passed SB 1672, the Integrated Regional Water Management Planning Act, to provide bond funds to regional water management work groups statewide. Integrated regional water management plans (IRWMPs) are statewide voluntary initiatives to foster regional water management and are intended to “ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy” (DWR 2015c). The purpose of IRWM is to comprehensively address water supply, quality, flood, and ecosystem challenges through a collaborative planning and implementation framework of regional partners. The IRWM Planning Act of 2002 requires that regional water management groups be formed to administer the development of IRWMPs. Regional water management groups across the State are responsible for developing their own organizational structure, size, and means of governance (DWR 2015c).

5.16.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of

that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address surface water hydrology and water quality.

Local surface water regulations include IRWMPs, urban water management plans (UWMPs), General Plans, and land-use ordinances. Many of these regulations pertain to the study area. These plans and their relationship to water supply are discussed in Section 5.20, Water Supply.

5.16.4 Impact Analysis

5.16.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing surface water hydrology and water quality.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that may impact surface water hydrology and quality. However, the timing and the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this surface water hydrology and quality analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.16.4.2 Standards of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to surface water hydrology and quality resources is considered significant if the proposed project would do any of the following:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or 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.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Cause inundation by seiche, tsunami, or mudflow.
- Violate any water quality standards or waste discharge requirements.
- Otherwise substantially degrade water quality.

5.16.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build any new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur as there would be no change in the drainage patterns or increase in impervious surface cover. Accordingly, there would be no change in erosion or siltation on- or off-site. Also, no change in surface runoff exceeding the capacity of existing or planned stormwater drainage systems and/or result in flooding on- or off-site in PWA service areas would occur. Furthermore, as there would not be an increase impervious surface cover, there would be no change in surface runoff that could discharge pollutants into surface waters which could adversely affect receiving water quality over existing conditions. Therefore, there would be no violation of water quality standards or waste discharge requirements or substantial degradation of water quality related to construction of new or modified facilities.

Because no new or modified facilities would be operated, long-term impacts of operating and maintaining these facilities would not occur and there would be no associated permanent changes to water quality over existing conditions. Additionally, operation of the SWP is subject to ongoing State and federal laws and regulations, including water quality regulations. Therefore, as compared to existing conditions it is anticipated that there would be no violation of water quality standards or waste discharge requirements or substantial degradation of water quality related to operation of new or modified facilities.

Since no housing or structures would be constructed as part of the proposed project, impacts associated with impeding or redirecting flood flows or placing housing within a 100-year flood hazard area would not occur. In addition, because the proposed project would not construct, modify, or otherwise affect levees or dams, or modify the way flood flows are routed, the project would not expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam, seiche, tsunami, or mudflow.

As a result, **no impacts** to surface water hydrology and water quality in the study area would occur and no mitigation measures are required. Therefore, these impacts are not further evaluated in this DEIR.

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5.17 TRIBAL CULTURAL RESOURCES

5.17.1 Introduction

This section addresses potential impacts to tribal cultural resources resulting from project implementation. CEQA requires the lead agency to consider the effects of a project on tribal cultural resources. Tribal cultural resources include any 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, that is listed or eligible for listing in the California or National Registers, or has been identified at the discretion of the lead agency. These can include both prehistoric archaeological sites and Native American human remains, both of which are discussed in greater detail in Section 5.6, Cultural Resources.

No comments related to tribal cultural resources were received in response to the NOP (see Appendix B).

5.17.2 Environmental Setting

As stated above, tribal cultural resources are site features, places, cultural landscapes, sacred places or objects, which are of cultural value to a tribe or tribes. These resources may also be on, or eligible for, listing in the NRHP, CRHP, or be determined by the lead agency to be considered Tribal Cultural Resources. Tribal cultural resources also include prehistoric archaeological sites and human remains as discussed in Section 5.6, Cultural Resources, ethnographic sites, and historic-era landscapes and sites occupied, used, or spiritually and culturally valued by Native Americans.

Section 5.6, Cultural Resources, contains a description of prehistoric, ethnographic, and historical settings in the study area, which is also briefly summarized below.

Archaeological data show that humans have inhabited California for the past 10,000–12,000 years. Prior to European contact, California was occupied by hundreds of tribes, speaking over 300 dialects of 100 languages. European settlements had direct and indirect effects on the Native American populations. Despite hardships, Californian Native American communities persisted, and have maintained many of their traditional sites, features, and buildings. Typically, these are interpreted as ethnographic resources or historic resources, but it is also important to consider them as tribal cultural resources.

Currently, there are 109 federally recognized tribes in California, as well as 45 tribal communities of formerly recognized tribes that were terminated as part of the United States' termination policy in the 1950s or tribal communities that were never recognized by the federal government. Consultation efforts between DWR and California tribes for

this project is detailed in the following section. According to the 2010 U.S. Census, California represents 12 percent of the Nation's total Native American population (approximately 720,000) who identified themselves as Native American. Over one-half of the state's Native American population is composed of individuals (and now their descendants) who were relocated to large urban areas as part of the federal government's termination policy.

5.17.2.1 Native American Contact

DWR maintains a list for AB 52 consultation that includes 16 tribes. Letters to these identified tribes were sent via certified mail on July 6, 2018, and receipts of delivery were received for all 16 tribes. The United Auburn Indian Community of the Auburn Rancheria (UAIC) requested consultation with DWR on July 24, 2018 (UAIC, 2018). DWR also distributed letters to 98 other, non-AB 52 affiliated, tribes within the study area on July 6, 2018. Receipts of letter delivery were received for 86 of the tribes identified through NAHC consultation. The Ohlone/Costanoan-Esselen Nation requested consultation on August 5, 2018, stating that the Project site lies within its area of cultural interest, and requesting consultation for all soil disturbance within their aboriginal homeland of Monterey County.

Consultation with both the United Auburn Indian Community of the Auburn Rancheria and Ohlone/Costanoan-Esselen Nation is ongoing. No additional requests for consultation have been received as of writing of this report.

5.17.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on tribal cultural resources.

5.17.3.1 Federal

Section 106 of the National Historic Preservation Act

The National Park Service has identified Traditional Cultural Properties (TCPs) as sites that may be eligible for inclusion in the NRHP based on their associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community. TCPs are much the same as Tribal Cultural Resources. Designation of a TCP allows for a different way of grouping or identifying what are legally considered historic resources, that is, a mechanism for emphasizing a place or feature's value and significance to a living community.

Tribal cultural resources are protected through the NHPA of 1966, as amended (16 USC 470f), and its implementing regulations, Protection of Historic Properties (36 CFR Part 800), the American Indian Religious Freedom Act of 1978, and the Native American Graves Protection and Repatriation Act. Prior to implementing an “undertaking” (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on traditional cultural properties and to afford the Advisory Council on Historic Preservation and the SHPO a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the NRHP. As indicated in section 101(d)(6)(A) of the NHPA, properties of traditional religious and cultural importance to a tribe are eligible for inclusion in the NRHP. Under the NHPA, a resource is considered significant if it meets the NRHP listing criteria at 36 CFR 60.4. This project is not subject to Section 106 of the NHPA because it does not involve a federal undertaking.

National Register of Historic Places

A description of the NRHP is provided in the Regulatory Setting section of Section 5.6, Cultural Resources. In summary, The NRHP is the guide 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. The NRHP recognizes both historic-period and prehistoric archaeological properties that are significant at the national, state, and local levels.

5.17.3.2 State

California Environmental Quality Act Statute and Guidelines

CEQA and the CEQA Guidelines include special procedures for identifying, analyzing, and disclosing significant impacts on tribal cultural resources, which include all resources listed in or formally determined eligible for listing in the NRHP, the California CRHR, or local registers.

California Register of Historical Resources

As with TCPs in the NRHP, identification of Tribal Cultural Resources for the CRHR emphasizes a place or feature’s value and significance to living communities. AB 52, discussed in more detail below, further clarified this designation process.

Native American Heritage Commission

The Native American Heritage Commission (NAHC) identifies and manages a catalog of places of special religious or social significance to Native Americans. This database, known as the Sacred Lands File, 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.

Public Resources Code 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.

Assembly Bill 52

AB 52, enacted in September 2014, recognizes that California Native American tribes have expertise with regard to their tribal history and practices. AB 52 established a new category of cultural resources known as Tribal Cultural Resources in order to consider tribal cultural values when determining impacts on cultural resources. Public Resources Code section 21074(a) defines a tribal cultural resource as any of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
 - included or determined to be eligible for inclusion in the California Register; or
 - included in a local register of historical resources, as defined in California Public Resources Code section 5020.1(k).¹
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in California Public Resources Code section 5024.1(c).² In applying these criteria, the lead agency would consider the significance of the resource to a California Native American tribe.
- A cultural landscape that meets the criteria of California Public Resources Code section 21074(a)³ also is a tribal cultural resource if the landscape is geographically defined in terms of the size and scope.

¹ Public Resources Code section 5020.1(k) defines “local register of historical resources” as “a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution.”

² The criteria set forth in California Public Resources Code section 5024.1(c) include whether a resource: “(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage. (2) Is associated with the lives of persons important in our past. (3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values. (4) Has yielded, or may be likely to yield, information important in prehistory or history.”

³ A cultural landscape meets the criteria of California Public Resources Code section 21074(a) if it either is “included or determined to be eligible for inclusion in the California Register of Historical Resources” or is “included in a local register of historical resources” pursuant to California Public Resources Code section 5020.1(k).

- An historical resource as described in California Public Resources Code section 21084.1,⁴ a unique archaeological resource as defined in California Public Resources Code section 21083.2,⁵ or a non-unique archaeological resource as defined in California Public Resources Code section 21083.2⁶ may also be a tribal cultural resource if it meets the criteria of California Public Resources Code section 21074(a).

AB 52 requires lead agencies to analyze project impacts on “tribal cultural resources,” separately from archaeological resources (California Public Resources Code sections 21074, 21083.09), in recognition that archaeological resources have cultural values beyond their ability to yield data important to prehistory or history. AB 52 also defines “tribal cultural resources” in California Public Resources Code section 21074 (see above), and requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (California Public Resources Code sections 21080.3.1, 21080.3.2, 21082.3).

5.17.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each of these counties and cities has local regulations and General Plans with unique goals and policies that address sensitive prehistoric archeological and tribal cultural resources. These include policies guiding action following accidental discovery, as well as consultation with tribes prior to project construction.

5.17.4 Impact Analysis

5.17.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA’s Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP

⁴ Public Resources Code section 21084.1 defines an “historical resource” as “a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources.”

⁵ Public Resources Code section 21083.2(g) defines “unique archaeological resource” as “an archaeological artifact, object, or site about 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: (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information. (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type. (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.”

⁶ Public Resources Code section 21083.2(h) defines “nonunique archaeological resource” as “an archaeological artifact, object, or site which does not meet the criteria in subdivision (g).”

and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes that could result in effects on tribal cultural resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in a changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could change water levels in existing SWP storage and/or conveyance facilities. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.17.4.2 Thresholds of Significance

CEQA Guidelines Appendix G was amended in August 2016 to include considerations related to tribal cultural resources. As a result, an impact related to tribal cultural resources is considered significant if the proposed project would do any of the following:

- Cause a substantial adverse change in the significance of a tribal cultural resource, defined in California Public Resources Code 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: (i) is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in California Public Resources Code section 5020.1(k), or (ii) is determined at the discretion of the lead agency to be significant pursuant to criteria set forth California Public Resources Code section 5024.1(c).

5.17.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no impacts to known or unknown

tribal cultural resources, including subsurface archaeological or human remains. Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur. Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities (such as earth disturbing activities and use of equipment) would not occur and there would be no impacts to known or unknown tribal cultural resources, including subsurface archaeological or human remains.

Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no impacts to known or unknown tribal cultural resources, including subsurface archaeological or human remains.

5.17.4.4 Impacts and Mitigation Measures

Table 5.17-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.17-1
SUMMARY OF IMPACTS CONCLUSIONS – TRIBAL CULTURAL RESOURCES**

Impact Statement	Transfers	Exchanges
5.17-1: Changes in San Luis Reservoir water levels or flows in the Feather, Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges of carryover water implemented by PWAs could result in a substantial adverse change in the significance of a tribal cultural resource.	LTS	LTS

LTS: Less than Significant

Impact 5.17-1: Changes in San Luis Reservoir water levels or flows in the Feather, Sacramento, American, and San Joaquin rivers associated with increased frequency of transfers/exchanges of carryover water implemented by PWAs could result in a substantial change in significance of a tribal cultural resource.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta. In addition, the proposed amendments would allow PWAs to transfer a portion of their carryover water in San Luis Reservoir, and transfer up to 50 percent of its carryover water in a single-year transfer (i.e., a future or multi-year commitment of transferring carryover water is not allowed).

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

With the proposed project, changes in water levels due to transfers of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held in beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may result in lower water levels in San Luis Reservoir if transferred water is delivered in before its scheduled date for release.

Transferring SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. Changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers could expose known or unknown cultural resources which could result in a substantial adverse change to the significance of a tribal cultural resource.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. The proposed amendments would allow PWAs to exchange a portion of their carryover water in San Luis Reservoir, and exchange up to 50 percent of its carryover water in a single-year transaction (i.e. a future or multi-year commitment of exchanging carryover water is not allowed).

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. With the proposed project, changes in water levels due to exchanges of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held in beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may result in lower water levels in San Luis Reservoir if transferred water is delivered in before its scheduled date for release.

Exchanging SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. Changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers could expose known or unknown cultural resources which could result in a substantial adverse change to the significance of historical resources or to the integrity of a tribal cultural resources.

Impact Conclusion

It is possible that transfers and exchanges of SWP water from one PWA to another PWA could result changes in San Luis Reservoir water levels or surface water levels in the Feather, Sacramento, American and San Joaquin rivers that might expose known or unknown cultural resources. However, the SWP would continue to be operated consistent with Contract terms (including that transfers and exchanges shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and the proposed project would be using existing SWP facilities used for existing transfers and exchanges. Therefore, it is not anticipated that increased movement of SWP water among the PWAs would result in a substantial adverse change to the significance of a tribal cultural resources, and this impact would be **less than significant**.

Mitigation Measures

None required.

5.17.5 References

United Auburn Indian Community (UAIC), 2018. Letter to Jackie Wait, DWR, regarding AB 52 Consultation Request for the Proposed California WaterFix Project. July 2018.

5.18 TRANSPORTATION

5.18.1 Introduction

This section addresses transportation facilities in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments related to transportation were received in response to the NOP (see Appendix B).

5.18.2 Environmental Setting

The study area covers a broad area of California, as a result the land uses in the study area are numerous and varied. Land uses include urban and suburban development of varying densities, commercial uses, industrial uses, transportation, institutional uses, agriculture, recreational, and natural habitat/open space.

SWP facilities in the study area include small reservoirs in northern part of the State which are primarily used for recreation (Lake Davis, Frenchman Lake and Antelope Lake) and downstream reservoirs that are primarily used for storage but are also accessed for recreation including, but not limited to, Lake Oroville, San Luis Reservoir, Lake Perris and Castaic Lake. Public use of these reservoirs includes picnic areas, camping, fishing, and boating.

The roadway system in the study area contains numerous local streets and State and federal highways and freeways, all of varying capacities and service levels. Numerous freeways and expressways serve portions of the study area. Several major arterials run north-south, generally parallel to the Sacramento River. State Route (SR) 99 and SR-70 run north-south in the Central Valley. SR-273 runs north-south from Redding, generally paralleling the Sacramento River before it intersects with Interstate I-5 several miles north of the Shasta/Tehama county line. Major east-west routes in the study area on the east side of the Sacramento Valley include SR-70, SR-49, and SR-88, US 50, and I-80. US 101 extends north and south near the coast from San Luis Obispo south to Los Angeles, and I-5 runs north-south through the Central Valley to Los Angeles and on to San Diego.

The UPRR and Western Pacific Railroad have rail lines serving the study area. The alignments of these rail lines generally follow the I-5 alignment through the San Joaquin Valley. The UPRR line runs north-south near the coast, from the San Francisco Bay Area through Los Angeles, then southeast toward the Arizona/Mexico border.

A number of airports with various facility sizes and frequency of daily flights are also located in study area.

In addition, there are numerous local and county roadways, which are generally two- to four-lane county and local roads providing access to local and regional areas. Collectors (both major and minor) provide a linkage between local streets and minor roads and higher volume arterial streets and State and regional highways. Collector streets serve a variety of functions ranging from providing access to individual properties to conveying higher volumes of traffic to and between higher volume arterial and highway travel routes.

5.18.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on transportation and circulation. While there are no federal or State regulations specifically pertaining to transportation and circulation, local laws and regulations do exist to regulate transportation development.

5.18.3.1 Federal

Federal Highway Administration

The Federal Highway Administration (FHWA) coordinates highway transportation programs in cooperation with states and other partners to enhance the country's safety, economic vitality, quality of life and the environment. FHWA has programs that provide federal financial assistance to states for construction and improvement of the National Highway System, urban and rural roads and bridges. This program provides funds for general improvements and development of safe highways and roads.

Federal Aviation Administration Airport Emergency Plan

The Federal Aviation Administration (FAA) is responsible for oversight of airports, air traffic control systems, and aircraft safety. Terrorist attacks and the 2004 and 2005 hurricane seasons highlighted the need for the FAA to focus on improving airport emergency management; incident response capabilities; and coordination processes across the nation during an airport emergency, which includes any occasion or instance, natural or human made, that warrants action to save lives and protect property and public health. The FAA developed the Airport Emergency Plan as a comprehensive national plan to improve the effectiveness of emergency management/response personnel across the full spectrum of potential incidents and hazard scenarios, including natural hazards, terrorist activities, and other human-made disasters (FAA 2010:1). The Airport Emergency Plan guides airport operators on how to prepare for and respond to natural disasters, including flooding and water rescue events.

5.18.3.2 State

California Department of Transportation

Caltrans is responsible for operating and maintaining the State highway system. In the vicinity of SWP, several of the major highways and freeways, exit and entrance ramps, and intersections fall under Caltrans jurisdiction.

California Transportation Commission

The California Transportation Commission (CTC) is responsible for the programming and allocating of funds for the construction of highway, passenger rail and transit improvements throughout California. The CTC also advises and assists the Secretary of the California State Transportation Agency and the Legislature in formulating and evaluating State policies and plans for California's transportation programs. The CTC is also an active participant in the initiation and development of State and Federal legislation that seeks to secure financial stability for the State's transportation needs.

5.18.3.3 Local

Numerous regional agencies work with local jurisdictions to address regional transportation issues, including Council of Governments (COGs), Association of Governments, and regional transportation commissions and authorities. These regional agencies are often responsible for developing policies, planning and securing funding for transportation and transit facilities.

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each of these counties and cities has local regulations and General Plans with unique goals and policies that address circulation, emergency access and transit and pedestrian travel routes. General Plan circulation elements include policies to facilitate their respective Congestion Management Plans as well as local and regional transportation planning.

5.18.4 Impact Analysis

5.18.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and

clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to land use that would result in an increase in vehicle trips or conflict with applicable plans, policies, or ordinances or congestion management plans. There would also be no change in air traffic patterns.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in changes to existing land uses that could affect traffic patterns. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.18.4.2 Thresholds of Significance

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

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

5.18.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities would not occur and there would be no short-term increase in construction-related vehicle trips that could reduce levels of service on affected roadways. There would also be no short-term interference with emergency access, or use of pedestrian, bike or transit facilities. Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and there would be no permanent change in land use that could result in an increase in vehicle trips that could reduce levels of service or conflict with applicable plans, policies, or ordinances or congestion management plans. Furthermore, because no new facilities would be constructed there would be no increase in hazards due to a design feature.

As noted above, portions of the proposed amendments related to water transfers and water exchanges may result in changes to the amount of Table A and/or Article 21 water moving among the PWAs that could result in changes in land use that could result in an increase in vehicle trips.

5.18.4.4 Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for

additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in transfers there would be no increase in vehicle trips that could reduce levels of service or conflict with applicable plans, policies, or ordinances or congestion management plans. There would also be no change in air traffic patterns. Furthermore, because no new facilities would be constructed there would be no increase in hazards due to a design feature.

5.18.4.5 Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. However, because it is assumed that no new facilities would be constructed and operated, or existing facilities modified to accommodate the increases in exchanges there would be no increase in vehicle trips that could reduce levels of service or conflict with applicable plans, policies, or ordinances or congestion management plans. There would also be no change in air traffic patterns. Furthermore, because no new facilities would be constructed there would be no increase in hazards due to a design feature.

Therefore, **no impacts** related to transportation would occur and no mitigation measures are required.

5.18.5 References

Federal Aviation Administration (FAA). 2010. Advisory Circular No: AC 150/5200-31C. Subject: Emergency Response Plan. May 1. https://www.faa.gov/documentLibrary/media/150_5200_31c_chg1.pdf. Accessed September 12, 2017.

5.19 UTILITIES AND SERVICE SYSTEMS

5.19.1 Introduction

This section addresses public utilities and service systems including wastewater collection and treatment, and solid waste services in the study area, and the potential changes that could occur as a result of implementing the proposed project. Water supply is addressed in Section 5.20, Water Supply and stormwater drainage is addressed in Section 5.16, Surface Water Hydrology and Water Quality. No comments related to public utilities or service systems were received in response to the NOP (see Appendix B).

5.19.2 Environmental Setting

As described in Section 5.12, Land Use and Planning, the study area covers a broad area of California. As a result, land uses in the study area are numerous and varied. Land uses include urban and suburban development of varying densities, commercial uses, industrial uses, transportation, institutional uses, agriculture, recreation, and natural habitat/open space. Community-wide water and wastewater treatment and distribution systems are provided in suburban and urban communities in the study area, while water and wastewater systems are often developed by individual property owners in more rural areas. Solid waste disposal for household wastes are provided to all suburban and urban communities in the study area. In rural areas, individuals are responsible for commercial and agricultural waste disposal.

5.19.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on utilities and service systems.

5.19.3.1 Federal

Clean Water Act

Title 40 CFR Part 503, Title 23 CCR, and standards established by the Regional Water Board's all regulate the disposal of biosolids. The main purpose for these regulatory measures is to ensure appropriate limits for effluent discharge to surface waters. These limits affect the sizing and treatment capacities of wastewater utilities that serve communities in California.

National Pollutant Discharge Elimination System Permits

The NPDES permit system was made to regulate industrial and municipal discharges to surface waters within the United States. Each NPDES permit contains allowable concentrations limits for pollutants found in discharges. Sections 401 and 402 of the CWA provide general requirements regarding NPDES permits. Section 307 of the CWA

specifies the factors that the USEPA is required to recognize when preparing effluent limits for pollutants designated as priority. See more a detailed description of these regulations in Section 5.16, Surface Water Hydrology and Quality.

5.19.3.2 State

California Integrated Waste Management Act

The California Integrated Waste Management Act, also known as AB 939 (Public Resources Code, section 41780), enacted in 1989, contains regulations affecting solid waste disposal in California. AB 939 is designed to increase landfill life and conserve other resources through increased source reduction and recycling. AB 939 requires cities and counties to prepare solid waste management plans and adopt source reduction and recycling elements (SRREs) to implement AB 939's goals. These goals include diverting approximately 50 percent of solid waste from landfills and identifying programs to stimulate local recycling in manufacturing and the purchase of recycled products.

The legislature amended the California Integrated Waste Management Act in 2007 through SB 1016. Previously, AB 939 had required the California Department of Resources Recycling and Recovery (CalRecycle) to review a jurisdiction's SRRE and household hazardous waste element (HHWE) at least once every 2 years. Under SB 1016, which repealed that requirement, CalRecycle instead was required to make a finding as to whether each jurisdiction was in compliance with AB 939's diversion requirements for calendar year 2006 and to determine compliance for the 2007 calendar year and later years based on the jurisdiction's change in its per capita disposal rate. CalRecycle is also required to review a jurisdiction's compliance with those diversion requirements in accordance with a specified schedule, which would be based on the finding that the jurisdiction is in compliance with those requirements or has implemented its SRRE and HHWE. SB 1016 repealed this review schedule on January 1, 2018, and, since that date, requires CalRecycle to review each jurisdiction's SRRE and HHWE at least once every 2 years.

SB 1016 also requires CalRecycle to issue an order of compliance if it finds that the jurisdiction has failed to make a good faith effort to implement its SRRE or its HHWE pursuant to a specified procedure. CalRecycle is required to comply with certain requirements in making this determination, including considering the extent to which the jurisdiction has maintained its per capita disposal rate.

Assembly Bill 341

AB 341, which was enacted in 2011, states that it is the policy goal of the State that not less than 75 percent of solid waste generated be reduced, recycled, or composted by the year 2020. The bill also requires that a business, defined to include a commercial or public entity that generates more than 4 cubic yards of commercial solid waste per week arrange for recycling services, on and after July 1, 2012. Jurisdictions, on and after July 1, 2012, are required to implement a commercial solid waste recycling program or revise their SRRE to meet this requirement.

California Department of Resources Recycling and Recovery

CalRecycle is the home of California's recycling and waste reduction efforts. Officially known as the Department of Resources Recycling and Recovery, CalRecycle is a department within the California Environmental Protection Agency and administers programs formerly managed by the California Integrated Waste Management Board and Division of Recycling. CalRecycle is the State department charged with the primary responsibility for permitting of solid waste facilities. CalRecycle operates through its designated local enforcement agencies, which typically are county health departments. Air pollution from solid waste facilities is regulated by local APCDs or AQMDs, while water pollution is regulated by Regional Water Boards.

Universal Waste Regulations

Universal wastes are hazardous wastes that are widely produced by households and many different types of businesses. Universal wastes include televisions, computers, and other electronic devices as well as batteries, fluorescent lamps, and mercury thermostats and other mercury-containing equipment, among others. The hazardous waste regulations identify seven categories of hazardous wastes that can be managed as universal wastes. Any unwanted item that falls within one of these waste streams can be handled, transported, and recycled following the simple requirements set forth in the universal waste regulations (22 CCR Division 4.5, Chapter 23).

5.19.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address utility and service systems.

5.19.4 Impact Analysis

5.19.4.1 Methods of Analysis

As described in Section 5.1 Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete and modify provisions of the Contracts and would clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect changes to existing population levels that could affect providing utility services.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) could result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could support changes in population levels that could affect providing utility services. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this utilities analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.19.4.2 Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to utilities and service systems is considered significant if the proposed project would do any of the following:

- Exceed wastewater treatment requirements of the applicable Regional Water Board.
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Result in a determination by the wastewater treatment provider that 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.

- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs or to comply with federal, state, and local statutes and regulations related to solid waste.

As noted in the Introduction to this section, water supply is addressed in Section 5.20, Water Supply and stormwater drainage is addressed in Section 5.16, Surface Water Hydrology and Water Quality.

5.19.4.3 Impacts and Mitigation Measures

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities would not occur and there would be no short-term increase in population to support construction activities. As a result, there would no change in demand for utility service systems and no associated need for new or modified wastewater or water treatment and/or distribution facilities. Because there would be no change in population, there would also be no change in the need for solid waste collection or disposal and no change in landfill capacity. Because no construction would occur there would also be no solid waste produced requiring disposal and no effect on the capacity of landfills.

Furthermore, because no new facilities would be built or existing facilities modified, there would be no increase in population to support operation and maintenance activities. As a result, there would no change in demand for utility service systems and no associated need for new or modified wastewater or water treatment and/or distribution facilities. Because there would be no change in population, there would also be no change in the need for solid waste collection or disposal and no change in landfill capacity.

As noted above, portions of the proposed amendments related to water transfers and water exchanges may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions.

However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in water transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Because it is assumed that no new facilities would be built or existing facilities modified to accommodate the increases in transfers, there would be no increase in population to support operation and maintenance activities. As a result, there would no change in demand for utility service systems and no associated need for new or modified wastewater or water treatment and/or distribution facilities. Because there would be no change in population, there would also be no change in the need for solid waste collection or disposal and no change in landfill capacity.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. However, because it is assumed that no new facilities would be built or existing facilities modified to accommodate the increases in exchanges, there would be no increase in population to support operation and maintenance activities. As a result, there would no change in demand for utility service systems and no associated need for new or modified wastewater or water treatment and/or distribution facilities. Because there would be no change in population, there would also be no change in the need for solid waste collection or disposal and no change in landfill capacity.

Therefore, **no impacts** related to utilities and service systems would occur and no mitigation measures are required.

5.20 WATER SUPPLY

5.20.1 Introduction

This section describes the impacts to water supply resources in the study area and the potential changes that could occur as a result of implementing the proposed project. No comments addressing water supply were received in response to the NOP (see Appendix B). Comments received recommended measures to be included in the alternatives, including water conservation measures and/or reductions or changes in the maximum Table A deliveries (based on DWR reliability reports, climate change reports and the Delta Reform Act, other reports on future water supplies, and the BDCP alternatives); these comments are addressed in Chapter 7, Alternatives.

Groundwater is addressed in Section 5.10, Groundwater Hydrology and Quality, and potential indirect or direct growth, as a result water supply changes, is discussed in Growth Inducement section of Chapter 6 Other CEQA Considerations.

5.20.2 Environmental Setting

Water supplies and use vary by region and by PWA, as described below.

5.20.2.1 Regional Water Supply and Use

Large reservoirs throughout the Sacramento River and San Joaquin River hydrologic regions provide storage for flood control, power production, diversions and conservation storage for urban and agricultural purposes, fish and habitat, recreation, and salinity control. This storage is often operated by or in conjunction with valley irrigation districts that hold water rights and distribute the surface water to their users. Water use in the Sacramento River and San Joaquin River hydrologic regions is mostly for agricultural production, including a variety of crops as well as livestock management, followed by environmental and urban use. Irrigation using both groundwater and surface water dominates water use volume, but municipal water use has grown along with the rising population. Many of the cities in the San Joaquin River Hydrologic Region experienced groundwater depressions, resulting in increased use of treated surface water for municipal supplies (DWR 2013).

Water use in the Delta is mostly agricultural, and is used under appropriative or riparian rights. Irrigation water is diverted directly from Delta waterways and transported to farmlands; the surface water levels and quality are determined in part by Delta inflows, tides, local diversions, and CVP/SWP water export operations and deliveries. Other water sources include groundwater and recycled water. Groundwater use is primarily for residential use, and little is known about the quantity of groundwater used for this

purpose. Recycled water use is primarily for agricultural irrigation or for wetlands and natural systems (DWR 2013).

In the Central Coast Hydrologic Region, agricultural uses account for approximately half of water use in the region, while urban water use accounts for 15 to 20 percent. The remainder is applied to environmental purposes, such as maintaining instream flows to sustain fish populations. Groundwater accounts for approximately 83 percent of the water supply used for agricultural and urban purposes and nearly 100 percent for rural domestic purposes. Groundwater accounts for nearly 100 percent of the potable supply in the Salinas Valley (DWR 2013).

Applied water demands in the South Coast Hydrologic Region are reflective of the populous and urban setting. Urban water users require more than 80 percent of the total water use in the region. Almost 75 percent of the urban water uses occurred in the Metropolitan Los Angeles and Santa Ana areas, with slightly more than 40 percent occurring in Metropolitan Los Angeles.

In the Colorado River Hydrologic Region, agriculture accounts for approximately 75 percent of demand, primarily within the Imperial Valley. More than half of the urban demand in this region occurs in the Coachella Valley (DWR 2013).

The South Lahontan Hydrologic Region is arid and is a closed basin, such that all rivers and streams flow to internal basins. Two of the fastest-growing urban areas are located within the region: Antelope and Victor valleys. Agriculture, although small in acreage, has remained steady over the years. Groundwater is used to meet approximately 62 percent of demand (2005–2010), while SWP supplies, other surface water, and recycled water meet the remaining demand. Recycled water is used mainly in Antelope Valley for recreation and landscape irrigation purposes.

5.20.2.2 SWP Use by PWA

The following discussion summarizes the sources and uses of water supplies within each PWA's water service area, including the role of SWP supplies. The volumes and relative proportions of various water sources vary depending on precipitation, regulatory restrictions, legislative restrictions and operational conditions. The proportions below are generally for long-term averages (if available) or the most recent year reported; the year(s) used to derive proportions vary by PWA. For specific information on the year(s) used to derive proportions, please refer to the document(s) cited in the relevant discussion.

Every two years, DWR prepares a State Water Project Delivery Capability Report (DWR 2017). This report informs the PWAs and the public about key factors important to the operation of the SWP and provides an estimate of the current SWP water supply delivery capability, taking into account regulatory requirements, the variability of hydrology and potential impacts of climate change. The report states that the total average Annual Table A delivery capability under existing conditions is 2,571 taf/year, slightly more than the average annual estimated in 2015.

Alameda County FC&WCD, Zone 7 – Alameda County FC&WCD, Zone 7 or Alameda County Zone 7 WA relies on the SWP for approximately 80 percent of its water supply; it also receives other water from local water rights. The agency is a water wholesaler to M&I retailers and retailer to agricultural water users. Alameda County Zone 7 WA water uses in 2009 included residential (54 percent), commercial/institutional (16 percent), landscape (13 percent), agriculture (10 percent) unaccounted-for water (7 percent) and industrial (1 percent) (Zone 7 Water Agency 2010; pers. comm., Rank and Florez 2015).

Alameda County WD – Alameda County WD received approximately 29 percent of its supply from the SWP during the district’s fiscal years 2005/06 through 2014/15; the remainder comes from the San Francisco Regional Water System (17 percent) and local water supplies (54 percent). Water use during this period was predominantly residential (67 percent) while the remainder (33 percent) was provided to commercial, industrial, dedicated landscape and institutional customers (Alameda County Water District 2016).

Antelope Valley-East Kern WA – Currently, SWP supplies are 100 percent of Antelope Valley-East Kern WA’s water supplies. Groundwater banking allows the agency to store supplies when demands are low, and deliver them when demands are high but supplies are constrained (by conveyance capacity and/or availability). Antelope Valley East-Kern WA is a wholesaler to M&I (87 percent of deliveries in 2010) and retailer to agricultural water users (13 percent of deliveries in 2010) (Antelope Valley East-Kern Water Agency et al. 2013; pers. comm., Barnes 2015).

Butte County –Butte County is a wholesaler of SWP supplies. SWP supplies are a small portion of their overall water supply portfolio; other sources include the CVP, local surface water supplies, groundwater, and recycled water. According to the Butte County Water Inventory and Analysis (Butte County Department of Water and Resource Conservation 2001), in a normal year, water use includes agriculture (71 percent), conveyance losses (15 percent), environmental demands (10 percent), and urban demands (4 percent). Water use allocations are similar in drought years.

Santa Clarita Valley WA (formerly known as Castaic WA)– In addition to SWP supplies, Santa Clarita WA receives supplies from two other water districts in Kern County, and has access to groundwater and recycled water. The agency is a

wholesaler to four retail purveyors, who deliver supplies to primarily M&I users (Castaic Lake Water Agency 2015).

Coachella Valley WD – Coachella Valley WD supplies in 2010 included Colorado River water (54 percent), groundwater (19 percent), SWP supplies (13 percent), and local water supplies (10 percent). Water uses include agriculture (45 percent), M&I (33 percent), golf courses (17 percent), and fish farms and duck clubs (4 percent) (Coachella Valley Water District 2011).

Crestline-Lake Arrowhead WA – SWP supplies made up approximately 80 percent of Crestline-Lake Arrowhead WA's water supplies in 2010, while the remainder of their supplies came from local surface water sources. The agency is primarily a wholesaler; information on water use within the purveyors' water service areas is not available; however, Crestline-Lake Arrowhead WA estimates that 93 percent of the retail service connections in the service area are classified as general or residential, 57 as commercial connections, 8 as agricultural/irrigation connections, and 17 as other water systems and camps (none as industrial) (Crestline-Lake Arrowhead Water Agency 2011).

Desert WA – Desert WA's water sources in 2010 included groundwater (28 percent), local surface water (10 percent), SWP supplies (45 percent), and recycled water (7 percent). In 2010, water uses included residential (66 percent), commercial (30 percent), and industrial/government (4 percent) (Desert Water Agency 2011).

Dudley Ridge WD – Dudley Ridge WD uses surface water supplies exclusively, including supplies from the SWP and other sources outside of the district. All deliveries are agricultural (Dudley Ridge Water District 2012).

Empire West Side ID – Empire West Side ID uses surface water supplies exclusively, including supplies from the SWP and local river runoff. All deliveries are agricultural (State Water Contractors [SWC] 2015).

Kern County WA – Kern County WA is a wholesaler to various agricultural and M&I member districts. For three of the member districts, SWP water is the sole water supply; for others, it is a supplemental supply. SWP supplies make up approximately 30 percent of Kern County WA supplies; CVP supplies and Kern River surface water make up the remainder (pers. comm., Creel and Minaberrigarai 2015).

County of Kings – Kings County WD has a variety of water sources, including local surface water supplies and SWP supplies, and makes agricultural deliveries (SWC 2015).

Littlerock Creek ID – Littlerock Creek ID provides surface water, including SWP and local supplies, and groundwater to agricultural and residential customers (Littlerock Creek Irrigation District 2018).

Metropolitan WDSC – Metropolitan WDSC is a wholesaler of SWP and Colorado River water supplies; deliveries are made to other wholesalers and retailers. Within the water service area, local surface water and groundwater supplies meet approximately half of the demand. On a long-term basis, approximately 35 percent of retail demand is met with SWP supplies. In 2015, approximately 97 percent of Metropolitan WDSC’s deliveries to water retailers are used for M&I, and 3 percent for agricultural purposes (pers. comm., Upadhyay and Napoli 2015; Metropolitan Water District of Southern California 2016).

Mojave WA – SWP supplies are approximately 20 percent of Mojave WA’s water supply portfolio, and it is primarily used to recharge groundwater. Other sources include natural local surface water flows, return flow from pumped groundwater not consumptively used, and wastewater imports from outside the Mojave WA service area (pers. comm., Cortner et al. 2015; Mojave Water Agency 2016).

Napa County FC&WCD – Napa County FC&WCD provides SWP water to three cities in Napa County (pers. comm., Miller and Martin 2015; Napa County 2011).

Oak Flat WD – Oak Flat WD provides SWP supplies to agricultural users (pers. comm., Hansen 2015).

Palmdale WD – SWP supplies make up approximately half of Palmdale WD’s supplies; the remainder comes from groundwater (40 percent) and local surface water (10 percent) (pers. comm., Lamoreaux 2015; Palmdale Water District 2016).

Plumas County FC&WCD – SWP supplies are the sole water supply to Plumas County FC&WCD; they currently provide supplies to the City of Portola and a private golf course (Grizzly Lake Conservation Storage District is also anticipated to take deliveries in the future) (pers. comm., Perrault 2015).

San Bernardino Valley Metropolitan WD – San Bernardino Valley Metropolitan WD wholesales SWP supplies to retail purveyors and manages groundwater storage within its boundaries (San Bernardino Valley Metropolitan Water District et al. 2016).

San Gabriel Valley Municipal WD – San Gabriel Valley Municipal WD is a wholesaler of SWP supplies to primarily M&I customers; they have no other water supply sources (pers. comm., Kasamoto and Lemieux 2015).

San Geronio Pass WA – In addition to SWP supplies, San Geronio Pass WA purchases a small amount of local water supplies (pers. comm., Davis 2015; San Geronio Pass Water Agency 2017).

San Luis Obispo County FC&WCD – San Luis Obispo County FC&WCD is an urban wholesaler, providing SWP supplies to 11 subcontractors in San Luis Obispo County (Central Coast Water Authority (CCWA) 2016).

Santa Barbara County FC&WCD – Santa Barbara County FC&WCD serves SWP water to customers through the Central Coast Water Authority (CCWA) facilities. The CCWA serves water to 13 public and private entities (CCWA 2016).

Santa Clara Valley WD – Santa Clara Valley WD's water supplies include natural groundwater recharge, local surface water, SWP supplies, CVP supplies, recycled and purified water, and transfers. Nearly all of the SWP water is used for M&I needs (Santa Clara Valley Water District 2016).

Solano County Water Agency – The water sources for the Solano County WA are the SWP (19 percent in 2015) and the Federal Solano Project (81 percent in 2015). SWP supplies are sold wholesale to cities in Solano County (Solano County Water Agency 2016).

Tulare Lake Basin WSD – Tulare Lake Basin WSD has a variety of water sources, including local surface water supplies and SWP supplies, and makes agricultural deliveries (Tulare Lake Basin Water Storage District 2015).

Ventura County FCD (Ventura County Watershed Protection District) – Ventura County Watershed Protection District primarily relies on local surface water supplies; it does not regularly rely on SWP supplies (pers. comm., Wickstrum 2015).

Yuba City – In addition to SWP supplies, which comprise the majority of the city's supplies, Yuba City has local water supplies and a surface water supply contract with North Yuba Water District. In addition, Yuba City uses groundwater as an emergency water source (City of Yuba City 2016; pers. comm., Cook and Langley 2015).

5.20.3 Regulatory Setting

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of the proposed project's impacts on water supply.

5.20.3.1 Federal

Central Valley Project Improvement Act

Implementation of the CVPIA changed management of the CVP by making fish and wildlife protection a project purpose, equal to water supply for agricultural and urban uses. The CVPIA affects water exports from the Delta to San Luis Reservoir and increases operational pressures on the reservoir to meet south of Delta water demands. CVPIA Section 3406 (b)(2) authorized and directed the Secretary of the Interior, among other actions, to dedicate and manage 800 taf of CVP yield annually for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized in the CVPIA, to assist the State of California in its efforts to protect the waters of the San Francisco Bay-Delta estuary, and to help meet obligations

legally imposed on the CVP under federal or State law following the date of enactment of the CVPIA.

CVPIA sections 3406(d)(1) and 3406(d)(2) dedicate two water supplies to refuges: Level 2 water and Level 4 water. The CVPIA requires delivery of Level 2 water in all year types except critically dry water year conditions, when Level 2 water can be reduced by 25 percent. Level 4 water amounts to about 163 taf and are in addition to Level 2 water supplies. The availability of Level 4 water is influenced by the availability of water for transfer from willing sellers, which varies from year to year.

Coordinated Operation Agreement

The COA is an agreement between Reclamation and DWR that governs the coordinated operations of the CVP and SWP in the Sacramento River watershed and the Delta. With the goal of using coordinated management of reservoir releases and surplus flows in the Delta to improve Delta export and conveyance capability, the COA received congressional approval in 1986 and became Public Law 99-546. As modified by interim agreements, the COA provides for equitable sharing of surplus water entering the Delta while jointly meeting obligations to protect beneficial uses. Recently DWR and Reclamation have been in a process to review the COA. In August 2018 Reclamation sent to DWR a notice to initiate renegotiation of the COA.

5.20.3.2 State

California Water Rights

A water right is a legally granted and protected right to take possession of water and put it to beneficial use. As authorized by the California Water Code, the State Water Board allocates surface water rights and permits the diversion and use of water throughout the State. Through its Division of Water Rights, the State Water Board issues permits to divert water for new appropriations, change existing water rights, or store water for a certain length of time. The State Water Board attaches conditions to these permits to ensure that the water user prevents waste, conserves water, does not infringe on the rights of others, and puts the State's water resources to the beneficial use in the best interest of the public.

Sacramento-San Joaquin Delta Reform Act

In November 2009 the Sacramento-San Joaquin Delta Reform Act was passed. It established State policy of coequal goals for the Delta and created the Delta Stewardship Council as a new, independent State agency that will delineate how to meet these goals through development and implementation of the Delta Plan. The 'coequal goals' are providing a more reliable water supply for California and protecting,

restoring, and enhancing the Delta ecosystem. Under the act, the Delta Stewardship Council adopted the Delta Plan and implementing regulations in May 2013. The Delta Plan and implementing regulations address water supply in the Delta directly and indirectly (Delta Stewardship Council 2016 and 2018).

Integrated Regional Water Management Planning Act of 2002, California Water Code, Division 6, Part 2.2

In 2002, the State of California passed SB 1672, the Integrated Regional Water Management Planning Act, California Water Code, Division 6, Part 2.2 to provide bond funds to regional water management work groups statewide. The IRWM Grant Program's intent is to "promote and practice integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy" (DWR 2018a). The purpose of IRWM is to comprehensively address water supply, quality, flood, and ecosystem challenges through a collaborative planning and implementation framework of regional partners. The IRWM Planning Act of 2002 requires that regional water management groups be formed to administer the development of IRWMPs. Tribes and others across the State have worked collaboratively to organize and establish 48 regional water management groups, covering over 87 percent of the State's area and 99 percent of its population (DWR 2018b).

Assembly Bills 1668 and Senate Bill 606

In May 2018, Governor Brown signed AB1668 and SB 606 which require the State Water Board and DWR to adopt long-term urban water use efficiency standards, including standards for indoor residential use, outdoor residential use, water losses and other uses by June 30, 2022. In addition, local water suppliers will be required to calculate and comply with their urban water use objectives and report those objectives and actual use to DWR. Starting in 2027, local water suppliers' failure to comply with the State Water Board's adopted long-term urban water use efficiency standards could result in fines.

Assembly Bills 91 and 92

In March 2015, in response to the fourth consecutive year of extreme drought in California, the California Legislature adopted two appropriations bills (AB 91 and SB 75) and two policy trailer bills (AB 92 and SB 76) allocating approximately \$1 billion for drought-related activities in the State. This legislation includes making funds available for emergency relief (drinking water projects, drought disaster recovery support, and food assistance to people affected by the drought); water recycling demonstration

projects, and clean drinking water and wastewater treatment infrastructure; monitoring and mitigation for drought conditions and continued evaluation of surface and groundwater conditions by DWR; species and environmental preservation; and regulatory oversight of State Water Board for enforcement of water rights and water curtailment actions.

5.20.3.3 Local

Integrated Regional Water Management Plans

Integrated regional water management implements integrated water management – an approach to achieve social, environmental, and economic objectives in water management – on a regional scale. Forty-eight regional water management groups now cover almost 90 percent of the State’s geographic area, and 99 percent of the population. IRWM regions in the study area include Upper Feather River Watershed, North Sacramento Valley, North Coast Resource Partnership, San Francisco Bay Area, Westside (Yolo, Solano, Napa, Lake, Colusa), Pajaro River Watershed, San Luis Obispo, Kern County, Poso Creek, Kings Basin Water Authority, Westside-San Joaquin, Tule, Fremont Basin, Watersheds Coalition of Ventura County, Mojave, Antelope Valley, Santa Barbara County, Upper Santa Clara River, Greater Los Angeles County, Gateway Region, Santa Ana Watershed Project Authority, South Orange County Water Management Area, Upper Santa Margarita, Coachella Valley, and San Diego. Each of these regions (except Tule and Fremont Basin) has adopted an IRWMP pursuant to the 2002 IRWM Planning Act. The IRWMPs for the Tule and Fremont Basin regions are under development (DWR 2015).

Urban Water Management Plans (UWMP)

UWMPs developed in response to the Water Conservation Act of 2009 address water use in urban areas, including how water management tools are used to maximize resources and minimize waste, quantifications of past water use and projections of future water use, and discussions of past and future water demand management measures. The plans include measures to achieve the legislated goal of a 20 percent per capita reduction in water use by 2020. Many of the plans to date look to achieve this goal through a combination of measures to increase water conservation, improve water use efficiency, and increase use of recycled water to offset potable demand, among others. In addition, according to AB 1668 and SB 606 (described above), five-year drought risk assessments and water shortage contingency plans must also be incorporated into UWMPs.

SWP water use within each PWA's water service area was previously described in Section 5.20.2, Environmental Setting. The following list presents relevant local UWMPs, and notes any projected changes in reliance on or use of SWP supplies:

Alameda County Zone 7 WA 2015 UWMP (2016) – The UWMP does not project a change in the use of SWP supplies. The 2015 UWMP does plan for additional sources of water such as reuse, to fill in projected gaps in future water supply due to reduced SWP supplies as projected by DWR in the 2015 SWP Delivery Capability Report.

Alameda County WD UWMP 2015–2020 (2016) – The UWMP does not project a change in the use of SWP supplies but it does reflect a reduced level of supplies from the SWP after 2020.

Antelope Valley-East Kern WA 2015 UWMP (2016) – Antelope Valley-East Kern WA has a groundwater banking project to store excess water available from the SWP during wet periods and recover it during dry and high demand periods or during a disruption in deliveries from the SWP. The UWMP does not project any changes in reliance on or use of SWP supplies.

Santa Clarita Valley WA 2015 UWMP (formerly known as Castaic Lake WA) (2016) – The UWMP does not project a change in the use of SWP supplies.

Central Coast WA 2015 UWMP (2016) – The UWMP does not project a change in the use of SWP supplies but it does reflect a reduced level of supplies after 2020 (covers SWP supplies for Santa Barbara County and parts of San Luis Obispo County).

Coachella Valley WD 2015 UWMP (2016) – The UWMP calls for reduced SWP supplies after 2020 as projected by DWR in the 2015 SWP Delivery Capability Report.

Lake Arrowhead WA 2010 UWMP (2011) – The UWMP projects increasing demands for SWP supplies, though it does not anticipate reaching demand for Crestline-Lake Arrowhead WA's maximum Table A amount before 2035, if ever. The UWMP does not project a change in use of SWP supplies.

Desert WA 2015 UWMP (2016) – The UWMP does not project a change in the use of SWP supplies.

Kern County WA Kern County IRWMP (2011) – The IRWMP does not project a change in reliance on or use of SWP supplies.

Kings Basin IRWMP (2018) – The UWMP does not identify a change in reliance on or use of SWP supplies.

Metropolitan WDSC 2015 IWRMP (2016) – The IRWMP does not project a change in the use of SWP supplies. The IRWMP does forecast reduced SWP supplies after 2020 as projected by DWR in the SWP Delivery Capability Report.

Mojave WA 2015 UWMP (2016) – The UWMP does not project a change in the use of SWP supplies.

Palmdale WD 2015 UWMP (2016) – Palmdale WD is investigating ways to diversify their water portfolio, including groundwater banking, desalination and water reuse. The UWMP does not project a change in use of SWP supplies but does project a slight decrease in availability of SWP supplies as projected by DWR in the SWP Delivery Capability Report.

2015 San Bernardino Valley Regional UWMP (2016) – The UWMP does not project a change in reliance on or use of SWP supplies.

2015 UWMP for the San Gorgonio Pass WA (2017) – The UWMP does not project a significant change in the use of SWP supplies.

Santa Clara Valley WD 2015 UWMP (2016) – The UWMP does not project a change in the use of SWP supplies. The UWMP does forecast a need to augment supplies during extended drought with conservation, water recycling, stormwater capture and reuse, and use of banked groundwater partially due to lower SWP supplies as projected by DWR in the 2015 SWP Delivery Capability Report.

Solano County Water Agency 2015 UWMP (2016) – The UWMP does not project a change in reliance on or use of SWP supplies.

Tulare Lake Basin WSD Water Management Plan (2015) – The water management plan does not project a change in reliance on or use of SWP supplies. The District notes that it cannot depend on receiving its maximum Table A amount.

Yuba City 2015 UWMP Update (2016) – According to the UWMP, the City will need to reduce demand and increase supplies during extended dry periods due to the lower availability of SWP supplies during those times as projected by DWR in the 2015 SWP Delivery Capability Report.

General Plans

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each General Plan addresses a broad range of topics and includes unique goals and policies that address water supply. General plans also have policies toward water supply protection and enhancement, and coordinate closely with their local water supply master plans. General plans are typically administered by local planning commissions.

5.20.4 Impact Analysis

5.20.4.1 Methods of Analysis

As described in Section 5.1, Method of Analysis, SWP water supply would continue to be delivered to the PWAs consistent with current Contracts. The proposed project would not build new or modify existing SWP facilities and would not change any of the PWA's Annual Table A amounts. Therefore, the proposed project would not change the water supply delivered by the SWP. DWR would continue to maintain and operate the SWP and deliver available supplies to the PWAs consistent with the current Contract terms, and all regulatory requirements. As described in Chapter 4 Project Description, the proposed amendments would add, delete, and modify provisions of the Contracts and clarify certain terms of the Contracts. Many of the proposed amendments would include administrative modifications that would not result in direct or indirect physical changes to existing water supply resources.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) may result in changes to the frequency, duration, and timing of Table A and/or Article 21 water moving among the PWAs that could result in a change to water supply resources. However, the timing of the availability of Article 21 water would not change. Because the precise location, amount and timing of future water transfers and exchanges are not known at this time, this water supply analysis is programmatic, focusing on the types of reasonably foreseeable changes in the physical environment that may occur due to implementation of the proposed amendments. Once proposals for specific transfers and exchanges among the PWAs are proposed as a result of the proposed amendments, the PWAs will comply with the appropriate project-level CEQA documentation.

5.20.4.2 Standards of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact related to water supply is considered significant if the proposed project would do any of the following:

- Not have sufficient water supplies available to serve the project from existing entitlements and resources, or need new or expanded water entitlements

Additionally, a significant impact would occur if the proposed project would:

- Adversely affect surface water supply availability and facilities operations
- Substantially change reservoir storage
- Substantially change the rate and timing of flows in the Sacramento River and its tributaries

5.20.4.3 Impacts Not Further Evaluated

Water transfers and exchanges would be implemented using existing physical facilities and operational and regulatory processes, including CEQA compliance. The proposed project would not build new or modify existing SWP facilities and it is anticipated that the PWAs would not construct or operate additional facilities or projects. Therefore, activities associated with construction of facilities would not occur and short-term need for new or expanded water supplies would not be required. Furthermore, because no new facilities would be built or existing facilities modified as a result of the proposed project, long-term impacts of operating and maintaining new or modified facilities would not occur and new or expanded water supplies would not be required.

While more water transfers and exchanges may occur with the proposed project, transfers and exchanges currently occur within the SWP. Therefore, changes to the operations and maintenance of the SWP facilities would not change as a result of the proposed project.

Potential increases in pumping associated with changes in transfers and exchanges and consumption of energy is discussed in Section 5.7, Energy.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions may be beneficial from a water supply reliability perspective as it would provide the PWAs with increased flexibility to allow for short-term and long-term planning of their available SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

It is possible that transfers from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (i.e., switching from high water-using crops to low water-using crops) in the study area. Impacts associated with fallowing of

agricultural lands and changes in cropping patterns is discussed in Section 5.3, Agricultural and Forest Resources. Impacts to groundwater resources associated with transferring surface water supplies is discussed in Section 5.10, Groundwater Hydrology and Water Quality. While some PWAs may transfer a portion of their Table A water or Article 21 water to other PWAs, as discussed above, the proposed project would not include any permanent change to the PWA's Annual Table A amounts.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

As stated in Section 5.14, Population, Employment, and Housing, the proposed amendments do not propose new housing or employment uses that could directly induce population growth thereby requiring additional water supply. Furthermore, PWAs are still governed by local General Plans include goals, policies, and actions to ensure sustainable growth and development across diverse environments, communities, and jurisdictions within California. In addition, the SWP would continue to be operated consistent with Contract terms and operational and regulatory processes, and the proposed project would not change any goals or policies relating to the provision of water supply in any of the jurisdictions within the study area.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

It is possible that exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in cropping patterns in the study area because agricultural PWAs would be temporarily exchanging this water supply to other PWAs. Impacts associated with fallowing of agricultural lands and changes in cropping patterns is discussed in Section 5.3 Agricultural and Forest Resources. Impacts to groundwater resources associated with transferring surface water supplies is discussed in Section 5.10, Groundwater Hydrology and Water Quality. While some PWAs may exchange a portion of their Table A water or Article 21 water to other PWAs, as

discussed above, the proposed project would not include any permanent change to the PWA's Annual Table A amounts.

As stated in Section 5.14, Population, Employment, and Housing, the proposed amendments do not propose new housing or employment uses that could directly induce population growth thereby requiring additional water supply. Furthermore, PWAs are still governed by local General Plans include goals, policies, and actions to ensure sustainable growth and development across diverse environments, communities, and jurisdictions within California. In addition, the SWP would continue to be operated consistent with Contract terms and operational and regulatory processes, and the proposed project would not change any goals or policies relating to the provision of water supply in any of the jurisdictions within the study area.

Therefore, **no impacts** related to new or expanded water supply, water supply availability or facility operations would occur and no mitigation measures are required.

5.20.4.4 Impacts and Mitigation Measures

Table 5.20-1 summarizes the impact conclusions presented in this section for easy reference.

**TABLE 5.20-1
SUMMARY OF IMPACTS CONCLUSIONS – SURFACE WATER HYDROLOGY AND WATER QUALITY**

Impact Statement	Transfers	Exchanges
5.20-1: Changes in San Luis Reservoir water levels due to transfers/exchanges of carryover water implemented by PWAs may impact reservoir storage levels.	LTS	LTS
5.20-2: Changes in transfers or exchanges implemented by PWAs could impact rate and timing of flows in the Feather, Sacramento, American, and San Joaquin rivers.	LTS	LTS
LTS: Less than Significant		

Impact 5.20-1: Changes in San Luis Reservoir water levels due to transfers/exchanges of carryover water implemented by PWAs may impact reservoir storage levels.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's

Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

In addition, the proposed amendments would allow PWAs to transfer a portion of their carryover water in San Luis Reservoir, and transfer up to 50 percent of its carryover water in a single-year transfer (i.e., a future or multi-year commitment of transferring carryover water is not allowed).

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions.

After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

With the proposed project, changes in water levels due to transfers of carryover water may result in higher water levels in San Luis Reservoir if transferred water is held beyond its scheduled date for delivery. Conversely, with the proposed project, transfers may result in lower water levels in San Luis Reservoir if transferred water is delivered before its scheduled date for release.

Whether changes in reservoir water levels due to transfers of carryover water result in higher or lower water levels in San Luis Reservoir, the SWP would continue to be operated consistent with regulatory processes and Contract terms (including that transfers shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs). Therefore, the reservoir's ability to store or release water would not diminish due to the transfers of carryover water.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. The proposed amendments would allow PWAs to exchange a portion of their carryover water in San Luis Reservoir, and

exchange up to 50 percent of its carryover water in a single-year transaction (i.e., a future or multi-year commitment of exchanging carryover water is not allowed).

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

With the proposed project, changes in water levels due to exchanges of carryover water may result in higher water levels in San Luis Reservoir if exchanged water is held beyond its scheduled date for delivery. Conversely, with the proposed project, exchanges may result in lower water levels if exchanged water is delivered before its scheduled date for release.

Whether changes in reservoir water levels due to exchanges of carryover water result in higher or lower water levels in San Luis Reservoir, the SWP would continue to be operated consistent with regulatory processes and Contract terms (including that exchanges shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs). Therefore, the reservoir's ability to store or release water would not diminish due to the exchanges of carryover water.

Impact Conclusion

With the proposed project, it is possible that transfers or exchanges may result in higher water levels in SWP reservoirs if water is held in reservoirs beyond its scheduled date for delivery. Conversely, with the proposed project, exchanges may result in lower water levels if exchanged water is delivered before its scheduled date for release. However, there is an obligation that the SWP reservoirs maintain a certain amount of flood control space and operate according to flood control rules. In addition, the SWP would continue to be operated consistent with regulatory processes and Contract terms. Therefore, the reservoir's ability to store or release water would not diminish due to the transfers/exchanges of carryover water and this impact would be **less than significant**.

Mitigation Measures

None required.

Impact 5.20-2: Changes in transfers or exchanges implemented by PWAs could impact rate and timing of flows in the Feather, Sacramento, American, and San Joaquin rivers.

Water Transfers

The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed project could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions. After operation of California WaterFix begins, the water transfers would occur using the California WaterFix facilities that have undergone CEQA review and other required environmental permitting.

Transferring SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. However, the SWP would continue to be operated consistent with Contract terms (including that transfers shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and the proposed project would be using existing diversion facilities used for existing transfers.

Water Exchanges

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

Exchanging SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. However, the SWP would continue to be operated consistent with Contract terms (including that exchanges shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and the proposed project would be using existing diversion facilities used for existing exchanges.

Impact Conclusion

Transfer or exchanging SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. However, the SWP would continue to be operated consistent with Contract terms and operational and regulatory processes, and the proposed project would be using existing diversion facilities used for existing transfers or exchanges. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

5.20.5 References

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Chapter 6

Other CEQA Considerations



6 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, the 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.

Section 15130(a) of the CEQA Guidelines requires that an EIR contain an assessment of the cumulative impacts that could be associated with project implementation. This assessment is included in Section 6.1 of this EIR.

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe any significant impacts that cannot be avoided, even with the implementation of feasible mitigation measures. The effects of the proposed project on various aspects of the environment are presented in Chapter 5 of this EIR. Section 6.2 summarizes that analysis.

Section 15126.2(c) of the CEQA Guidelines requires a discussion of any significant and irreversible environmental changes that would be caused by the proposed project. This analysis is included in Section 6.3 of this EIR.

Section 15126.2(d) of the CEQA Guidelines requires that an EIR evaluate the growth-inducing impacts of a project. This analysis is presented in Section 6.4 of this EIR.

6.1 CUMULATIVE IMPACTS

This section provides a discussion of CEQA analysis requirements for assessment of cumulative impacts and explains the cumulative impacts assessment developed from the analysis of proposed project impacts provided in the technical sections of Chapter 5, Environmental Analysis. The CEQA Guidelines require that an EIR assess the cumulative impacts of a project when its incremental effect is “cumulatively considerable” (CEQA Guidelines Section 15130). CEQA requires that an EIR assess the cumulative impacts of a project by either discussing the significant cumulative impacts with respect to past, current, and probable future projects within the context of the cumulative setting or by providing a summary of projects contained in an adopted local, regional, or statewide plan, or related planning document, that deserves or evaluates conditions contributing to the cumulative effect. 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 cumulative impacts discussion shall reflect “the severity of the impacts and their likelihood of occurrence” and shall “be guided by the standards of practicality and reasonableness.” The CEQA Guidelines further indicate that the discussion of cumulative impacts should include:

- Either: (A) a list of past, present, and probable future projects producing related cumulative impacts; or (B) a summary of projections contained in an adopted General Plan or similar document, or in an adopted or certified environmental document, which describes or evaluates conditions contributing to a cumulative impact.
- A discussion of the geographic scope of the area affected by the cumulative effect.
- A summary of expected environmental effects to be produced by these projects.
- Reasonable, feasible options for mitigating or avoiding the project’s contribution to any significant cumulative effects.

6.1.1 Cumulative Projects

As described in Chapter 4 Project Description, the proposed project would add, delete and modify provisions of the Contracts to clarify terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water supply within the service area; and provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. The proposed project would not build or modify existing SWP facilities nor change each PWA’s contractual maximum Table A amount. In light of the fact that the proposed project would add, delete and modify provisions of the Contracts, the discussion of cumulative impacts took into consideration past, present, and probable future projects that would or did result in changes to Contract provisions. Additional criteria used to identify projects for consideration includes: (1) whether the project is under active consideration; (2) whether the project would be operational or contemplated within the timeframe of the proposed project; and (3) whether the project in combination with the proposed project would have the potential to affect the same resources. If a project met all of these criteria, then it was considered reasonably foreseeable and was selected for inclusion in the cumulative impact analysis. Projects that were already past the consideration process and met criteria 2 and 3 were also included in the cumulative impact analysis. Based on these criteria it was determined that the following projects were considered in this cumulative analysis:

1. California WaterFix
2. Contract Extension Project

3. Monterey Amendment and Settlement Agreement
4. Sustainable Groundwater Management Act Implementation

Each of these projects is further described below and in the following pages, followed by an assessment of if each of these projects in combination with the proposed project would contribute to a cumulative impact.

6.1.1.1 California WaterFix

As described in Chapter 2 State Water Project, California WaterFix would involve upgrading the SWP infrastructure by constructing three new intakes in the northern Delta and two approximately 30-mile-long tunnels to transport water to the existing pumping plants in the south Delta. On July 21, 2017 DWR certified the Final EIR, adopted Findings and a Statement of Overriding Considerations, adopted the Mitigation Monitoring and Reporting Program, approved California WaterFix and filed the NOD. Reclamation has not yet adopted a ROD for the Final EIS. In an effort to further refine a facility element of California WaterFix following the July 21, 2017 NOD, DWR proposed modifications to the footprint resulting from propose design modifications that were evaluated in a Draft Supplemental EIR/EIS that was released on July 17, 2018 for public review and comment. The proposed project is separate and independent from the California WaterFix project. The California WaterFix project could occur independent of the proposed project.

6.1.1.2 Contract Extension Project

As stated in Chapter 2, State Water Project, the State of California entered into Contracts with water agencies in the 1960s. Under the contract terms, DWR provides water service to these public agencies, known as State Water Project Contractors (or Public Water Agencies or PWAs), from the SWP in exchange for payments that will recoup all costs associated with providing this water service over the life of the SWP. The majority of the capital costs associated with the development and maintenance of the SWP is financed using revenue bonds. These bonds have historically been sold with 30-year terms, but such bonds have not been sold with maturity dates that extend beyond the year 2035, the year the contracts begin to expire. In order to ensure continued debt service affordability to PWAs, it is necessary to extend the contract termination date. Contract extensions will allow DWR to again sell bonds with 30-year terms or longer, commensurate with the economic life of the project being financed, thus ensuring the debt service on these bonds remains affordable to PWAs and their water customers. DWR released the DEIR for the Contract extensions on August 17, 2016, and the public comment period closed October 17, 2016. DWR held a public hearing for the DEIR on September 12, 2016 and a legislative hearing was held

for the Contract extension project on September 11, 2018. DWR is preparing to finalize the Contract Extension DEIR, after which it may approve the project and execute amendments to extend the Contracts and revise certain financial provisions with the PWAs. Extending the Contracts' expiration date to 2085 would enable DWR to finance SWP expenditures beyond 2035 and continue to receive a reliable stream of revenues from PWAs for the construction, operation, and maintenance of the SWP. The proposed project is separate and independent from the Contract Extension project. The Contract Extension project would occur independent of the proposed project.

6.1.1.3 The Monterey Amendment and Settlement Agreement

As described in Chapter 2, State Water Project, Section 2.5.1, in 1994, 27 of the 29 PWAs negotiated with DWR to amend the Contracts with a set of 14 principles developed by the PWAs to modify water allocations and the development of measures to facilitate more effective management of the more limited SWP water supplies anticipated to be available to them in the future. Later in 1994, DWR and the 27 PWAs executed the Monterey Agreement. The EIR that was prepared for the agreement was challenged and mediation commenced. The Parties executed a settlement agreement in May 2003. The Monterey Settlement Agreement allowed the SWP to continue to operate pursuant to the Monterey Agreement while a new EIR was being prepared.

The Monterey Settlement Agreement provided a way for the PWAs and the plaintiffs to advise DWR in the preparation of the new EIR, and it commits DWR to several actions, including: deleting references to the term "entitlement" in the long-term water supply contract, developing a water supply reliability report (now referred to as the capability report) to be published every 2 years, and conducting certain contract amendment negotiations in public. The Monterey Settlement Agreement also required that DWR and the PWAs not rely on the Monterey Agreement EIR to approve any new project or activity that was not approved, initiated, or implemented before March 26, 2011, and that could require separate environmental documentation.

In 2010, the Monterey Plus EIR was subject to two separate legal challenges. The trial court ruled that most of the EIR is adequate under CEQA, but that the EIR's discussion of the Kern Water Bank Authority's use and operation of the Kern Water Bank was insufficient. In 2014, the Sacramento County Superior Court ruled in both actions that DWR must decertify and revise its EIR to include a description and analysis of the development, use and operation of the Kern Water Bank lands as a water banking and recovery project particularly to groundwater hydrology and water quality. The matter is currently on appeal. DWR published the Monterey Plus Draft Revised EIR on April 28, 2016. In September of 2016, DWR filed its return to writ of mandate. The Revised EIR

was subject to a separate legal challenge. In October of 2017, the Sacramento County Superior Court discharged the 2014 writ and ruled in favor of DWR by denying the petition challenging the Revised EIR. This matter is currently on appeal.

6.1.1.4 Sustainable Groundwater Management Act Implementation

As described in Section 5.10, Groundwater Hydrology and Water Quality, under SGMA, DWR is responsible for (1) developing regulations related to local agency requests to modify groundwater basin boundaries; (2) adopting regulations for evaluating and implementing Groundwater Sustainability Plans (GSPs) and coordination agreements; (3) identifying basins subject to critical conditions of overdraft; (4) identifying water available for groundwater replenishment; and (5) publishing best management practices for the sustainable management of groundwater.

The Act gives the local agency the authority to develop a Groundwater Management Plan (GMP) in groundwater basins defined in DWR Bulletin 118, and to raise revenue to pay for facilities to manage the basin (extraction, recharge, conveyance, quality [DWR 1975]). The intent of SGMA is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions and to provide a methodology for developing a GMP. GSPs developed in compliance with SGMA will consist of similar technical components.

2018 SGMA Basin Prioritization findings indicate that 109 of California's 517 groundwater basins and subbasins are high and medium priority. SGMA required the formation of Groundwater Sustainability Agencies (GSAs) which must develop GSPs or alternatives to GSPs in the groundwater basins (or subbasins) that were designated by DWR as medium or high priorities by June 2017.

SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040 (GSPs implemented by 2020). For the remaining high and medium priority basins, 2042 is the deadline (GSPs implemented by 2022) (DWR 2018b).

6.1.2 Cumulative Impact Methodology and Analysis

To determine the significance of the proposed project's cumulative impacts, a three-step process is followed. First, the extent of the cumulative impacts without the proposed project is evaluated to determine whether a significant cumulative impact on a resource would exist in the future. To do so, the combined effects of past, present, and probable future projects are evaluated to determine whether there is a significant cumulative

impact. Second, a determination is made regarding whether the proposed project's incremental contribution to any significant cumulative impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Statute section 21083). Third, a determination is made as to whether mitigation measures would reduce the proposed project's contribution to the cumulative impact to a less-than-considerable level, therefore resulting in a less-than-significant cumulative impact. If not, then the cumulative impact would remain significant and unavoidable.

The geographic scope for the cumulative impact analysis is the study area for all resource areas.

As stated in Chapter 4, the proposed project would add, delete, and modify provisions of the Contracts and clarify certain terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water within the service area; and provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity. The proposed project would amend Contract provisions to allow the PWAs to enter into water transfers, subject to DWR's approval and in compliance with all applicable laws. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. Proposed transfer and exchange provisions would provide the PWAs with increased flexibility for short-term and long-term planning and management of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs in the SWP service area than under the current Contract provisions. In addition, the proposed amendments would allow PWAs to transfer or exchange a portion of their carryover water in San Luis Reservoir, and transfer or exchange up to 50 percent of their carryover water in a single-year transfer (i.e., a future or multi-year commitment of transferring or exchanging carryover water is not allowed). The proposed project would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts. The proposed project would not change the water supply delivered by the SWP as SWP water would continue to be delivered to the PWAs consistent with current Contract terms, and all regulatory requirements.

Therefore, the focus of this cumulative impact analysis is on how existing conditions (including the current effects of past projects) and reasonably foreseeable and probable future projects interrelate with the proposed project in a manner that could result in considerable contribution to cumulative impacts.

6.1.3 Cumulative Impact Analysis

As identified in Chapter 5, Environmental Analysis, implementation of the proposed project would not result in physical environmental impacts on the following resource areas: hazards and hazardous materials; noise; population, employment and housing; public services and recreation; surface water hydrology and water quality; transportation; and utilities and service systems. Therefore, these resource areas would not contribute to a cumulative effect and would not compound or increase an environmental impact of these other projects. As a result, cumulative effects associated with these resource areas are not discussed further. Impacts associated with the remaining resource areas (aesthetics, agriculture and forest resources, air quality, biological resources, cultural resources, energy, geology and soils, GHG, groundwater hydrology and water quality, land use and planning, and water supply) focus on four types of impacts that were identified as less than significant or potential impacts of the proposed project that could contribute to cumulative impacts with the other projects identified above. The four types of impacts are impacts to groundwater supplies, subsidence, fallowing and changes in crop patterns, energy and GHG, reservoir storage, and surface water flow above or below diversions. The types of impacts are discussed below and the criteria applied to evaluate the significance of the overall cumulative effect are the same criteria used to evaluate direct and indirect impacts associated with each applicable resource area.

6.1.3.1 Groundwater Supplies

The cumulative projects listed above have completed draft or final environmental documents (except for SGMA which did not require CEQA) that analyzed their potential impacts on groundwater supplies, if applicable. According to these documents, the impacts on groundwater supplies would be significant. However, it is anticipated that the implementation of the 2014 SGMA will result in changes to how groundwater is managed in the study area to meet future groundwater sustainability goals, which could potentially lessen or mitigate impacts associated with depletion of groundwater recharge or lowering of the local groundwater tables. SGMA requires governments and water agencies of high and medium priority basins to meet sustainability goals, including but not limited to bringing groundwater basins into balanced levels of pumping and recharge. Under SGMA, high, and medium priority basins should reach sustainability within 20 years of implementing their sustainability plans, which are to be implemented in 2020 for critically over-drafted basins and 2022 for the remaining high and medium priority basins. However, full implementation of SGMA is not anticipated until 2040 or 2042, therefore, it is anticipated that the cumulative projects contribution to groundwater supplies would be significant. Because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges

implemented by PWAs are not known, it is possible that both transfers and exchanges among the PWAs could result in changes to groundwater levels (either increases or decreases), if additional pumping were available in that area. One possibility is that agricultural PWAs could be temporarily transfer or exchange surface water supply to other PWAs (likely for M&I supply), and these agricultural PWAs would then increase groundwater pumping as a replacement water source for transferred or exchanged water supplies. This could potentially result in an increase in groundwater pumping in the study area and the potential for a net deficit in aquifer volume or lowering of the local groundwater table.

Alternatively, some PWAs may transfer or exchange excess water beyond their demands, and the PWAs that receive this transferred or exchanged surface water may use this additional source instead of groundwater, which could result in benefits to groundwater because these PWAs would not be pumping groundwater (thereby not impacting aquifer levels nor lowering the groundwater table). Another possibility is that some PWAs that receive transferred or exchanged water could use this additional source for groundwater recharge within the study area, which would be beneficial to local groundwater levels and aquifer volume. Therefore, while there is also potential for the proposed project to be beneficial for groundwater levels, there is also potential for the proposed project to result in a net deficit in aquifer volume or lowering the local groundwater table in some locations of the study area.

However, as stated above, full implementation of SGMA will result in changes to how groundwater is managed in the study area to meet future groundwater sustainability goals, which could potentially lessen or mitigate impacts associated with deletion of groundwater recharge or lowering of the local groundwater tables. While some PWAs have submitted an "Alternative in lieu of a GSP" to DWR, all GSPs have not yet been submitted to DWR for review. Therefore, DWR cannot be sure the GSPs would be likely to achieve the sustainability goal, which would prohibit the withdrawal of water if it caused undesirable impacts. DWR anticipates that due to the SGMA's incremental milestones coupled with DWR's periodic review of the GSPs to ensure they are implementing the GSP in a manner to reach the sustainability goals that in the long term there would be no impacts to the groundwater table in the study area.

Therefore, the incremental contribution of the proposed project's effect on groundwater supplies would be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects (as full implementation of SGMA is not anticipated until 2040 or 2042). This cumulative impact would be **significant**.

Mitigation

Because SGMA is in the process of being implemented and because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, assumptions related to the ability of SGMA to mitigate any changes in groundwater levels are speculative. Therefore, DWR cannot currently conclude that feasible mitigation measures will be implemented to avoid significant impacts in all cases. PWAs would address project-level impacts in future site-specific environmental analysis conducted by lead agencies at the time such facilities or actions are proposed. PWAs could implement feasible mitigation measures such as increased monitoring and limiting groundwater pumping, requiring a return of the exchanged water to limit changes in groundwater levels, or rotating areas and timing of pumping to reduce significant impacts to less than significant. However, such implementation and enforcement of mitigation would be within the responsibility and jurisdiction of public agencies other than DWR and it is not possible for DWR to conclude that feasible mitigation measures would be available to avoid or mitigate significant groundwater effects in all cases.

Therefore, because DWR has no information on specific implementation of the transfers and exchanges from the proposed project and it has no authority to implement mitigation measures in the PWA service area, the cumulative impact would remain **significant and unavoidable**.

6.1.3.2 Subsidence

The cumulative projects listed above have completed draft or final environmental documents (except for SGMA which did not require CEQA) that analyzed their potential impacts on subsidence, if applicable. According to these documents, the impacts resulting from subsidence would be less than significant. Therefore, it is anticipated that the cumulative projects contribution to subsidence would be less than significant.

As discussed above for Groundwater Supplies, it is possible that transfers and exchanges among the PWAs could result in benefits to groundwater levels, as transferred or exchanged water could be used instead of groundwater supplies or this water could be used for groundwater recharge. However, it is also possible that transfers and exchanges from agricultural to M&I PWAs could result in an increase in groundwater pumping in some areas of the study area causing subsidence due to a net deficit in aquifer volume or lowering the local groundwater table.

However, as stated above, full implementation of SGMA will result in changes to how groundwater is managed in the study area to meet future groundwater sustainability goals, which could potentially lessen or mitigate subsidence impacts associated with

deletion of groundwater recharge or lowering of the local groundwater tables. While some PWAs have submitted an “alternative in lieu of a GSP” to DWR, all GSPs have not yet been submitted to DWR for review. Therefore, DWR cannot be sure the GSPs would be likely to achieve the sustainability goal, which would prohibit the withdrawal of water if it caused undesirable impacts, including subsidence. DWR anticipates that due to the SGMA’s incremental milestones coupled with DWR’s periodic review of the GSPs to ensure they are implementing the GSP in a manner to reach the sustainability goals that in the long term there would be no impacts to the groundwater table in the study area.

Therefore, the incremental contribution of the proposed project’s effect on subsidence would be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects (as full implementation of SGMA is not anticipated until 2040 or 2042). This cumulative impact would be **significant**.

Mitigation

Because SGMA is in the process of being implemented and because the extent, location, and implementation timing of groundwater pumping associated with changes in transfers and exchanges implemented by PWAs are not known, assumptions related to the ability of SGMA to mitigate any changes in groundwater levels or related subsidence are speculative. Therefore, DWR cannot currently conclude that feasible mitigation measures will be implemented to avoid significant impacts in all cases. PWAs would address project-level impacts in future site-specific environmental analysis conducted by lead agencies at the time such facilities or actions are proposed. PWAs could implement feasible mitigation measures such as increased monitoring and limiting groundwater pumping, requiring a return of the exchanged water to limit changes in groundwater levels, or rotating areas and timing of pumping to reduce significant impacts to less than significant. However, such implementation and enforcement of mitigation would be within the responsibility and jurisdiction of public agencies other than DWR and it is not possible for DWR to conclude that feasible mitigation measures would be available to avoid or mitigate significant groundwater effects in all cases.

Therefore, because DWR has no information on specific implementation of the transfers and exchanges from the proposed project and it has no authority to implement mitigation measures in the PWA service area, the cumulative impact would remain **significant and unavoidable**.

6.1.3.3 Fallowing and Changes in Cropping Patterns

The cumulative projects listed above have completed draft or final environmental documents that analyzed their potential impacts as a result of fallowing and changes in

cropping patterns, if applicable. According to these documents, the impacts resulting from fallowing and changes in cropping patterns would be potentially significant. Therefore, it is anticipated that the cumulative projects contribution to fallowing and changes in cropping patterns would be potentially significant.

It is possible that such transfers and exchanges of SWP water from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. However, the effects of fallowing or changing crop patterns would not affect existing agricultural land use designations in the study area because the land would remain in agricultural use. Furthermore, additional water transfers are not expected to substantially affect the acreage of fallowing compared to existing fallowing practices or changes to crop patterns done for other reasons (e.g., market conditions, economic conditions, etc.).

Therefore, the incremental contribution of the proposed project's effects on aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use as a result of fallowing and changes in cropping patterns would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be **less than significant** and no mitigation is required.

6.1.3.4 Energy and GHG

The cumulative projects listed above have completed draft or final environmental documents (except SGMA which did not require CEQA) that analyzed their potential impacts on energy and GHG, if applicable. According to these documents, the impacts on GHG would be significant and impacts on energy would be less than significant. Therefore, it is anticipated that the cumulative projects contribution to GHG would be significant and to energy less than significant.

During water transfers and exchanges, SWP facilities would continue to be operated as efficiently as feasible and in compliance with the GGERP. Water would be distributed at the lowest possible pressure to minimize friction losses, which would reduce the energy needed for pumping. If additional energy is required for SWP facilities, it may be provided through increases in renewable energy procurement.

Increased water transfers or exchanges among the PWAs could use more energy, and in other cases they may use less energy. Energy needed for water transfer or exchanges would depend on the parties transferring or exchanging the water, and the

source and destination of the water. Over a multiple year period, energy use as a result of transfers or exchanges are expected to average in such a way that it is very similar to historical operations with no substantial changes to energy use or hydropower generation. Therefore, increased water transfers or exchanges attributed to the proposed project would not be anticipated to result in a substantial increase in energy or GHG emissions or result in inefficient, wasteful, or involve unnecessary long-term consumption of energy.

Therefore, the incremental contribution of the proposed project's effects on energy and GHG would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be **less than significant** and no mitigation is required.

6.1.3.5 San Luis Reservoir Storage

The cumulative projects listed above have completed draft or final environmental documents (except SGMA which did not require CEQA) that analyzed their potential impacts on San Luis Reservoir storage, if applicable. According to these documents, the impacts on San Luis Reservoir storage would be less than significant. Therefore, it is anticipated that the cumulative projects contribution to San Luis Reservoir storage would be less than significant.

With the proposed project, changes in water levels due to transfers/exchange of carryover water may result in higher water levels in San Luis Reservoir if transferred or exchanged water is held beyond the scheduled date of delivery. Conversely, with the proposed project, transfers or exchanges may result in lower water levels in San Luis Reservoir if water is delivered before its scheduled date for release. Whether changes in reservoir water levels due to transfers/exchanges or carryover water result in higher or lower water levels in San Luis Reservoir, the SWP would continue to be operated consistent with regulatory processes and Contract terms (including that transfers shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs). As a result, the reservoir's ability to store or release water would not diminish due to the transfers/exchanges or carryover water.

Therefore, the incremental contribution of the proposed project's effect on water supply, cultural or tribal resources, or special-status fish or terrestrial species as a result of changes in San Luis Reservoir storage would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be **less than significant** and no mitigation is required.

6.1.3.6 Flows above or below Point of Diversions

The cumulative projects listed above have completed draft or final environmental documents (except SGMA which did not require CEQA) that analyzed their potential impacts on flows above or below point of diversions, if applicable. According to these documents, the impacts on flows above or below point of diversions would be potentially significant. Therefore, it is anticipated that the cumulative projects' contribution to impacts on flows above or below point of diversions would be potentially significant.

Transferring SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. However, the SWP would continue to be operated consistent with Contract terms (including that transfers shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and the proposed project would be using existing diversion facilities used for existing transfers.

Therefore, the incremental contribution of the proposed project's effect on water supply, cultural or tribal resources, or special-status fish or terrestrial species as a result of changes in flows above or below point of diversions would not be cumulatively considerable when viewed in connection with the effects of past projects, and current and probable future projects. This cumulative impact would be **less than significant** and no mitigation is required.

6.2 SIGNIFICANT UNAVOIDABLE IMPACTS

CEQA Guidelines Section 15126.2(b) states that an EIR must include a description of impacts identified as potentially significant and unavoidable should the proposed project be implemented. Impacts that have been deemed by a lead agency as significant and unavoidable are those impacts that the lead agency has determined either no mitigation, or only partial mitigation, is feasible. As identified and discussed in Section 5.10, Groundwater Hydrology and Water Quality, implementation of the proposed project would result in the following significant and unavoidable impacts:

Impact 5.10-1: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could substantially deplete groundwater supplies in some areas of the study area.

Impact 5.10-2: The increase in groundwater pumping associated with changes in transfers and exchanges implemented by PWAs could result in subsidence in some of the study area.

6.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines Section 15126.2(c) requires 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 the project commits future generations to similar uses of nonrenewable resources. In addition, CEQA requires that irreversible damage resulting from an environmental accident associated with the project be evaluated.

The proposed project would add, delete and modify provisions of the Contracts to clarify terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water supply within the service area; and provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. The proposed project would not build or modify existing SWP facilities nor change each PWA's contractual maximum Table A amounts. The proposed project would amend and add financial provisions to the Contracts based on the negotiated Agreements in Principle between DWR and the PWAs. Therefore, the proposed project would not result in the commitment of nonrenewable natural resources such as gravel, petroleum products, steel, and slowly renewable resources such as wood products any differently than under existing conditions, and there would be no significant irreversible environmental changes.

6.4 GROWTH-INDUCING IMPACTS

The CEQA Guidelines Section 15126.2(d) requires that an EIR evaluate the growth-inducing impacts of a project. The EIR must:

Discuss the ways in which the 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 characteristics 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 or indirect growth inducement potential. Direct growth inducement would result if a project involved construction of substantial new housing or commercial development. A project would have an indirect growth-inducement effect if it removed an obstacle to additional growth and development, such as removing a constraint on a required public service. For example, an increase in the capacity of utility or road infrastructure could allow either new or additional development in the surrounding area.

As identified in CEQA Section 15126.2(d), 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 in conflict with local land use plans) could indirectly cause adverse environmental impacts, for example, 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.

In California, cities and counties have primary authority¹ over land use decisions, while water suppliers, through laws and agreements, are expected and usually required to

¹ Although cities and counties have primary authority over land use planning, there are exceptions to this such as the CEC (with permit authority and CEQA lead agency status for some thermal power plant projects) and the CPUC (with regulatory authority and CEQA lead agency status for certain utility projects).

provide water service if water supply is available. Approval or denial of development proposals is the responsibility of the cities and counties in the study area. Numerous laws are intended to ensure that water supply planning, including planning for water supply infrastructure, and land use planning (such as the approval of, or establishment of constraints to, development) proceed in an orderly fashion.

6.4.1 Growth Inducement Potential

6.4.1.1 Direct Growth Inducement Potential

As previously stated, the proposed project would add, delete and modify provisions of the Contracts to clarify terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water supply within the service area; and provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. The proposed project would not build new or modify existing SWP facilities nor change each PWA's contractual maximum Table A amounts. As discussed in Section 5.14, Population, Employment, and Housing, because there would be no new facilities built or existing facilities modified, no housing is proposed as part of the project or required as a result of it, nor would the project provide substantial new permanent employment opportunities. Therefore, the proposed project would not result in direct growth inducement.

6.4.1.2 Indirect Growth Inducement Potential

Because the proposed project would not result in the construction of new or modification of existing water supply storage, treatment or conveyance facilities it would not remove an obstacle to growth associated with water supply.

Portions of the proposed amendments (amendments related to water transfers and water exchanges) could result in changes to the frequency, duration, and timing of Table A and/or Article 21 water (including carryover water transferred or exchanged) moving among the PWAs. Proposed transfer provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. As a result, the proposed amendments could result in a greater amount of water transfers among the PWAs than under the current Contract provisions. However, the proposed project would not include any permanent change to the PWA's Annual Table A amounts. Most water transfers would occur south of the Delta and not involve additional export of SWP water from the Delta.

The proposed exchange provisions of the AIP would establish return ratios in consideration of varying hydrology and also maximum compensation with respect to

SWP charges. The proposed provisions would also allow PWAs to conduct water exchanges as buyers and sellers in the same year. While DWR has approved water exchanges pursuant to the existing Contracts, the proposed project would provide the PWAs with increased flexibility for short-term and long-term planning of water supplies. As a result, exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies.

The proposed project would also amend the Contracts to include provisions that establish the allocation of costs to the south of Delta PWAs for California WaterFix. Some of the participating agricultural PWAs could satisfy a portion or all of their financial obligations for the cost of California WaterFix by contracting with other PWAs for additional water transfers under the provisions of the proposed project. This would result in an increase in transfers from existing conditions. As discussed in Section 5.3 Agricultural and Forestry Resources, it is possible that transfers from agricultural to M&I PWAs could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) in the study area. It is also possible that exchange of SWP water from agricultural to M&I PWAs could occur. However, these transfers and exchanges and any associated fallowing of agricultural land and/or changes in cropping patterns in the study area would not be anticipated to change the existing agricultural land use designations because the land use would remain in agricultural use. Furthermore, additional water transfers or exchanges are not expected to substantially affect the acreage of land fallowed or put into dry farming compared to existing practices for other reasons (e.g., market conditions, economic conditions, etc.). As a result, it would not be anticipated that there would be a change in land uses associated with delivery of SWP water supplies including, conversion of agricultural land uses to urban uses or increased developed uses in urban areas.

Proposed transfer and exchange provisions would provide the PWAs with increased flexibility for short-term and long-term planning of their SWP water supplies. More frequent transfer and exchange of Table A and Article 21 water would increase the reliability of SWP supplies for M&I PWAs that could support additional population in jurisdictions within the M&I PWA service areas. However, while with the proposed amendments transfers and exchanges could be more frequent and longer in duration, they would not be a permanent transfer of a PWAs Annual Table A amounts; therefore, it would not represent a viable long-term source of urban water supply to support additional unplanned growth. Therefore, the proposed amendments would not result in additional water supply that could support growth over what is currently planned for in

those jurisdictions and the proposed project would not result in indirect growth inducement.

As previously discussed, cities and counties have primary authority over land use decisions, and water suppliers (such as the PWAs) are expected and usually required to provide water service if water supply is available. Approval or denial of development proposals is the responsibility of the cities and counties in the study area and not DWR. Availability of water is only one of the many factors that land use planning agencies consider when making decisions about growth.

Furthermore, cities and counties are responsible for considering the environmental effects of their growth and land use planning decisions (including, but not limited to, conversion of agricultural land to urban uses, loss of sensitive habitats, and increases in criteria air emissions). As new developments are proposed, or general plans adopted, local jurisdictions prepare environmental compliance documents to analyze the impacts associated with development in their jurisdiction pursuant to CEQA. The impacts of growth would be analyzed in detail in general plan EIRs and in project-level CEQA compliance documents. Mitigation measures for identified significant impacts would be the responsibility of the local jurisdictions in which the growth would occur. If identified impacts could not be mitigated to a level below the established thresholds, then the local jurisdiction would need to adopt overriding considerations.

Chapter 7

Alternatives



7 ALTERNATIVES

7.1 INTRODUCTION

CEQA requires that an EIR describe and evaluate a range of reasonable 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 purpose of the alternatives analysis is to determine whether or not a variation of the proposed project would reduce or eliminate significant project impacts within the framework of the project's basic objectives.

The focus and definition of the alternatives evaluated in this DEIR is governed by the "rule of reason" in accordance with section 15126.6(f) of the CEQA Guidelines requiring evaluation of only those alternatives "necessary to permit a reasoned choice." Further, an EIR "need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative." (CEQA Guidelines section 15126.6(f)(3).) CEQA Guidelines section 15126.6(a) requires every EIR to describe and analyze a "range of reasonable alternatives" that "would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." Alternatives to the proposed project were developed and analyzed for their ability to meet the basic objectives of the proposed project (see Section 7.4). Where alternatives were found to attain most of the basic objectives, they were included as part of the detailed analysis presented in this chapter. Where alternatives were not found to attain most of the basic project objectives or not to be within a feasible means to achieve basic project objectives, they were eliminated from further detailed consideration. The selection and discussion of alternatives is intended to foster meaningful public participation and informed decision making. The scoping process (as described in Chapter 1, Introduction) and the Contracts negotiation process (see Chapter 1, Introduction) are some of the methods used to identify a range of potential alternatives that are evaluated in this chapter.

The alternatives considered but rejected are discussed in Section 7.3. The alternatives carried forward for analysis are discussed in Section 7.4. The CEQA Guidelines also requires that the environmentally superior alternative be identified in the EIR. Section 7.5 identifies the environmentally superior alternative and summarizes the impacts and the ability to meet project objectives for each alternative as compared to the proposed project.

7.2 PROJECT OBJECTIVES

As presented in Chapter 4, Project Description, DWR and the PWAs have common interests to ensure supplies from the SWP are used efficiently and to ensure the financial integrity of the SWP. In order to address water management flexibility and to allocate costs for California WaterFix, DWR and the PWAs agreed to the following objectives:

1. Supplement and clarify terms of the SWP water supply contract that will provide greater water management regarding transfers and exchanges of SWP water supply within the SWP service area.
2. Provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity.

7.3 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 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 are:

1. Implement new water conservation management provisions in the Contracts
2. Alternative Cost Recovery Mechanisms

7.3.1 Implement New Water Conservation Provisions in the Contracts

Comments during the scoping process recommended that the EIR include an alternative that requires new agriculture and/or urban water conservation measures in the Contract amendments.

As described in Section 5.20, Water Supply, federal, State, and local regulatory requirements are in place that require water efficiency, conservation, and management measures for water users in California. In addition, the PWAs' (both agricultural and M&I) water uses are governed by the Reasonable and Beneficial Use Doctrine (Reasonable Use Doctrine) within California's water right laws. Under the Reasonable

Use Doctrine, all water use must be reasonable and beneficial regardless of the type of underlying water right. This can affect all water uses, including urban, hydropower, recreation, environment, and agriculture (Wilson 2012).

On April 1, 2015, Governor Brown issued EO B-29-15 requiring statewide mandatory water reductions. The mandatory water reductions included a 25 percent reduction in potable urban water use through February 2016, as compared to the amount used in 2013. On May 9, 2016 Governor Brown issued EO B-27-16 which directed State Agencies (DWR, State Water Board, CPUC, California Department of Food and Agriculture (CDFA), and CEC [collectively, EO Agencies]) to establish a long-term framework for water conservation and drought planning. On April 7, Governor Brown issued Executive O B-40-17 which lifted the drought emergency in all California counties except Fresno, Tulare and Tuolumne. However, under EO B-40-17, the State Water Board will maintain urban water use reporting requirements and prohibitions on wasteful practices such as watering during or after rainfall, hosing off sidewalks, and irrigating ornamental turf on public street medians (State of California, 2017).

On April 17, 2017 the EO Agencies, implementing EO B-37-16, released the framework titled Making Water Conservation a California Way of Life, which provides information to the Legislature and other interested parties on the EO Agencies' proposed framework for efficient water use, and includes a proposed implementation timeline (DWR 2017).

As described above, agriculture and urban water efficiency, conservation, and management measures are governed by the existing regulatory and legal requirements independent from the proposed project, including AB 1668 and SB 606 (see Section 5.20, Water Supply). Additional water conservation measures in the Contracts would not provide greater water management regarding transfers and exchanges of SWP water as compared to the proposed project, nor would it provide a fair and equitable approach for cost allocation of California WaterFix because water conservation is already required. Consequently, these actions are independent from the proposed project and do not meet the basic project objectives. Therefore, amending the Contracts to require implementation of agriculture and M&I water conservation measures was rejected, as these actions are required by state statute and are met by local water agencies under existing law.

7.3.2 Alternative Cost Recovery Mechanisms

Comments during the scoping process recommended that the EIR include an alternative that establishes alternative cost recovery mechanisms that could include distributing fixed charges based on the relative share of prior-year deliveries (i.e.,

consumption-based fixed charges); supplementing lower fixed charges with volume-based variable charges; allowing PWAs to sell or exchange local conservation savings through the SWP; and d) reserving some portion of SWP water for auction.

The above suggested alternative cost recovery mechanisms are infeasible and also do not meet the project objective to provide a fair approach for cost allocation of California WaterFix facilities. The proposed project cost recovery methodology for California WaterFix will be used to recover the substantial capital and debt service costs involved in this project. With a commitment of this magnitude by each participating contractor, each such contractor will need a high degree of certainty from year to year and over an extended period with regards to the amount and share of the costs for which it will be responsible. The comment's suggested methodologies would not provide this necessary level of certainty.

7.4 PROJECT ALTERNATIVES

The following alternatives were identified for analysis in this DEIR:

- Alternative 1: No Project
- Alternative 2: Reduce Table A Deliveries
- Alternative 3: Reduced Flexibility in Water Transfers/Exchanges
- Alternative 4: More Flexibility in Water Transfers/Exchanges
- Alternative 5: Only Agriculture to M&I Transfers Allowed
- Alternative 6: Transfers and Exchanges Only after Implementation of California WaterFix

Table 7-1 presents a summary of the alternatives. The following subsections include a more detailed description of each alternative along with an analysis of impacts, as compared to the proposed project, and the alternative's ability to achieve the proposed project's objectives.

7.4.1 Alternative 1: No Project

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 impacts of approving a project with impacts of not approving a project. Under the No Project Alternative, DWR takes no action, and DWR and the PWAs would continue to operate and finance the SWP under the current Contracts.

Although under the No Project Alternative DWR would take no action to amend the Contracts, DWR and the PWAs would continue to operate and finance the SWP under

**TABLE 7-1
COMPARISON OF ALTERNATIVES TO PROPOSED PROJECT**

	Proposed Project	Alternative 1 No Project	Alternative 2 Amending Contract to Reduce Table A Deliveries	Alternative 3 Less Flexibility in Water Transfers/ Exchanges	Alternative 4 More Flexibility in Water Transfers/ Exchanges	Alternative 5 Greater Water Management Only Agriculture to M&I Transfers Allowed	Alternative 6 Transfers/ Exchanges Only after Operation of California WaterFix
Environmental Impacts							
	No impact or LTS for all resource areas other than Groundwater Resources which is SU	Similar to or Greater	Similar to or Greater	Similar to or Greater	Similar	Similar to or Greater	Similar to or Greater
Meets Project Objectives:							
Objective 1	Yes	No	No	Yes, but to a lesser degree	Yes	Yes, but to a lesser degree	Yes, but to a lesser degree
Objective 2	Yes	No	Yes	Yes	Yes	Yes	Yes

NOTES:

LTS – Less than Significant
SU – Significant and Unavoidable

the existing Contracts, some of which are set to expire as early as 2035. DWR is in the process of extending the Contracts' expiration date to 2085 which will allow DWR to sell bonds with 30-year terms or longer, commensurate with the economic life of the SWP being financed, thus ensuring the debt service on these bonds remains affordable to the PWAs and their water customers. However, absent the Contracts being extended, PWAs can submit Article 4¹ letters (at least 6 months prior to the existing expiration date for each Contract) which allows the term of the Contracts to be extended beyond their current expiration dates. To date, DWR has received Article 4 requests from 9 PWAs (Alameda County FC&WD, Kern County WA, Antelope Valley-East Kern WA, Coachella Valley WD, Crestline-Lake Arrowhead WA, Littlerock Creek ID, Mojave WA, San Gabriel Valley Municipal WD, and Zone 7).

Therefore, under Alternative 1, the PWA's expiration date could be extended beyond the existing terms of the contracts (either by PWAs submitting their Article 4 letters or through the Contract extension process), enabling DWR to finance SWP expenditures beyond 2035 and continue to receive a reliable stream of revenues from PWAs for the construction, operation, and maintenance of the SWP. DWR and the PWAs would transfer and exchange water consistent with the existing water management and existing financial provisions in the Contracts.

In addition, Alternative 1 would not amend the Contracts to include provisions that establish the allocation of costs to south of Delta PWAs for California WaterFix. Therefore, under the No Project Alternative five PWAs (Yuba City, Butte County, Plumas County FC&WCD, Napa County FC&WCD, and Solano County WA) would be allocated costs for the California WaterFix compared with the proposed project. DWR would begin including California WaterFix costs in all PWA's statements of charges under the existing Contract.

Similar to the proposed project, Alternative 1 would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts. Also similar to the proposed project, Alternative 1 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, and all regulatory requirements. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for

¹ Article 4 states that, by written notice to DWR at least 6 months prior to the expiration date of a Contract, the PWA can elect to receive continued service after the expiration of the term under the following conditions unless otherwise agreed to: (1) service of water in annual amounts up to and including the PWA's Annual Table A amount; (2) service of water at no greater cost to the PWA than would have been the case had the Contract continued in effect; (3) service of water under the same physical conditions of service, including time, place, amount, and rate of delivery; (4) retention of the same chemical quality objective provision; and (5) retention of the same options to use the SWP transportation facilities as provided for in Articles 18(c) and 55, as applicable.

water rights, water quality and endangered species protection, among other State and federal laws. Alternative 1 would not require permits or approvals.

7.4.1.1 Impact Analysis

Without the water management tools facilitated by the proposed amendments, such as the increased flexibility to transfer and exchange Table A water (including multi-year transfers and Transfer Packages), PWAs would not be able to transfer Table A water for multiple years (up to the terms of their Contract) to other PWAs for compensation in order to relieve the financial burden of WaterFix. Less flexibility to move SWP water among the PWAs could also result in less SWP water supply reliability for those PWAs needing increased water supplies in dry-year conditions. Therefore, PWAs may seek alternative sources of surface water (e.g. acquisition of non-project surface water or increased groundwater pumping) to meet their water needs. Development of new or modification of existing surface or groundwater supply facilities would result in new potentially significant impacts when compared to the proposed project because the proposed project assumes that PWAs would not build and operate new facilities or modify existing facilities. These impacts include, but might not be limited to, impacts related to construction activities such as disturbance or loss of cultural, tribal or sensitive habitats, and short term increases in criteria air emissions. Long term impacts could include conversion of agricultural land, land subsidence, and impacts to aquatic resources.

If alternative sources of water are available, then the less than significant impacts to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use would be similar to the proposed project.

However, if alternative sources of water are not available or the burden of paying for California WaterFix is too great, agricultural PWAs may fallow agricultural lands and/or make changes in cropping patterns (e.g., switching from high water-using crops to low water-using crops). However; it is assumed that any fallowed land would remain in agricultural use, as designated by the local jurisdiction's general plan, because the PWAs could seek alternative water supplies to serve their service area as described above to irrigate the agricultural land. Therefore, impacts to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use could be potentially significant when compared to the proposed project.

Less flexibility to move SWP water among the PWAs could result in less water availability to those PWAs needing increased supplies in dry-year conditions and PWAs

may increase groundwater pumping to supplement their surface water supply. This may result in impacts to nearby wells, lower groundwater levels, and possible subsidence of lands overlying the groundwater basin. Therefore, these impacts would be similar to the proposed project and be significant and unavoidable.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy. In addition, similar to the proposed project, the increase in energy would not be anticipated to result a significant increase in GHG emissions and would not conflict with DWR's GGERP and its goals to reduce GHG emissions.

7.4.1.2 Ability to Meet Project Objectives

Objective 1. Under Alternative 1, DWR and the PWAs would not amend the existing Contracts to provide greater water management regarding transfers and exchanges. Therefore, Alternative 1 would not meet this objective discussed in Section 7.2.

Objective 2. Under Alternative 1 DWR would require all SWP PWAs to pay for California WaterFix and would not amend the Contracts to include provisions that establish the allocation of costs to south of Delta PWAs for California WaterFix. Therefore, Alternative 1 would not meet this objective discussed in Section 7.2.

Summary

Therefore, Alternative 1 would not meet the objectives of the project because Alternative 1 does not provide greater water management regarding transfers and exchanges of SWP water supply within the SWP service area and does not provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity as compared to the proposed project. In addition, impacts under Alternative 1 would be similar but greater when compared to the proposed project. Alternative 1 could result in new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project. In addition, if alternative sources of water are not available, then the less than significant impacts identified for the proposed project could be potentially significant.

7.4.2 Alternative 2: Amending Contract to Reduce Table A Deliveries

Under Alternative 2, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 2 would provide a fair and equitable approach for cost

allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. However, unlike the proposed project, the Contracts would be amended to reduce Annual Table A amounts proportionately for all the PWAs.

As described in Chapter 2, water delivery is estimated in each of the Contracts and included in a schedule for each PWA that sets forth the maximum annual amount of water that may be requested to be delivered; this is called the Annual Table A amount. The Contracts specify that DWR make all reasonable efforts to perfect and protect necessary water rights. Annual Table A amounts are not a contractual guarantee for water service. Water service depends on water availability in the system, which in turn depends on hydrology and water year type (average, dry, etc.), prior rights to water, and environmental requirements, among other considerations. In addition, Annual Table A amounts are used in the proportioning of available Table A water and Article 21 water among the PWAs.

DWR annually determines the supply of SWP water that can be scheduled for delivery throughout the year based on hydrology, SWP reservoir storage, SWP facility constraints, and regulatory and environmental constraints. The initial determination of SWP water is forecasted in December and is prorated among the PWAs in relation to their Annual Table A Amounts. As winter and spring progress, updated rainfall and snowpack typically increase the available SWP water supply, which includes Table A water and other types of water (e.g. Article 21 water). Whenever the supply of Table A water is less than the total of all PWAs' Table A requests, the available supply of Table A water is allocated among all PWAs in proportion to each PWA's Annual Table A Amount. Under extreme drought conditions, DWR may re-allocate based on human health and safety needs.

The SWP, as originally envisioned, has not been completed, and that the reliability of SWP water supply fluctuates for many reasons, including physical limitations and regulatory requirements. Additional storage upstream of the Delta in conjunction with facilities to transport water across the Delta have not been constructed. Additionally, listing of Delta smelt and winter-run Chinook salmon as endangered and threatened under the federal ESA, as well as more stringent water quality standards in the Delta, contribute to a reduced probability of delivering 100 percent of the Annual Table A amounts from when the Contracts were executed in the 1960s. To help PWAs better evaluate their SWP water supply, every two years DWR publishes a report entitled "The State Water Project – Delivery Capability Report" which provides information on the reliability of SWP water supplies under a range of hydrologic conditions.

Also stated in Chapter 2, the Contracts currently include water management practices that address the allocation of water during times of surplus and deficiencies. These water management practices include transfers and exchanges of water among the PWAs; storing of PWA water outside their service area for future return in their service area; and the option to carry over a portion of Table A water in SWP conservation reservoirs from one year into the following year(s). The Contract also includes provisions for PWAs to take delivery of SWP and non-SWP water. For example, Article 21 has provisions for an interruptible water supply made available only when certain operational and Delta conditions exist, to supplement a PWA's Table A water. As with all SWP water, Article 21 water is supplied under existing SWP water rights permits, and is pumped from the Delta under the regulatory, environmental, and operational constraints that apply to all SWP water. SWP conveyance of non-SWP water is another important aspect of total PWA supplies, such as in Article 55² of the Contracts. The PWAs often enter into agreements with water agencies upstream of the Delta for temporary water supplies when SWP and other local supplies are forecasted to be less than the target supply needed to meet their demands. These temporary transfer supplies (termed Article 55 water in the Contract) represent additional water to the downstream system, provided there is available SWP pumping capacity from the Delta and consistent with the requirements of the Biological Opinions issued by USFWS and NMFS in December 2008 and 2009, respectively.

The current relative delivery capability of the SWP is presented in **Figure 7-1**. This figure presents the relative distribution of SWP deliveries for Table A water, Article 21 water, and Article 55 water in various hydrologic years (DWR 2015).

Assuming no limitations to Article 21 deliveries, reduction of Annual Table A amounts would mean that the relative deliveries of Table A amounts and Article 21 water would be different, but would not necessarily result in a reduction in the total amount of SWP water exported from the Delta. Article 21 supplies would increase, and the SWP would use available capacity to move water to storage south of the Delta for future allocation such that reservoirs South of the Delta would be fuller more often. This is shown in **Figure 7-2**.

² Article 55(a) states, subject to the delivery priorities in Article 12(f), contractors shall have the right to receive services from any of the project transportation facilities to transport water procured by them from nonproject sources for delivery to their service areas and to interim storage outside their service areas for later transport and delivery to their service areas: Provided, that except to the extent such limitation in section 12931 of the Water Code be changed, a contractor shall not use the project transportation facilities under this option to transport water the right to which was secured by the contractor through eminent domain unless such use be approved by the Legislature by concurrent resolution with the majority of the members elected to each house voting in favor thereof.

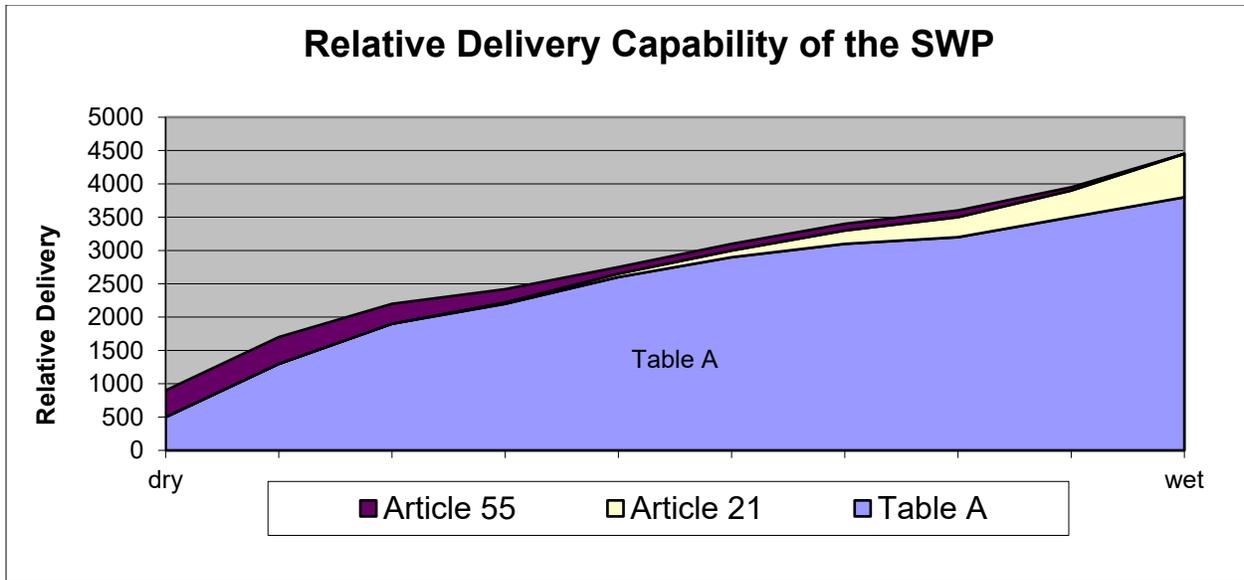


Figure 7-1
Relative Delivery Capability of the SWP

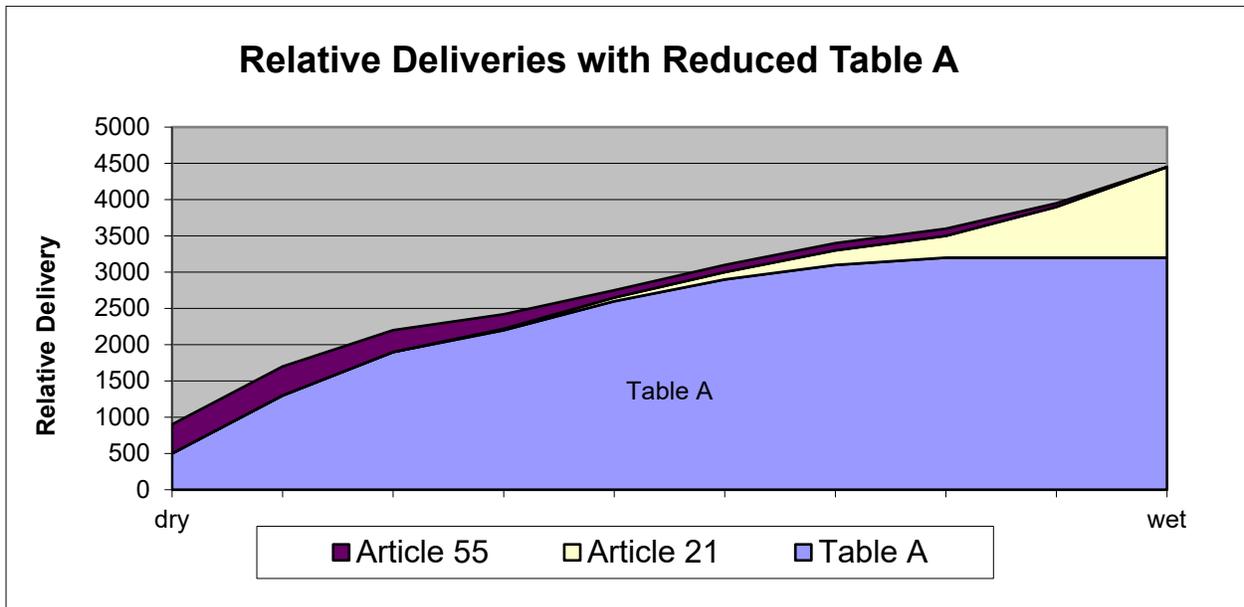


Figure 7-2
Relative Deliveries with Reduced Table A

7.4.2.1 Impact Analysis

It is anticipated that changes in Article 21 water deliveries would alter the distribution of water among the PWAs to the benefit of some and detriment of others. This differential change occurs because Article 21 water is only available under certain conditions that generally occur only in the winter and early spring. PWAs that cannot accept delivery of

Article 21 water would be those that do not have sufficient storage capabilities like local surface reservoirs or groundwater recharge facilities, or those that cannot immediately beneficially use the water. Those that have such capabilities can get an added share from other PWAs who are unable to take their allocation of Article 21 water. In addition, without greater water management tools facilitated by the proposed amendments, such as the increased flexibility to transfer and exchange Table A water, there would be less flexibility to move SWP water among the PWAs. Less flexibility to move SWP water among the PWAs could also result in less SWP water supply reliability for those PWAs needing increased water supplies in dry-year conditions.

Therefore, due to a reduction in Table A water and without the increased flexibility to transfer and exchange Table A water, PWAs may seek alternative sources of surface water (e.g. acquisition of non-project water) to meet their water needs.

If alternative sources of water are available, then the less than significant impacts to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use would be similar to the proposed project.

If alternative sources of water are not available, agricultural PWAs may fallow agricultural lands and/or make changes in cropping patterns (e.g., switching from high water-using crops to low water-using crops). Similar to the proposed project, it is assumed that fallowed land would remain in agricultural use as designated by the local jurisdiction's general plan; however, without sources of water to irrigate the land, it might result in permanent fallowing which could lead to conversion of agricultural land. Impacts identified for the project to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land could be potentially significant when compared to the proposed project.

Less flexibility to move SWP water among the PWAs could result in less water availability to those PWAs needing increased supplies in dry-year conditions and PWAs may increase groundwater pumping to supplement their surface water supply. This may result in impacts to nearby wells, lower groundwater levels, and possible subsidence of lands overlying the groundwater basin. Therefore, these impacts would be similar to the proposed project and be significant and unavoidable.

Less flexibility to move SWP water among the PWAs, a reduction in Table A water, and/or PWAs with limited surface storage or groundwater recharge facilities who cannot take their full allocation of Article 21 water could result in less water availability to those

PWAs needing increased supplies in dry-year conditions. As a result, PWAs may increase groundwater pumping to supplement their surface water supply. This may result in impacts to nearby wells, lower groundwater levels, and possible subsidence of lands overlying the groundwater basin. Therefore, these impacts would be similar to the proposed project and be significant and unavoidable.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy. In addition, similar to the proposed project, the increase in energy would not be anticipated to result a significant increase in GHG emissions and would not conflict with DWR's GGERP and its goals to reduce GHG emissions.

Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws.

7.4.2.2 Ability to Meet Project Objectives

Objective 1. Under Alternative 2, DWR and the PWAs would not amend the existing Contracts to provide greater water management regarding transfers and exchanges, but the Contracts would be amended to reduce the Annual Table A Amounts. Alternative 2 would not meet Objective 1 listed under Section 7.2.

Objective 2. As with the proposed project, Alternative 2 would amend the Contract to establish a fair and equitable approach for cost allocation of California WaterFix facilities costs, which is vital to maintaining the SWP financial integrity, and to which was agreed upon in the AIP. Alternative 2 meets Objective 2 listed in Section 7.2.

Summary

Therefore, Alternative 2 would meet some of the objectives of the project, but to a lesser degree because it would cause a reduction in delivery of Annual Table A amounts proportional for all PWAs and would not provide greater water management regarding transfers and exchanges. In addition, impacts under Alternative 2 would be similar but greater when compared to the proposed project. Alternative 2 could result in new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project. In addition, if alternative sources of water are not available, then the less than significant impacts identified for the proposed project could be potentially significant.

7.4.3 Alternative 3: Less Flexibility in Water Transfers/Exchanges

Under Alternative 3, DWR and the PWAs would agree to amend the Contracts. Similar to the proposed project, Alternative 3 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. However, unlike the proposed project, the Contracts would not be amended to modify provisions of the Contracts and clarify certain terms of the Contracts to provide greater water management regarding transfers and exchanges of SWP water supply within the SWP service area. Some increase in flexibility of exchanges and transfers would be agreed to, but not all. For example, Alternative 3 would amend the Contracts to allow PWAs to transfer carryover water in San Luis Reservoir, but only 20 percent of the carryover water (the proposed project allows for 50 percent), allow limited multi-year transfers of five years or less (the proposed project allows for up to the Contract term), and not allow use of Transfer Packages. In addition, unlike the proposed project, PWAs would transfer water based on cost compensation established by DWR. Also, under Alternative 3, the Contracts would not amend the text in Article 56(f) regarding water exchanges to add provisions, such as conducting water exchanges as buyers and sellers in the same year and increasing the compensation allowed to facilitate the exchanges.

Similar to the proposed project, Alternative 3 would not build new or modify existing SWP facilities nor change any of the PWA's Annual Table A amounts. Also similar to the proposed project, Alternative 3 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, and all regulatory requirements. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. Also similar to the proposed project, Alternative 3 would not require additional permits or approvals.

Alternative 3 would result in a similar or slightly less amount of water transfers among the PWAs than the proposed project, due to the less flexibility in water transfers and exchanges. Similar to the proposed project, after operation of California WaterFix begins, the water transfers that would occur could then use the California WaterFix facilities. These facilities have undergone separate CEQA review and other required environmental permitting. However, as with the proposed project, if the new facilities became operational and improve SWP water supply reliability, Alternative 3 would only facilitate movement of water among PWAs and not be the reason for development of new water supplies.

7.4.3.1 Impact Analysis

With reduced flexibility in water transfers and exchanges, the PWAs may have difficulty in meeting water needs during dry-year conditions. Therefore, PWAs may seek alternative sources of surface water (e.g. acquisition of non-project surface water or increased groundwater pumping) to meet their water needs. Development of new or modification of existing surface or groundwater supply facilities would result in new potentially significant impacts when compared to the proposed project because the proposed project assumes that PWAs would not build and operate new facilities or modify existing facilities. These impacts include, but might not be limited to, impacts related to construction activities such as disturbance or loss of cultural, tribal or sensitive habitats, and short term increases in criteria air emissions. Long term impacts could include conversion of agricultural land, land subsidence, and impacts to aquatic resources.

If alternative sources of water are available, then the less than significant impacts to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use would be similar to the proposed project.

If alternative sources of water are not available, agricultural PWAs may fallow agricultural lands and/or make changes in cropping patterns (e.g., switching from high water-using crops to low water-using crops). Similar to the proposed project, it is assumed that fallowed land would remain in agricultural use as designated by the local jurisdiction's general plan; however, without sources of water to irrigate the land, it might result in permanent fallowing which could lead to conversion of agricultural land. Impacts identified for the project to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land could be potentially significant when compared to the proposed project.

Less flexibility to move SWP water among the PWAs could result in less water availability to those PWAs needing increased supplies in dry-year conditions and PWAs may increase groundwater pumping to supplement their surface water supply. This may result in impacts to nearby wells, lower groundwater levels, and possible subsidence of lands overlying the groundwater basin. Therefore, these impacts would be similar to the proposed project and be significant and unavoidable.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy

consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy. In addition, similar to the proposed project, the increase in energy would not be anticipated to result a significant increase in GHG emissions and would not conflict with DWR's GGERP and its goals to reduce GHG emissions.

7.4.3.2 Ability to Meet Project Objectives

Objective 1. Under Alternative 3, DWR and the PWAs would amend the existing Contracts and some increase in flexibility of exchanges and transfers would be agreed to, but not all. Thus Alternative 3 would provide greater water management regarding transfers and exchanges, but to a lesser degree than the proposed project. Therefore, Alternative 3 would only partially meet this objective discussed in Section 7.2.

Objective 2. As with the proposed project, Alternative 3 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. Providing a fair and equitable approach for cost allocation does meet Objective 2 as discussed in Section 7.2.

Summary

Therefore, Alternative 3 would meet some of the objectives of the project, but to a lesser degree because the water transfers and exchanges would not provide as much water management flexibility regarding transfers and exchanges. In addition, impacts under Alternative 3 would be similar but greater when compared to the proposed project. Alternative 3 could result in new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project. In addition, if alternative sources of water are not available, then the less than significant impacts identified for the proposed project could be potentially significant.

7.4.4 Alternative 4: More Flexibility in Water Transfers/Exchanges

Under Alternative 4, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 4 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. However, unlike the proposed project, the Contracts would be amended to allow PWAs more flexibility in water transfers and exchanges. Similar to the proposed project, PWAs would be able to transfer carryover water in San Luis Reservoir, transfer water for multiple years without permanently relinquishing that portion of their Table A amounts, and transfer water in Transfer Packages. Similar to the proposed project, PWA would be able to transfer water based on terms they establish for cost compensation and duration, and store and transfer water in the same year. Unlike the

proposed project that only allows for a single-year transfers associated with carryover water, Alternative 4 would allow transfers and exchanges to include up to 100 percent of a PWA's carryover in San Luis Reservoir and allow multi-year use of its carryover water in both transfers and exchanges. Similar to the proposed project, the proposed exchange provisions of the AIP would establish a larger range of return ratios in consideration of varying hydrology and also maximum compensation with respect to SWP charges and allow PWAs to conduct additional water exchanges as buyers and sellers in the same year.

Similar to the proposed project, Alternative 4 would not build new or modify existing SWP facilities nor change any of the PWA's contractual maximum Table A amounts. Also similar to the proposed project, Alternative 4 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, including Table A water and Article 21 water. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. Also similar to the proposed project, Alternative 4 would not require additional permits or approvals.

7.4.4.1 Impact Analysis

Alternative 4 could increase the frequency, duration, and timing of water transfers and exchanges due to greater flexibility in transfers and exchanges and increased carryover storage as compared to the proposed project. However, the amount of potential carryover to exchange or transfer would be limited by capacity of San Luis Reservoir. Similar to the proposed project transfer and exchanges may be used more frequently to respond to variations in hydrology, such as dry-year water supplies. It is possible that transfers and exchanges of SWP water could result in fallowing of agricultural lands and/or changes in crop patterns (e.g., switching from high water-using crops to low water-using crops) by PWAs that take advantage of the additional flexibility to engage in increased transfers and exchanges their SWP water. However, as with the proposed project, it is assumed fallowing of agricultural land or changing crop patterns would not affect the existing agricultural land use designations in the study area because the land would remain in agricultural use. Therefore, these impacts would be less than significant similar to the proposed.

It is possible that transfers or exchanges from agricultural to M&I PWAs could result in an increase in groundwater pumping in some areas of the study area because agricultural PWAs would be temporarily exchanging surface water supply to other PWAs. Therefore, there is potential for Alternative 4 to result in a net deficit in aquifer

volume, lowering of the local groundwater table, or subsidence in some areas of the study area. Therefore, these impacts may be significant and unavoidable, similar to the proposed project.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy. In addition, similar to the proposed project, the increase in energy would not be anticipated to result a significant increase in GHG emissions and would not conflict with DWR's GGERP and its goals to reduce GHG emissions.

Changes in water levels due to Alternative 4 may result in higher water levels in San Luis Reservoir as a result of 100 percent of a PWA's carryover being held in San Luis Reservoir or if transferred/exchanged water is held beyond its originally scheduled date for delivery. However, as stated above, the amount of potential carryover to exchange or transfer water would be limited by capacity of San Luis Reservoir. Conversely, transfers or exchanges due to Alternative 4 may result in lower water levels in San Luis Reservoir if transferred/exchanged water is delivered before its originally scheduled date for release. Whether changes in reservoir water levels due to transfers of carryover water result in higher or lower water levels in San Luis Reservoir, the SWP would continue to be operated consistent with regulatory processes and Contract terms (including that transfers shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs). Therefore, the reservoir's ability to store or release water would not diminish due to the transfers or exchanges of carryover water. Therefore, the less than significant impacts associated with changing water levels in San Luis Reservoir including potential damage or destruction of cultural or tribal cultural resources, adverse effects to special-status fish or terrestrial species, and water supply would be similar to the proposed project.

Increased flexibility in transferring and exchanging SWP water from one PWA to another PWA could result in water being diverted from various point of diversions along the Feather, Sacramento, American, and San Joaquin rivers. This could result in increased or decreased flows above or below the point of diversions. However, the SWP would continue to be operated consistent with Contract terms (including that transfers shall be scheduled only if they do not impact normal SWP operations, must not create significant adverse impacts in a PWA service area, and must not harm non-participating PWAs), operational and regulatory processes, and Alternative 4 would be using existing diversion facilities used for existing transfers.

Therefore, the less than significant impacts associated with changes in flow including, adverse effects to special-status fish or terrestrial species, and water supply would be similar to the proposed project.

7.4.4.2 Ability to Meet Project Objectives

Objective 1. Under Alternative 4, DWR and the PWAs would amend the existing Contracts to allow PWAs more flexibility in water transfers and exchanges than the proposed project. Thus Alternative 4 would provide greater water management regarding transfers and exchanges. Therefore, Alternative 4 would meet this objective discussed in Section 7.2.

Objective 2. As with the proposed project, Alternative 4 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. Providing a fair and equitable approach for cost allocation does meet Objective 2 as discussed in Section 7.2.

Summary

Therefore, Alternative 4 would meet the objectives of the project. In addition, Under Alternative 4 the less than significant impacts associated with changes in flow including, adverse effects to special-status fish or terrestrial species, and water supply would be similar to the proposed project. However, similar to the proposed project, there is potential for Alternative 4 to result in a net deficit in aquifer volume, lowering of the local groundwater table, or subsidence in some areas of the study area with impacts that may be significant and unavoidable.

7.4.5 Alternative 5: Greater Water Management - Only Agriculture to M&I Transfers Allowed

Under Alternative 5, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 5 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP.

Unlike the proposed project, DWR and PWAs would amend Contract provisions to allow the transfer of Table A water only from agricultural PWAs to M&I PWAs and not change any current Contract provisions for exchanges. Transfers from M&I PWAs to M&I PWAs, M&I PWAs to agricultural PWAs, and agricultural PWAs to agricultural PWAs would not be allowed. Similar to the proposed project, PWAs could transfer carryover water in San Luis Reservoir to PWAs, transfer water for multiple years without permanently relinquishing that portion of their Table A amounts and request DWR's approval of Transfer Package; however, unlike the proposed project, these transfers

would only be from agricultural PWAs to M&I PWAs. Similar to the proposed project, Alternative 5 would revise the Contract to allow the PWAs to transfer water based on terms they establish for cost compensation and duration. An agricultural PWA would be able to store and transfer water in the same year to M&I PWAs, and transfer up to 50 percent of its carryover water, but only for a single-year transfer to an M&I PWA (i.e. a future or multi-year commitment of transferring carryover water is not allowed). Under Alternative 5, the Contracts would not be amended to modify the text in Article 56(f) regarding water exchanges to include additional provisions, such as conducting water exchanges as buyers and sellers in the same year.

Similar to the proposed project, Alternative 5 would not build new or modify existing SWP facilities nor change any of the PWA's contractual maximum Table A amounts. Also similar to the proposed project, Alternative 5 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, including Table A and Article 21 deliveries. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. Also similar to the proposed project, Alternative 5 would not require additional permits or approvals.

7.4.5.1 Impact Analysis

Water transfers limited to agricultural to M&I PWAs could potentially increase water needs for M&I or PWAs during dry-year conditions (as transfers from M&I PWAs to M&I PWAs, M&I PWAs to agricultural PWAs, and agricultural PWAs to agricultural PWAs would not be allowed). Therefore, PWAs may seek alternative sources of surface water (e.g. acquisition of non-project surface water or increased groundwater pumping) to meet their water needs. Development of new or modification of existing surface or groundwater supply facilities would result in new potentially significant impacts when compared to the proposed project because the proposed project assumes that PWAs would not build and operate new facilities or modify existing facilities. These impacts include, but might not be limited to, impacts related to construction activities such as disturbance or loss of cultural, tribal or sensitive habitats, and short term increases in criteria air emissions. Long term impacts could include conversion of agricultural land, land subsidence, and impacts to aquatic resources.

If alternative sources of water are available, then the less than significant impacts to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use would be similar to the proposed project.

If alternative sources of water are not available, agricultural PWAs may fallow agricultural lands and/or make changes in cropping patterns (e.g., switching from high water-using crops to low water-using crops). Similar to the proposed project, it is assumed that fallowed land would remain in agricultural use as designated by the local jurisdiction's general plan; however, without sources of water to irrigate the land, it might result in permanent fallowing which could lead to conversion of agricultural land. Impacts identified for the project to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land could be potentially significant when compared to the proposed project.

Less flexibility to move SWP water among the PWAs could result in less water availability to those PWAs needing increased supplies in dry-year conditions and PWAs may increase groundwater pumping to supplement their surface water supply. This may result in impacts to nearby wells, lower groundwater levels, and possible subsidence of lands overlying the groundwater basin. Therefore, these impacts would be similar to the proposed project and be significant and unavoidable.

Changes to groundwater levels could affect the energy required to pump groundwater, and changes to groundwater extraction volumes could affect energy uses, with more or less localized energy consumption. However, these localized changes to energy consumption would not result in inefficient, wasteful, or involve unnecessary long-term consumption of energy. In addition, similar to the proposed project, the increase in energy would not be anticipated to result a significant increase in GHG emissions and would not conflict with DWR's GGERP and its goals to reduce GHG emissions.

7.4.5.2 Ability to Meet Project Objectives

Objective 1. Under Alternative 5, DWR and the PWAs would amend the existing Contracts but only increase the flexibility of exchanges and transfers from agricultural PWAs to M&I PWAs. Thus Alternative 5 would provide greater water management regarding transfers and exchanges, but to a lesser degree than the proposed project. Therefore, Alternative 5 would only partially meet this objective discussed in Section 7.2.

Objective 2. As with the proposed project, Alternative 5 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. Providing a fair and equitable approach for cost allocation does meet Objective 2 as discussed in Section 7.2.

Summary

Therefore, Alternative 5 would meet some of the objectives of the project, but to a lesser degree because the water transfers and exchanges would not provide as much water management flexibility regarding transfers and exchanges. In addition, impacts under Alternative 5 would be similar but greater when compared to the proposed project. Alternative 5 could result in new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project. In addition, if alternative sources of water are not available, then the less than significant impacts identified for the proposed project could be potentially significant.

7.4.6 Alternative 6: Transfers/Exchanges Only after Operation of the California WaterFix Facilities

Under Alternative 6, DWR and the PWAs would agree to amend the Contracts. As with the proposed project, Alternative 6 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP.

Also, similar to the proposed project, DWR and PWAs would amend Contract provisions to allow the PWAs to transfer carryover water in San Luis Reservoir, transfer water for multiple years without permanently relinquishing that portion of their Annual Table A amounts, request DWR approval of Transfer Packages. Also similar to the proposed project, Alternative 6 would revise the Contract to allow the PWAs to transfer water based on terms they establish for cost compensation and duration. A PWA would be able to store and transfer water in the same year, and transfer up to 50 percent of its carryover water, but only for a single-year transfer (i.e. a future or multi-year commitment of transferring carryover water is not allowed). Also similar to the proposed project, PWAs would transfer water based on cost compensation established by PWAs and the Contracts would amend the text in Article 56(f) regarding water exchanges to include additional provisions, such as conducting water exchanges as buyers and sellers in the same year.

However, unlike the proposed project, Alternative 6 would amend the PWA Contracts to allow the above changes in water transfers and exchanges but they would come into effect after the commencement of operation of California WaterFix and deliveries of water using these facilities.

Similar to the proposed project, Alternative 6 would not build new or modify existing SWP facilities nor change any of the PWA's contractual maximum Table A amounts.

Also similar to the proposed project, Alternative 6 would not change the water supply delivered by the SWP as SWP water supply would continue to be delivered to the PWAs consistent with current Contracts terms, including Table A and Article 21 deliveries. Operation of the SWP under this alternative would be subject to ongoing environmental regulations including for water rights, water quality and endangered species protection, among other State and federal laws. Also similar to the proposed project, Alternative 6 would not require additional permits or approvals.

7.4.6.1 Impact Analysis

Not having flexibility in water transfers and exchanges until after the commencement of the operation of California WaterFix, the PWAs may have difficulty in meeting water needs during dry-year conditions. Therefore, PWAs may seek alternative sources of surface water (e.g. acquisition of non-project surface water or increased groundwater pumping) to meet their water needs. Development of new or modification of existing surface or groundwater supply facilities would result in new potentially significant impacts when compared to the proposed project because the proposed project assumes that PWAs would not build and operate new facilities or modify existing facilities. These impacts include, but might not be limited to, impacts related to construction activities such as disturbance or loss of cultural, tribal or sensitive habitats, and short term increases in criteria air emissions. Long term impacts could include conversion of agricultural land, land subsidence, and impacts to aquatic resources.

If alternative sources of water are available, then the less than significant impacts to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land use would be similar to the proposed project.

If alternative sources of water are not available, agricultural PWAs may fallow agricultural lands and/or make changes in cropping patterns (e.g., switching from high water-using crops to low water-using crops). Similar to the proposed project, it is assumed that fallowed land would remain in agricultural use as designated by the local jurisdiction's general plan; however, without sources of water to irrigate the land, it might result in permanent fallowing which could lead to conversion of agricultural land. Impacts identified for the project to aesthetic resources, agricultural resources, criteria air emissions, biological resources, cultural and tribal cultural resources, soil erosion and loss of top soil, conflicts in land could be potentially significant when compared to the proposed project.

In addition, less flexibility to move SWP water among the PWAs until commencement of WaterFix could result in less water availability to those PWAs needing increased

supplies in dry-year conditions. As a result, PWAs may increase groundwater pumping to supplement their surface water supply. This may result in impacts to nearby wells, lower groundwater levels, and possible subsidence of lands overlying the groundwater basin. Therefore, these impacts would be similar to the proposed project and be significant and unavoidable.

7.4.6.2 Ability to Meet Project Objectives

Objective 1. Under Alternative 6, DWR and the PWAs would amend the existing Contracts to allow PWAs more flexibility in water transfers and exchanges than the proposed project, but these amendments would not go into effect until after commencement of operation of California WaterFix. Thus Alternative 6 would provide greater water management flexibility regarding transfers and exchanges, but to a lesser degree than the proposed project. Therefore, Alternative 4 would partially meet this objective discussed in Section 7.2.

Objective 2. As with the proposed project, Alternative 6 would provide a fair and equitable approach for cost allocation of California WaterFix facilities to maintain the SWP financial integrity based on the AIP. Providing a fair and equitable approach for cost allocation does meet Objective 2 as discussed in Section 7.2.

Summary

Therefore, Alternative 6 would meet some of the objectives of the project, but to a lesser degree because Alternative 6 would not provide as much water management flexibility regarding transfers and exchanges as compared to the proposed project. Therefore, Alternative 6 would partially meet the objectives of the project. In addition, impacts under Alternative 6 would be similar but greater when compared to the proposed project. Alternative 6 could result in new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project. In addition, if alternative sources of water are not available, then the less than significant impacts identified for the proposed project could be potentially significant.

7.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires identification of an environmental superior alternative; that is, the alternative that has the least significant impacts on the environment. Table 7-1 presents a summary of how each alternative compares to the proposed project with respect to the environmental impacts and the ability to meet project objectives. As presented in Chapter 5, implementation of the proposed project would result in less than significant

or no physical environmental impacts to all resource areas except for impacts related to groundwater supplies and subsidence, which are significant and unavoidable.

As discussed in Section 7.4, Alternative 4 would result in similar impacts as the proposed project (e.g. net deficit in aquifer volume, lowering of the local groundwater table, or subsidence in some areas of the study area). Alternatives 1, 2, 3, 5 and 6 could result in impacts similar or greater (new potentially significant impacts associated with the construction and operation of new water supply facilities that were not identified for the proposed project) than the proposed project. Therefore, because the proposed project and Alternative 4 would result in similar impacts and the other alternatives may result in similar or greater impacts, Alternative 4 would be the environmentally superior alternative.

7.6 REFERENCES

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Chapter 8

Climate Change and Resiliency



8 CLIMATE CHANGE AND RESILIENCY

8.1 INTRODUCTION

This chapter is organized differently than the resource topic sections in Chapter 5 in that it does not include an analysis of environmental effects associated with the proposed project in response to the thresholds of significance presented in Appendix G of the CEQA Guidelines. Instead this chapter asks and discloses the answers to three fundamental questions related to climate change:

1. What is the impact of the proposed project on climate change (i.e., how will GHG emissions associated with implementation of the proposed amendments contribute to elevated GHG concentrations in the atmosphere)?
2. How will the proposed amendments be affected by climate change? Are future changes in climate likely to exacerbate proposed project impacts?
3. How will the proposed amendments affect the resiliency and adaptability of the study area to the effects of climate change?

The first two questions are addressed below. The third question, how the proposed amendments affect the study areas resiliency and adaptability to climate change, is the remaining subject of this chapter.

No comments related to climate change were received in response to the NOP (see Appendix B).

Question 1: What is the impact of the proposed project on climate change (i.e., how will GHG emissions associated with implementation of the proposed amendments contribute to elevated GHG concentrations in the atmosphere)?

An analysis of GHG emissions associated with the proposed project is presented in Section 5.9 Greenhouse Gas Emissions. As discussed in Section 5.9, the proposed project would not build or modify existing facilities, there would be no construction activities and no associated short-term increases in GHG emissions. As discussed in Section 5.7 Energy, it is possible that increase in transfers and exchanges could result in a slight increase in energy use in the study area; however, if more energy would be required, it would be provided through increases in renewable energy procurement, it is assumed that energy standards, such as the Energy Policy Acts 2005, promote strategic planning that reduce consumption of fossil fuels, increase use of renewable resources, and enhance energy efficiency would be followed by DWR and the PWAs. In general, these regulations and policies specify strategies to reduce fuel consumption and increase fuel efficiencies and energy conservation. It is anticipated that the proposed project would conform to applicable plans, policies, or regulations of local

county and/or state energy standards. Furthermore, the SWP would be continued to be operated as efficiently as feasible. Water would be distributed at the lowest possible pressure to minimize friction losses, which would reduce the energy need for pumping and if additional energy is required for the SWP, it may be provided through increases in renewable energy procurement.

Therefore, changes in the frequency and timing of water transfers and exchanges would not be anticipated to result in a significant increase in GHG emissions that could have a significant impact on the environment. Furthermore, as discussed in Section 5.9 Greenhouse Gas Emissions, the proposed project would be considered not likely to create significant impacts or conflicts to the goals and objectives established through AB 32 and subsequent related state law and regulations, if all potential impacts can be managed and mitigated through procedures and protocols established in the GGERP.

Question 2: How will the proposed amendments be affected by climate change? Are future changes in climate likely to exacerbate proposed project impacts?

It should be noted that in 2015, the California Supreme Court held that CEQA does not have to consider the effect of the environment (including climate change) on a project (California Bldg. Indus. Ass'n v Bay Area Air Quality Mgmt. Dist. (2015) 62 C4th 369). However, while this discussion does not evaluate impacts of climate change on the proposed project, it does disclose how SWP operations and the increase in frequency of transfers and exchanges that could be implemented as a result of the proposed amendments could be affected by climate change.

Operation of the SWP could be affected by features of climate change that include changes in temperature, precipitation, humidity and hydrology. Changes in precipitation and humidity would increase the rate of evapotranspiration of water contained in SWP canals, rivers and reservoirs which could cause the surface water levels within the canals, rivers and reservoirs to fluctuate according to the amount of rainfall received in the project watershed. However, given the size of the watersheds in the study area and the ability to convey water within the SWP, even a substantial increase or decrease in precipitation will likely be able to be handled through SWP operations. As described in Chapter 4 Project Description, the proposed project would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts that will provide greater water management regarding transfers and exchanges of SWP water within the service area. Greater water management of Table A and Article 21 water would allow the PWAs to respond to the potential effects of climate change by having additional flexibility in transferring/exchanging Table A and Article 21 water to other PWAs depending on the water year and availability of water.

Question 3: How will the proposed amendments affect the resiliency and adaptability of the study area to the effects of climate change?

To respond to this question, this chapter presents: (1) background on what climate change is and observed climatological changes over time; (2) recent and anticipated future trends and effects (global and study area – California); (3) regulatory framework and guidance for addressing climate change, including water management; and (4) disclosure of evaluation of the proposed amendments effect on the study areas resiliency and adaptability to climate change.

8.2 BACKGROUND AND ENVIRONMENTAL SETTING

8.2.1 Background on Climate Change

Climate is the average weather over many years, measured most often in terms of temperature, precipitation, and wind. Most of California experiences a Mediterranean weather pattern, with cool wet winters and hot, dry summers. A majority of precipitation falls in the winter months. Climate is unique to a particular location, and changes on timescales of decades to centuries or millennia. Climate change generally refers to a change in the state of the climate that can be identified by changes in the mean and/or variability of its properties and that persists for an extended period, typically decades or longer (Intergovernmental Panel on Climate Change [IPCC] 2014). A vast amount of scientific research on climate change at all geographic scales has been conducted during the last 50 years. The United Nations Environment Program and the World Meteorological Organization established the IPCC in 1988 to provide the world with a clear scientific view on climate change and its potential environmental and socioeconomic consequences. The IPCC, an organization of more than 800 scientists from around the world, regularly publishes summary documents, which analyze and consolidate recent peer-reviewed scientific literature, providing a consensus of the state of the science. Thus, the IPCC is viewed by governments, policymakers, and scientists as the leading international body on the science of climate change and its summaries are considered to be the best available science. IPCC documents address change at the global and super-regional scales. This section references IPCC studies and California-specific studies (e.g., studies by the CARB, CEC, DWR, California Natural Resources Agency [Resources], U.S. Department of the Interior, and Reclamation).

Baseline temperature and CO₂ (carbon dioxide) data using ice cores and geologic records extends back to previous ice ages thousands of years ago. Over the last 10,000 years, the rate of temperature change has typically been incremental, with warming and cooling occurring over the course of thousands of years. Each of the last three decades, however, has been successively warmer at the Earth's surface than any preceding

decade since 1850 (IPCC 2014). Climate can and has changed in the past in response to natural drivers. However, the IPCC has reached consensus that human-caused emissions of GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increases in global average surface temperature from 1951 to 2010 were caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forces together (IPCC 2014). The major causes of this rapid loading of GHGs into the atmosphere include the burning of fossil fuels since the beginning of the industrial revolution, agricultural practices, increases in livestock grazing, and deforestation. More background information on GHG emissions is provided in Section 5.9 Greenhouse Gas Emissions. Higher global surface temperatures result in changes to the Earth's climate system, including: the jet stream; El Niño and La Nina; the Indian monsoon; ocean temperature and acidity; the extent of alpine glaciers, sea ice and polar ice sheets; atmospheric water content; and the extent and health of boreal and tropical forests (IPCC 2013). Some of the above changes will result in specific impacts at the state and local level.

8.2.2 Global Climate Trends and Associated Effects

8.2.2.1 Recent Trends

Scientific measurements have shown that changes in global climate are already occurring including rising air temperatures, rising ocean temperatures, increased ocean salinity, rising global sea levels, changes in precipitation patterns, and increased intensity and frequency of extreme events such as storms, droughts, and wildfires (IPCC 2014). Global mean surface temperature has increased since the late 19th century. Each of the past three decades has been successively warmer at the Earth's surface than any of the previous decades in the instrumental record, and the decade of the 2000's has been the warmest. Global surface temperatures for 2016 were the warmest since record keeping began in 1880, with most of the warming occurring in the past 35 years (16 of the 17 warmest years on record occurring since 2001; National Aeronautics and Space Administration 2017).

Much of the Western United States has experienced warming during the 20th century (approximately 2 degrees Fahrenheit [°F]) and is projected to experience further warming during the 21st century with central estimates varying from roughly 5 to 7°F depending on location. Based on median projected changes in temperature and precipitation, characterized generally across the western United States, future projections suggest that the northwestern and north-central areas of the United States (e.g., Columbia Basin and Missouri River basin) may gradually become wetter, while the

southwestern and south-central areas (e.g., San Joaquin, Truckee, and Rio Grande River basins and the Middle to Lower Colorado River Basin) may gradually become drier. Other areas (e.g., Klamath and Sacramento basins and the Upper Colorado Basin) have median projected changes closer to no change, meaning they have roughly equal chances of becoming wetter or drier (Reclamation 2011).

Climate change is also reducing average snowpack. It appears that warming trends have led to a shift in cool season precipitation towards more rain and less snow, which causes increased rainfall-runoff volume during the cool season accompanied by less snowpack accumulation on average. (From season to season, snowpack amounts remain highly variable, as can be seen in the winters of the recent 5-year drought when snowpack declined to a low of 5 percent of average in 2015, which was 1/5th the previous low, compared to the winter of 2016-17, when total snowpack exceeded historic record amounts in some locations). Hydrologic-based future climate projections suggest that warming and associated loss of snowpack will persist over much of the Western United States. However, there are geographic variations. Snowpack losses are projected to be greatest where the baseline climate is closer to freezing thresholds (e.g., in lower lying valley areas and lower altitude mountain ranges). In high altitude and high latitude areas (e.g., in the Columbia headwaters in Canada, Colorado headwaters in Wyoming), it appears that there is a chance that cool season snowpack could increase during the 21st century because precipitation increases are projected and appear to offset the snow-reduction from warming in these locations (Reclamation 2011).

Sea-level rise was observed in the 20th century, and the IPCC projects that global mean sea-level rise will continue during the 21st century, very likely at a faster rate than observed from 1971 to 2010. Observed trends in sea-level rise can be attributed to both thermal expansion of the world's oceans and the melting of ice sheets (polar and alpine). Since 1993, thermal expansion of the oceans (i.e., the expansion of water in oceans due to increased temperature of the water) has contributed about 57 percent of the sum of the estimated individual contributions to sea-level rise, with the decrease in glaciers and ice caps contributing about 28 percent, and losses from the polar ice sheets contributing the remainder (IPCC 2007). Between 1900 and 2007 (unless otherwise noted), measurements also show:

- Decline in the extent of mountain glaciers and global snow cover
- Increase in atmospheric water vapor content
- Loss in mass of the polar ice sheets
- Decrease in extent of Arctic sea ice

- Increase in precipitation in the eastern portions of North and South America, northern Europe and northern and central Asia
- Drying conditions in the Sahel region of the Sahara Desert in Africa, the Mediterranean and southern Africa
- Increase in frequency of extreme precipitation events over land areas
- Higher average night time temperatures
- Increase in tropical cyclone activity in the North Atlantic
- Increase in ocean temperature (since the 1960s)
- Strengthening in mid-latitude westerly winds (since the 1960s)
- More intense and longer drought conditions in the tropics and sub-tropics (since the 1970s)
- Decreased frost days and increased frequency and duration of extreme heat events (since the 1950s)

Changes in these conditions alter the likelihood of occurrence and/or strength of extreme weather and/or climate events, such as sea-level rise coupled with high tide and extreme storm surges. These changes are in turn resulting in changes to the climate of California as the regional climate is moderated by sea surface temperature, westerly jet stream wind patterns, the El Niño Southern Oscillation,¹ and Pacific storm patterns (IPCC 2013).

8.2.2.2 Future Projections

To evaluate climate change influences to 2100 as part of the IPCC Fifth Assessment Report, the IPCC developed future emission scenarios that differ based on varying combinations of economic, technological, demographic, policy, and institutional futures. IPCC developed and used four emissions scenarios—or, Representative Concentration Pathways (RCP)—to represent a broad range of climate outcomes, and develop sea-level rise projections. The RCPs document projected future emissions, concentrations, and land-cover change projections (IPCC 2014).

¹ The El Niño Southern Oscillation is a warming of the ocean surface, or above-average sea surface temperatures (SST), in the central and eastern tropical Pacific Ocean. Over Indonesia, rainfall tends to become reduced while rainfall increases over the tropical Pacific Ocean. The low-level surface winds, which normally blow from east to west along the equator (“easterly winds”), instead weaken or, in some cases, start blowing the other direction (from west to east or “westerly winds”) (L’Heureux 2014).

The four RCPs are RCP 2.6, RCP 4.5, RCP 6.0, and RCP 8.5 (Integrated Assessment Modeling Consortium 2009):

- **RCP 2.6 emissions scenario:** assumes very low GHG concentration levels, a scenario in which GHG emissions (and indirectly emissions of air pollutants) are reduced substantially over time.
- **RCP 4.5 emissions scenario:** a stabilization scenario where the total change in energy in the atmosphere due to GHG emissions is stabilized before 2100 through implementation of a range of technologies and strategies for reducing GHG emissions.
- **RCP 6.0 emissions scenario:** a stabilization scenario where the total change in energy in the atmosphere due to GHG emissions is stabilized after 2100 and assumes the implementation of a range of technologies and strategies for reducing GHG emissions.
- **RCP 8.5 emissions scenario:** characterized by increasing GHG emissions over time leading to high GHG concentration levels.

Based on several emission scenarios, the IPCC projects an average increase in global surface temperatures of 1.8 to 6.7°F (1.0 to 3.7° Celsius [C]) by the end of the 21st century (2081 through 2100) compared to the period from 1986 through 2005. When accounting for uncertainty, the IPCC projects a range of potentially 0.3 to 4.8° C or 0.54 to 8.6°F. Approximately half of the projected warming is the result of past GHG emissions and will occur even if GHG emissions do not increase past 2000 levels. Some regions of the globe, particularly high latitudes, will experience much larger changes compared to existing conditions. Corresponding global average sea-level rise levels are estimated to be between 15.7 and 24.4 inches (0.40 and 0.62 meters), with a range of 10.3 and 32.3 inches (0.26 and 0.82 meters). It is very likely that by the end of the 21st century, sea level will rise in more than 95 percent of the ocean area worldwide. About 70 percent of the coastline worldwide are projected to experience a sea level change within ±20 percent of the global average (IPCC 2014).

The following additional changes to the global climate system are projected (IPCC 2014):

- Increased ocean acidity due to increased carbon dioxide uptake by the oceans
- Reduced global snow cover
- Increased thaw depth in permafrost regions
- Decreased sea ice with potential full disappearance in summer months
- Increased frequency in heat waves, droughts, and heavy precipitation events
- Increased intensity of tropical cyclone events
- Northward movement of extra-tropical storm tracks

- Increased precipitation at high latitudes and decreased precipitation in tropical and sub-tropical regions
- Increased melting of the ice sheets

8.2.3 California Climate Trends and Associated Effects

8.2.3.1 Recent Trends

Scientific evidence indicates that California's climate is already changing in a manner consistent with global climate change. Since 1920, California's average temperature has increased. However, climate change impacts, including temperature increases, are not geographically uniform across California (Moser et al. 2009).

During the last century, sea level along the California coast has risen approximately 7 inches (18 centimeters), with higher rates of increase occurring since 1993 (Cayan et al. 2012).

Rising temperature has already begun to reduce the total snowpack with melting occurring earlier in the year, further shifting stream- and river-flow regimes throughout the Sierra (Stewart et al. 2004; Vanrheenen et al. 2004). In recent decades, there has been a trend toward more rain than snow in the total precipitation volume (DWR 2015). The average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 maf of snowpack storage (one acre-foot of water is enough for up to two families' domestic use for 1 year).

Warmer temperatures combined with long dry seasons over the last few decades have resulted in more severe wildfires (CEC and Resources 2012). Changing precipitation and water availability may also make forests more susceptible to pests and disease (Resources 2014).

Plants and animals around the globe are already responding to changes caused by increasing temperatures. In California, species are also reacting to extreme conditions, including heat waves (and increased fire frequency); cold snaps; droughts (and the saltwater intrusion that droughts often cause); floods; and coastal upwelling. Observed changes also include altered timing of animal and plant lifecycles (phenology), disruption of biotic interactions, changes in physiological performance, species range and abundance, increase in invasive species, altered migration patterns of fishes, aquatic-breeding amphibians, birds and mammals, changes in forage base, local extinction of plant and animal populations, and changes in habitat, vegetation structure, and plant and animal communities (California Department of Fish and Game 2010).

8.2.3.2 Future Trends and Projections to 2050 and 2100

Downscaling of global climate simulation model data suggests that average temperatures in California are projected to increase 2.7°F above 2000 averages by 2050 and, depending on GHG emission levels, 4.1 to 8.6°F by 2100. Warming will not be uniform temporally or geographically across the state. Summer temperatures will rise more than winter temperatures, and the increases will be greater in the interior regions of California, compared to the coast. Heat waves will be more frequent, hotter, and longer and there will be fewer extremely cold nights (CEC and Resources 2012). Increasing temperatures and frequency and duration of heat waves are expected to increase energy demand. Increased energy demand would require additional generation resources or the purchase of peak power from external sources.

Model projections for precipitation in California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. Recently, however, several climate models show a shift toward drier average conditions by the mid-to-late 21st century in Central and, most notably, Southern California (notwithstanding season-to-season variability, like was experienced in California between the 5-year drought and the winter of 2017). By late-century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10 percent below the historical average. This drying trend is caused by a decline in the frequency of rain and snowfall. Even in projections with relatively small or no declines in precipitation, central and southern regions of the state (Central Valley and southern Sierra Nevada) can be expected to be drier from predicted warming alone because the spring snowpack will melt sooner, and the moisture contained in soils will evaporate during long dry summer months (CEC and Resources 2012). Cayan et al. (2012) estimates California, particularly southern California, will have 16 to 23 percent less precipitation by 2100.

The hydrologic conditions within the Extended Planning Area are influenced by snowpack storage throughout the Sierra Nevada, Klamath, and Cascade Mountains. Snowpack storage in the Sierra Nevada is expected to diminish by 25 to 40 percent from its historical average by 2050 (DWR 2010) and by as much as 70 percent by 2100 (duVair 2003). The average annual Sierra snowpack, which is approximately equal to half the storage capacity of all the State's reservoirs combined, holds water until the melt in late spring and early summer. As the runoff comes earlier, spring and summer stream flow is projected to decline by 10 to 25 percent by 2050 and decline by potentially as much as 40 to 55 percent by the end of the century (duVair 2003). In the Klamath Mountains, annual precipitation is projected to decline by approximately an inch by 2050 and 2 inches by 2100 (California Emergency Management Agency

[CalEMA] and Resources 2012a). March snow levels in the higher-elevation, mountainous portions of this region could drop to almost zero by the 2090s, a decrease of 2 to 10 inches from 2010 levels. In areas with more snow, 3 to 5 inches of reduction is projected to occur by 2050. In areas with little snow currently (i.e., less than 3 inches per year), the snowpack is projected to be near zero by 2050 (CalEMA and Resources 2012a). Warmer temperatures throughout the Cascades is projected to result in earlier snowmelt, and March snowpack is projected to disappear by 2090 for most of the area, except for higher elevation areas near Mt. Shasta (DWR 2008; CalEMA and Resources 2012a).

A shift in precipitation falling as rain rather than snow will lead to increased wet-season flows in rivers and streams after storms, with increased potential for floods and erosion, because water that would normally be held as snow and ice until spring or early summer could flow into the Sacramento and San Joaquin Valleys concurrently with winter storm events (CalEMA and Resources 2012a). Changes in the timing or amounts of rainfall and snowfall may lead to changes in water supply and increase the severity and frequency of flooding risk.

Increases in extreme precipitation events could also result from warmer sea surface and air temperatures, including the phenomenon of “atmospheric rivers (ARs),” wherein warmer winter weather systems could bring more intense, narrow bands of heavy precipitation flowing in a river-like manner from over the Pacific Ocean to parts of the state in a relatively short time period (CEC and Resources 2012). High water events in the Delta coinciding with high tide events could result in increased widespread low land flooding (Resources 2009). In California, nearly all major historic flood events have been associated with the presence of ARs along the Pacific coast. It is estimated that future changes in climate will increase the frequency of years with AR storms, but the number of storms per year is not likely to be affected. More importantly, occasional extreme precipitation events with intensities greater than historically observed are projected to occur under most warming scenarios. Changes in the frequency and magnitude of ARs may result in increases in major flood and storm events (Ralph and Dettinger 2011).

Wildfire risk in California is expected to increase as a result of climate change. Earlier snowmelt, higher temperatures and longer dry periods over a longer fire season will directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning. Human activities will continue to be the biggest factor in ignition risk. Long-term increase in fire occurrence associated with a higher emissions scenario would be substantial, with increases in the number of larger fires statewide ranging from 58 to 128 percent above

historical levels by 2085. Under the same emissions scenario, estimated burned area will increase by 57 to 169 percent, depending on location (CEC and Resources 2012).

Assuming that sea level changes along the California coast reflect global trends, sea levels along the State's coastline will continue to increase through the end of this century and beyond (CEC and Resources 2012). Sea-level rise has the potential to impact the approximately three quarters of California's population that lives near the 1,100 miles of coastline and San Francisco Bay's 500-mile shoreline (Resources 2014).

Sea-level rise threatens coastal lands and infrastructure, increases flooding at the mouths of rivers, places additional stress on levees in the Delta, and will intensify the difficulty of managing the state's water supply system in the Delta (DWR 2013). Changes in temperature, precipitation, and sea-level rise may have substantial influences on other resource areas. Potential consequences of climate change on other resources that are anticipated in California include (CEC and Resources 2012):

- Increased average temperatures of air, water, and soil
- Changes in evapotranspiration
- Increased severity of droughts
- Increased frequency and severity of extreme heat events
- Increased energy demand (particularly during peak summer periods)
- Increased frequency and severity of wildfire events
- Sea-level rise (with increased salt water intrusion in the Delta)
- Changes in ocean chemistry (i.e., acidification)
- Shifts in species distribution and ranges
- Decreased number of species
- Increased number of vector-borne diseases and pests (including impacts to agriculture)
- Altered timing of animal and plant lifecycles (phenology)
- Disruption of biotic interactions
- Changes in physiological performance, including reproductive success and survival of plants and animals
- Changes in invasive species
- Altered migration patterns of fishes, aquatic-breeding amphibians, birds and mammals
- Changes in food (forage) base

- Changes in habitat, vegetation structure, and plant and animal communities

These changes have significant implications for water quality, water supply, flooding, aquatic ecosystems, energy generation, and recreation throughout California. Several guidance documents have been published to discuss strategies to protect resources from climate change. Resources released its first comprehensive plan for adapting to climate change in 2009 entitled *Safeguarding California: Reducing Climate Risk*. This plan is designed to be a roadmap of the ongoing actions and next steps being taken by California's state government to make its people, economy, and environment more resilient to the impacts of climate change. The most recent update was published in January 2018.

8.3 REGULATORY SETTING

The following text summarizes federal, State, and local laws and regulations pertinent to evaluation of climate change effects on the proposed project.

8.3.1 Federal

8.3.1.1 Coastal Zone Management Act

Section 303 of the Coastal Zone Management Act addresses national policy regarding sea level rise and climate change effects in coastal zones.

8.3.2 State

The major components of California's climate change initiative are described below. DWR's Climate Action Plan, Phase 1: Greenhouse Gas Emissions Reduction Plan is summarized in Section 5.9 Green House Gas Emissions.

8.3.2.1 Executive Order S-13-08

Executive Order S-13-08, signed by Governor Arnold Schwarzenegger on November 14, 2008, required Resources to develop California's first Climate Adaptation Strategy in coordination with local, regional, State, and federal public and private entities. Under the Executive Order, the National Academy of Sciences was instructed to issue a report on sea-level rise to advise California planning efforts; the report was released in June 2012. It also directed OPR to provide State land-use planning guidance related to sea-level rise and other climate change impacts. The Interim Guidance Document was released in November 2008, with an update released in 2013.

8.3.2.2 Executive Order B-30-15

On April 20, 2015, Governor Edmund G. Brown Jr. signed EO B-30-15 to establish a new California GHG reduction target of 40 percent below 1990 levels by 2030, as well

as increase statewide efforts to address the need for increased climate change adaptation measures by State agencies. These measures include:

- Incorporating climate change impacts into the State’s Five-Year Infrastructure Plan.
- Updating the Safeguarding California Plan 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.
- Factoring climate change into State agencies’ planning and investment decisions.
- Requiring OPR to establish a technical advisory group to help state agencies incorporate climate change impacts into planning and investment decisions.
- Implementing measures under existing agency and departmental authority to reduce greenhouse gas emissions.

8.3.2.3 Executive Order B-55-18

In September 2018, Governor Brown signed EO B-55-18 that establishes a state-wide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions after that.

8.3.2.4 Senate Bill 379, Climate Change Adaptation in General Plan Safety Elements

SB 379 (Jackson, Chapter 608, Statutes of 2015), requires all Cities and Counties to include climate adaptation and resiliency strategies in the Safety Elements of their General Plans. The General Plan update must include the following:

- A climate change vulnerability assessment
- Adaptation and resilience goals, policies, and objectives
- Feasible implementation measures
- Reference to or attachment of a separate adaptation plan, if it fulfills these requirements

The General Plan Safety Element update is due at the time of a jurisdiction’s first FEMA Local Hazard Mitigation Plan adopted after January 1, 2017, or if no such FEMA plan has been adopted, after January 1, 2022. The bill also references specific sources of useful climate information to consult, such as Cal-Adapt.

8.3.2.5 Senate Bill 246, Integrated Climate Adaptation and Resiliency Program

SB 246 establishes the Integrated Climate Adaptation and Resiliency Program, administered by OPR. The Program coordinates regional and local adaptation planning efforts with statewide climate adaptation strategies. The bill also requires, within 1 year

of an update to the Safeguarding California Plan, California Governor's Office of Emergency Services to review and update, as necessary, the Adaptation Planning Guide, in coordination with Resources, OPR, and relevant public and private entities. The Integrated Climate Adaptation and Resilience Program Technical Advisory Council is comprised of 17 public members and five state agency representatives. This Council, established through SB 246, brings together local governments, practitioners, scientists and community leaders to help coordinate activities that better prepare California for the impacts of a changing climate. The advisory council supports the goals of OPR and requires OPR to establish a clearinghouse for climate adaptation information.

8.3.2.6 2009 California Climate Adaptation Strategy

In compliance with EO S-13-08, Resources, in coordination with local, regional, State, and federal public and private entities, prepared the 2009 California Climate Adaptation Strategy. The 2009 California Climate Adaptation Strategy summarizes climate change impacts and recommends adaptation strategies across seven sectors: Public Health, Biodiversity and Habitat, Oceans and Coastal Resources, Water, Agriculture, Forestry, and Transportation and Energy. The report was the first of its kind to use downscaled climate models to assess statewide climate impacts with more accuracy as a basis for providing guidance for establishing actions that prepare, prevent, and respond to the effects of climate change (Resources 2009).

8.3.2.7 2018 Safeguarding California: Reducing Climate Risk

Safeguarding California is California's overall plan for climate adaptation (Resources 2018). The plan provides policy guidance for state decision-makers, and is part of continuing efforts to reduce impacts and prepare for climate risks. The 2018 Plan Update identifies ongoing actions and recommendations that protect infrastructure, communities, services, and the natural environment from climate change. It lays out the next steps to achieve the State's goals and how those objectives will be achieved and describes overarching strategies recommended by the Resources Agency. The Plan also outlines ongoing actions and cost-effective and achievable next steps to make California more resilient to climate change (Resources 2018).

8.3.3 Local

The study area covers multiple counties with multiple cities throughout California (see Section 5.1 for a list of counties in the study area). Each city and county in the study area has adopted a General Plan that describes plans for the physical development of that county or city. Each of these counties and cities has either General Plans with unique goals and policies that address climate change or have separate Climate Action Plans.

8.4 RESILIENCY AND ADAPTATION ANALYSIS

As described in Chapter 4 Project Description, the proposed project would add, delete and modify provisions of the Contracts and clarify certain terms of the Contracts that would provide greater water management regarding transfers and exchanges of water supply within the SWP service area. Greater water management of Table A and Article 21 water would allow the PWAs to respond to the potential effects of climate change by having additional flexibility in transferring/exchanging Table A and Article 21 water to other PWAs depending on the water year and availability of water. For example, the proposed Contract amendments would allow PWAs to exchange carryover water in San Luis Reservoir, and exchange up to 50 percent of their carryover water in a single-year transaction (i.e., a future or multi-year commitment of exchanging carryover water is not allowed). The proposed provisions would also allow PWAs to conduct water exchanges of carryover water as buyers and sellers in the same year.

While DWR has approved water exchanges pursuant to Articles 15(a), 41, and 56(f), under the proposed project, exchanges may be used more frequently to respond to variations in hydrology, such as wet years, and in single dry-year and multiple dry-year conditions. For example, in a wet year where water is abundant PWA1 could deliver 2 units of Table A water to willing PWA2 with the intent that PWA1 gets 1 unit of Table A water back in a dry year. The value of the dry year Table A water is worth PWA1 taking a reduction of return Table A water. Therefore, the proposed amendments would provide opportunities for PWAs to implement water management strategies to help maintain water supply reliability for their service areas in response to climate change.

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Chapter 9

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