Final

Environmental Impact Report
for
Long-Term Operation of the California State Water Project

State Clearinghouse No. 2019049121

State of California
Department of Water Resources

March 27, 2020

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California Department of Water Resources

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ACRONYMS AND OTHER ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
AB 52	Assembly Bill 52
ACID	Anderson–Cottonwood Irrigation District
AF	acre-feet
AFSP	Anadromous Fish Screen Program
AFY	acre-feet per year
Ag	agriculture
AMP	Adaptive Management Plan
ANN	artificial neural network
ARB	Air Resources Board
ARIS	Adaptive Resolution Imaging Sonar
AT	acoustic tag
B.P.	Before Present
BAFF	bio-acoustic fish fence
Banks Pumping Plant	Harvey O. Banks Pumping Plant
Bay Study	San Francisco Bay Study
Bay-Delta	San Francisco Bay/Sacramento–San Joaquin Delta
BDCP	Bay Delta Conservation Plan
BiOp	Biological Opinion
BMP	best management practice
BSPP	Barker Slough Pumping Plant
CAEP	Classroom Aquarium Education Project
CAISMP	California Aquatic Invasive Species Management Plan
CAL/OSHA	California Occupational Safety and Health Administration
CalEPA	California Environmental Protection Agency
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAMT	Collaborative Adaptive Management Team
CAP	Climate Action Plan
CARB	California Air Resources Board
CCF	Clifton Court Forebay
CCR	California Code of Regulations
CCSB	Cache Creek Settling Basin
CCTAG	Climate Change Technical Advisory Group
CCWD	Contra Costa Water District
CDE	California Department of Education
CDFG	California Department of Fish and Game

CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
CHP	California Highway Patrol
cm	centimeter(s)
cm TL	centimeters total length
CMIP5	Coupled Model Intercomparison Project 5
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
COA	Coordinated Operation Agreement
Council	Delta Stewardship Council
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Ranks
CSAMP	Collaborative Science and Adaptive Management Program
CTC	California Transportation Commission
CTR	California Toxics Rule
CV RWQCB	Central Valley Regional Water Quality Control Board
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
CWT	coded-wire tag
D-1485	SWRCB Water Rights Decision 1485
D-1641	SWRCB Water Rights Decision 1641
D-893	SWRCB Water Rights Decision 893
dB	decibel(s)
dBA	A-weighted decibels
DBP	disinfection by-product
DBW	California Department of Boating and Waterways
DCC	Delta Cross Channel
DDT	dichlorodiphenyltrichloroethane
Delta	Sacramento–San Joaquin Delta
Delta Methylmercury TMDL	Sacramento–San Joaquin Delta Estuary Total Maximum Daily Load for Methylmercury
Delta Reform Act	Sacramento–San Joaquin Delta Reform Act of 2009

DMC	Delta–Mendota Canal
DO	dissolved oxygen
DOI	U.S. Department of the Interior
DPC	Delta Protection Commission
DPM	Delta Passage Model
DPR-DBW	Department of Parks and Recreation-Division of Boating and Waterways
DPS	Distinct Population Segment
DRS	Delta Research Station
DSC	Delta Stewardship Council
DSLCM	Delta Smelt Life Cycle Model
DSM2	Delta Simulation Model II
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
E/I	export/import
EBMUD	East Bay Municipal Utility District
EC	electrical conductivity
EchoWater	Sacramento Regional Wastewater Treatment Plant Facility Upgrade Project
EDCP	The Egeria Densa Control Program
EDSM	Enhanced Delta Smelt Monitoring Program
EFH	essential fish habitat
EID	El Dorado Irrigation District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERP	Ecosystem Restoration Program
ERS	Estuarine Research Station
ESA	federal Endangered Species Act
ESU	Evolutionary Significant Unit
FBD	Fish Barrier Dam
FCCL	Fish Conservation and Culture Laboratory
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
F-gases	fluorinated gases
FFGS	Floating Fish Guidance Structure
FHWA	Federal Highway Administration
FMS	Flow Management Standard
FMWT	Fall Midwater Trawl
FRPA	Fish Restoration Program Agreement

FRSA	Feather River Service Allocation
ft/sec	foot (or feet) per second
FTC	Fish Technology Center
GCID	Glenn Colusa Irrigation District
GHG	greenhouse gas
GSPs	Groundwater Sustainability Plans
GWP	Global warming potential
HAB	harmful algal bloom
HCP	habitat conservation plan
HFC	hydrofluorocarbon
HOR	Head of Old River
HORB	Head of Old River Barrier
HSC	Habitat Suitability Criteria
Hz	hertz
I	Interstate
IBU	in-basin use
ID	Irrigation District
IEP	Interagency Ecological Program
IPCC	Intergovernmental Panel on Climate Change
IS	initial study
ITP	Incidental Take Permit
ITS	incidental take statements
JPE	juvenile production estimate
JPOD	Joint Point of Diversion
km	kilometer
kWh	kilowatt-hour(s)
L_{eq}	equivalent sound level
LFC	Low Flow Channel
LFS	Longfin Smelt
L_{max}	maximum sound level
LMP	Land Management Plan
LSIWA	The Lower Sherman Island Wildlife Area
LSZ	low salinity zone
LTO	long-term operation
M&I	municipal and industrial
MAF	million acre-feet
MAST	Management Analysis and Synthesis Team
MCVD	mosquito and vector control district
MERP	Mercury Exposure Reduction Program
MFR	minimum flow requirements

mg/L	milligrams per liter
mgd	million gallons per day
MID	Modesto Irrigation District
MIDS	Morrow Island Distribution System
mm	millimeter(s)
mm TL	millimeters total length
mmhos/cm	millimhos per centimeter
MND	mitigated negative declaration
mS/cm	microsiemens per centimeter
MRV	junction of Middle River and the San Joaquin River
MWD	Metropolitan Water District
NAAQS	National Ambient Air Quality Standards
Natomas Mutual	Natomas Central Mutual Water Company
NBA	North Bay Aqueduct
NCCP	natural community conservation plan
Ne	effective population size
NFH	National Fish Hatchery
NMFS	National Marine Fisheries Service
NPB	non-physical barrier
NO_2	nitrogen dioxide
NOD	Notice of Determination
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRA	National Recreation Area
NRHP	National Register of Historic Places
NSJCGBA	Northeastern San Joaquin County Groundwater Banking Authority
NTU	nephelometric turbidity units
O&M	operations and maintenance
OBI	Old River at Bacon Island
OCAP	Operations Criteria and Plan
OMR	Old and Middle River
ORV	junction of Old River and the San Joaquin River
PCB	polychlorinated biphenyl
PFC	perfluorinated chemicals
PFMC	Pacific Fishery Management Council
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM_{10}	PM equal to or less than 10 micrometers in diameter
$PM_{2.5}$	PM equal to or less than 2.5 micrometers in diameter

POD	Pelagic Organism Decline
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
ppt	parts per thousand
PRC	Public Resources Code
Proposed Project	Long-Term Operation of the Central Valley Project and State Water Project
PSL	pre-screen loss
psu	practical salinity units
PTM	Particle Tracking Model
PWA	Public Water Agencies
QWEST	Net flow on the San-Joaquin River at Jersey Point
RBDD	Red Bluff Diversion Dam
RCRA	Resource Conservation and Recovery Act
Reclamation	U.S. Bureau of Reclamation
RHJV	Riparian Habitat Joint Venture
RM	River Mile
ROC on LTO	Reinitiation of Consultation on the Coordinated Long-Term Operation
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
RPS	Renewables Portfolio Standard
RRDS	Roaring River Distribution System
RWQCB	Regional Water Quality Control Board
Sacramento County RSD	Sacramento County Regional Sanitation District
SAIL	Salmon and Sturgeon Assessment of Indicators by Life Stage
SB	Senate Bill
SBA	South Bay Aqueduct
SCHISM	Semi-implicit Cross-scale Hydroscience Integrated System Model
SCWA	Solano County Water Agency
SDM	Structured Decision Model
SF_6	sulfur hexafluoride
SFCWA	State and Federal Contractor's Water Agency
SFE	San Francisco Estuary
SFPF	Skinner Fish Protective Facility
SGM	Sustainable Groundwater Management
SGMA	Sustainable Groundwater Management Act
SJRRP	San Joaquin River Restoration Program
SLCP	short-lived climate pollutant
SLDMWA	San Luis and Delta–Mendota Water Authority
SLS	Smelt Larva Survey
SMARA	Surface Mining and Reclamation Act

SMGB	State Mining and Geology Board
SMPA	Suisun Marsh Preservation Agreement
SMSCG	Suisun Marsh Salinity Control Gates
SNP	single-nucleotide polymorphism
SO_2	sulfur dioxide
SR	State Route
SRA	State Recreation Area
SJRGA	San Joaquin River Group Authority
SRWTP	Sacramento Regional Wastewater Treatment Plant
SSC	species of special concern
SSQP	Sacramento Stormwater Quality Partnership
SST	Salmonid Scoping Team
STARS	Survival, Travel Time, and Routing Simulation
State	State of California
SVP	Society of Vertebrate Paleontology
SWC	State Water Contractors
SWG	Smelt Working Group
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TBP	DWR South Delta Temporary Barrier Project
TCCA	Tehama-Colusa Canal Authority
TCD	temperature control device
TCR	tribal cultural resource(s)
TFCF	Tracy Fish Collection Facility
TID	Turlock Irrigation District
TL	total length
TMDL	Total Maximum Daily Load
TOC	total organic carbon
Trinity River ROD	Trinity River Mainstem Fishery Restoration Record of Decision
UC Davis	University of California, Davis
UCMP	University of California, Berkeley Museum of Paleontology
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	ultraviolet
UWFE	unstored water for export
WNV	West Nile Virus
WOMT	Water Operations Management Team

WQCP	Water Quality Control Plan
WSPP	Western Systems Power Pool
YBHR	Yolo Bypass Habitat Restoration
YBSHRFPP	Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project
YOY	young-of-the-year

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Part I
Introduction

PART I INTRODUCTION

This document is the final environmental impact report (FEIR) for the Long-Term Operations of the State Water Project (SWP) (project).

On November 22, 2019, the California Department of Water Resources (DWR) released the draft environmental impact report (DEIR) for public review. The DEIR contained an environmental analysis of potentially significant effects of implementing the project. This FEIR consists of a revised version of the DEIR, written responses to all timely DEIR comments raising significant environmental issues, and additional technical information.

The DEIR included a Proposed Project as well as the following alternatives: No Project Alternative, Alternative 2a (Proposed Project with Additional Spring Delta Outflow), Alternative 2b (Proposed Project with Dedicated Water for Delta Outflow from SWP), Alternative 3 (Installation of Physical and Non-Physical Barriers), and Alternative 4 (Alternative Summer-Fall Action). DWR is seeking an incidental take permit (ITP) under the California Endangered Species Act (CESA) from the California Department of Fish and Wildlife (CDFW) to continue with the long-term operations, and CDFW will have oversight in how these operations will occur going forward. DWR staff has continued to work closely with CDFW staff since the issuance of the DEIR on long-term operations of the SWP that would allow for the issuance of an ITP meeting the standards of CESA.

Not long after issuing the DEIR, DWR submitted its ITP application to CDFW. The application reflected preliminary input from CDFW staff to the effect that CDFW likely would not issue an ITP for the Proposed Project without changes. The application was modified from the Proposed Project to make the proposal more protective under CESA consistent with CDFW's consultation. Dialogue between the two agencies continued during the CEQA public review period and until the time that this FEIR was ready for publication. With input from CDFW, DWR has built on Alternative 2b. DWR took this approach because Alternative 2b, with its dedicated Delta outflow, more closely resembled an operational proposal that would be acceptable to CDFW compared to the Proposed Project described in the DEIR. The FEIR refers to the updated version of Alternative 2b as "Refined Alternative 2b."

Refined Alternative 2b includes elements of the operations described in the Proposed Project, but also consists of a dedicated "block" of water for summer or fall Delta outflow and additional spring maintenance flows, which through the adaptive management plan (AMP) could be shifted for use in Summer-Fall period of the current year or Spring-Fall of the subsequent year. In addition to the Summer-Fall Delta Smelt Habitat Action in the Proposed Project, Refined Alternative 2b includes an additional salinity target in the Suisun Marsh to guide Suisum Marsh Salinity Control Gate operations in Wet, Above Normal, and Below Normal years. The additional spring through fall water dedicated for Delta outflow would be used to test hypotheses through scientific studies and narrow the uncertainty surrounding the effect of Delta outflow on spring Longfin Smelt abundance and Summer-Fall Delta Smelt habitat. The details of the scientific studies will be developed by DWR in coordination with CDFW and State Water Contractors (SWC) as described in the AMP. Refined Alternative 2b also includes the Georgiana Slough Behavioral Modification Barrier (GSBMB) that was described in the DEIR as a component of Alternative 3 (referred to Georgiana Slough Non-Physical Barrier in Alternative 3). The GSBMB is included to further minimize potential for salmonid entrainment by preventing them from entering the South Delta.

The complete analysis for Refined Alternative 2b, as provided in this FEIR, has been supplemented with additional modeling and analysis, which support the DEIR impact conclusions for the Alternative (see Chapter 1.4, below). No new impacts were identified based on the additional modeling and analysis. Although a number of parties who commented on the DEIR argued that DWR violated CEQA by filing an ITP application that differed from the Proposed Project, the fact that DWR, as the ITP applicant, has ultimately decided to pursue an alternative that appears to be more acceptable to CDFW, as the ITP decisionmaker, is fully consistent with CEQA. The same is true of DWR's efforts to continue to work with CDFW to refine the proposal for long-term operations of the SWP to meet CESA's requirements. As the courts have repeatedly emphasized, "[t]he CEQA reporting process is not designed to freeze the ultimate proposal in the precise mold of the initial project; indeed, new and unforeseen insights may emerge during investigation, evoking revision of the original proposal."[1] The same is true of the CESA ITP permitting process.

I.1 BACKGROUND

DWR is proposing to implement the ongoing, long-term operations of the SWP to promote protection and conservation of designated species in compliance with CESA, as authorized by the CDFW through the issuance of an ITP in accordance with Section 2081 of CESA (California Fish and Game Code Section 2081).

The SWP includes water storage, power production, and water conveyance facilities, delivering an annual average of 2.9 million acre-feet of water to contracted water users. The principal facilities of the SWP consist of Oroville Reservoir and related facilities, facilities in the Sacramento–San Joaquin Delta (Delta), the Suisun Marsh Salinity Control Gates, the California Aqueduct (including its terminal reservoirs), San Luis Dam and related facilities, and the North and South Bay Aqueducts. DWR holds contracts with 29 public agencies in northern, central, and southern California for the delivery of SWP water supplies.

The SWP operations provide flood control and water supplies for agricultural, municipal, industrial, recreational, and environmental purposes. The SWP operates pursuant to the existing water rights permits issued by the State Water Resources Control Board (SWRCB), which allow appropriation of water by storing, releasing, and conveying from storage throughout the year.

DWR and the U.S. Bureau of Reclamation (Reclamation) coordinate the operations of the SWP and federal Central Valley Project (CVP) under the terms of the Coordinated Operation Agreement (COA), as authorized by Public Law 99-546. DWR and Reclamation executed a COA Addendum on December 12, 2018, updating the agreement that reflected changed conditions since its original execution in 1986.

Until Reclamation issued a Record of Decision (ROD) in February 2020, the SWP and the CVP operated in accordance with the 2008 United States Fish and Wildlife Service (USFWS) Biological Opinion and the 2009 National Marine Fisheries Service (NMFS) Biological Opinion issued pursuant to Section 7 of the

[1] *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 736, quoting *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 199.

federal Endangered Species Act (ESA) of 1973. The USFWS and NMFS issued new biological opinions on October 21, 2019 (2019 Biological Opinions), which Reclamation adopted through issuance of the February 2020 ROD.

I.2 INTENDED USES OF THE FEIR

On December 13, 2019, DWR submitted an ITP application to CDFW pursuant to Section 2081 of the California Fish and Game Code. The application addressed species that are listed under the CESA and are subject to incidental take from long-term operation of the SWP (Delta Smelt, Longfin Smelt, Winter-run Chinook Salmon, and Spring-run Chinook Salmon). As a responsible agency, CDFW may rely on this FEIR to support issuing a new ITP for the SWP.

Refined Alternative 2b includes several modifications to the proposed long-term operations of SWP Delta facilities and ongoing programs that would enhance protection of special-status fish species in the Delta. Implementation of Refined Alternative 2b would provide for continued operation of the SWP and would enable delivery of up to the full contracted water amounts while minimizing and fully mitigating the take of listed species consistent with CESA requirements.

I.3 PUBLIC SCOPING AND COMMENTS

I.3.1 OUTREACH

DWR provided public notice of availability of the DEIR as required by Section 15087 of the CEQA Guidelines. Written notice was provided to individuals and organizations who previously have requested such notice, including the 19 parties who submitted comments in response to the notice of preparation. A public notice of availability was placed in seven newspapers with regional circulation throughout the state, announcing the availability of the DEIR and the opportunity to submit comments. The public notice was also distributed to 48 County Clerk offices and 19 State, federal, and local agencies.

A public meeting was held on December 12, 2019 in West Sacramento at the Department of General Services' Ziggurat Building Auditorium to receive input from agencies and the public on the DEIR. Attendees were able to provide written and oral comments during the public meeting.

I.3.2 CIRCULATION

The DEIR was circulated for public review and comment for a period of 45 days, from November 22, 2019 to January 6, 2020. The DEIR and associated Notice of Completion were filed with the California Office of Planning and Research State Clearinghouse on November 22, 2019.

A digital copy of the DEIR was available on the DWR website at https://water.ca.gov/News/Public-Notices. A hard copy of the DEIR was available at DWR's office at 3500 Industrial Boulevard, West Sacramento, California 95691. Digital copies were also available for public review at the following locations:

- Alameda County Library, 2450 Stevenson Boulevard, Fremont CA, 94538
- Beale Memorial Library, 701 Truxtun Avenue, Bakersfield, CA, 93301
- Central Library, 40 East Anapamu Street, Santa Barbara CA, 93101
- Cesar Chavez Central Library, 605 N. El Dorado Street, Stockton CA, 95202
- Colusa County Library, 738 Market Street, Colusa CA, 95932
- Contra Costa Library, Martinez Branch, 740 Court Street, Martinez CA, 94533
- Dr. Martin Luther King, Jr. Library, 150 East San Fernando Street, San Jose CA, 95112
- E.P. Foster Library, 651 East Main Street, Ventura CA, 93001
- East San Jose Carnegie Branch Library, 1102 E Santa Clara Street, San Jose CA, 95116
- El Centro Public Library, Community Center, 375 South 1st Street, El Centro CA, 92243
- Fairfield Civic Center Library, 1150 Kentucky Street, Fairfield, CA, 94533
- Fremont Library, 2400 Stevenson Boulevard, Fremont CA, 94538
- Hanford Branch Library, 401 North Douty Street, Hanford CA, 93230
- Los Angeles Public Library, 630 West 5th Street, Los Angeles CA 90071
- Marin County Library, 3501 Civic Center Drive #427, San Rafael, CA, 94903
- Mary L. Stephans Davis Branch library, 315 E. 14th Street, Davis, CA, 95616
- Merced County Library, Merced Branch, 2100 O Street, Merced CA, 95340
- Modesto Public Library, 1500 I Street, Modesto CA, 95354
- Napa Main Library, 580 Coombs Street, Napa CA 94559
- Norman F. Feldheym Central Library, 555 West 6th Street, San Bernardino CA, 92410
- Oroville Branch Library, 1820 Mitchell Avenue, Oroville CA, 95966
- Pleasant Hill Library, 1750 Oak Park Boulevard, Pleasant Hill CA, 94523
- Quincy Public Library, 445 Jackson Street, Quincy CA, 95971
- Red Bluff Library, 645 Madison Street, Red Bluff CA, 96080
- Redding Library, 1100 Parkview Avenue, Redding CA, 96001
- Riverside Public Library, 3581 Mission Inn Avenue, Riverside CA, 92501
- Sacramento County Library, 828 I Street, Sacramento CA, 95202
- San Diego Public Library, Central Library, 820 E Street, San Diego CA, 92101
- San Francisco Public Library, 100 Larkin Street, San Francisco CA, 94102
- San Luis Obispo Library, 995 Palm Street, San Luis Obispo, CA, 93401
- San Mateo Public Library, 55 West 3rd Avenue, San Mateo CA, 94402
- Santa Clara City, Central Park Library, 2635 Homestead Road, Santa Clara CA, 95051
- Sonoma County Central Library, 211 East Street, Santa Rosa CA, 95404
- Sutter County Library, Main Branch, 750 Forbes Avenue, Yuba City CA, 95991

- Visalia Branch Library, 200 West Oak Avenue, Visalia CA, 93291
- Willows Public Library, 201 North Lassen Street, Willows CA, 95988

Comments received on the DEIR during the public comment period include written and oral comments from organizations, agencies, and the public.

I.4 SUPPLEMENTAL TECHNICAL ANALYSES AND INFORMATION SINCE CIRCULATION OF THE DEIR

DWR has conducted several supplemental technical studies to verify the impact analyses of Refined Alternative 2b presented in the FEIR. Specific studies include the following:

- Climate Change Sensitivity Analysis utilizing CMIP 5
- CalSim II hydrological modeling
- DSM2 Hydro modeling
- DSM2 particle tracking model (PTM) for Delta Smelt and Longfin Smelt
- Nobriga-Rosenfield analysis for Longfin Smelt
- Analysis with X2-Longfin Smelt Abundance Index Relationship
- Salvage-Density analysis for all special-status species, except Delta and Longfin Smelt
- Delta hydrodynamic assessment and junction routing analysis for Chinook Salmon
- Delta Passage Model analysis for Chinook Salmon
- Survival, travel time, and routing analysis for Chinook Salmon
- Draft Adaptative Management Plan
- Framework of Voluntary Agreements to Update and Implement the Bay-Delta Water Quality Control Plan

The methods and results of these studies are included in Part III of this FEIR, as updates to DEIR Appendices C, E, F, and H. Appendix J and K are new to the FEIR.

I.5 NO CHANGES TO THE IMPACT CONCLUSIONS IN THE DEIR AS A RESULT OF SUPPLEMENTAL TECHNICAL STUDIES AND ANALYSIS

The supplemental technical studies and resulting analyses conducted following circulation of the DEIR have confirmed the impacts conclusions in the DEIR for Refined Alternative 2b. None of the impact conclusions in the DEIR were changed as a result of the technical analyses of hydrology, water quality, or biological resources conducted for the FEIR. Therefore, the results of the supplemental technical studies are not considered significant new information requiring recirculation under Section 15088.5 of the CEQA Guidelines.

I.6 FINDINGS AND CONCLUSIONS

As previously noted, the DEIR identified and evaluated four alternatives in addition to the Proposed Project. The analyses presented in the DEIR and the FEIR concludes that the Proposed Project and the

alternatives considered would have either no impact or a less-than-significant impact on the environment. Only the implementation of Alternative 4 could result in a potential significant impact, but it could be mitigated to a less-than-significant level.

Further, DWR is proposing mitigation to meet the legal standard under CESA to minimize and fully mitigate the take of listed species consistent with DWR's application for an ITP. Two of the alternatives evaluated in the DEIR provide freshwater flows in the spring and summer, and one alternative includes physical barriers and other deterrents to keep fish away from the SWP pumps. While the Proposed Project or alternatives could be implemented without generating significant environmental impacts, implementation of the Proposed Project or alternatives would result in multiple environmental benefits that would contribute to the protection of special status aquatic species over and above that achieved by the No Project Alternative.

A comparison of the identified alternatives is presented in Part I.6.1 and a discussion identifying the Environmentally Superior Alternative is presented in Part I.6.2.

I.6.1 COMPARISON OF ALTERNATIVES

As a result of the analyses performed and presented in the DEIR, including the analysis presented in Appendix A "Initial Study of the Long-term Operations of the State Water Project," and the additional analysis presented in this FEIR, the findings and conclusions presented in Table 1.6-1 have been developed.

Table 1.6-1. Findings and Conclusions

Environmental Topic	Proposed Project	No Project Alternative	Alternative 2a- Proposed Project with Additional Spring Delta Outflow	Refined Alternative 2b – Proposed Project with Dedicated Water for Delta Outflow from SWP	Alternative 3 – Installation of Spring Head of Old River Barrier and Non-Physical Barrier at Georgiana Slough	Alternative 4 – Alternative Summer-Fall Action
Hydrology	Appendix A to the DEIR, "Initial Study of the Long-Term Operations of the State Water Project" concluded that while the Proposed Project would modify surface water hydrology, this change would not constitute a significant impact on the environment. The Initial Study did report that while no effect on surface water hydrology would occur, impacts to associated environmental resources, such as water quality and aquatic biological resources, could occur.	Same as Existing Conditions	April-May Delta outflow would be less than the No Project Alternative but greater than the Proposed Project. Alternative 2a would result in reduced south of Delta exports in April-May compared to the Proposed Project, resulting in an increase in April-May OMR flows when compared to the Proposed Project.	April-May Delta outflow would be less than the No Project Alternative but greater than the Proposed Project. Refined Alternative 2b would result in reduced south of Delta exports in April-May compared to the Proposed Project, resulting in an increase in April-May OMR flows. A 100 TAF increase in Delta outflow would initially occur in August of wet and above normal years. Additional Delta outflow would be made available through reduction in south Delta exports. CDFW may define an alternate purpose for additional Delta outflow in summer within the June through September time period of wet and above normal years through the AMP.	The physical and non-physical barriers included in Alternative 3 would not substantially change hydrology compared to the Proposed Project.	Alternative 4 would replace the summer/fall action included in the Proposed Project with all other operations remaining same as those of the Proposed Project. Alternative 4 would add Delta Smelt habitat criteria to the summer/fall action. These water quality criteria include the maintaining position of a 2 ppt isohaline target in wet and above normal, and a 4 ppt target at Belden's Landing from June to August in below normal and dry years. The increased outflow would come from multiple sources including SWP and CVP exports, increased Oroville Reservoir releases, purchased water from other users.
Water Quality	The Proposed Project generally would increase salinity during the late fall and early winter in the years following wet and above-normal water years. Despite the potential for salinity increases, SWP will comply with D-1641 standards. The salinity standards in D-1641 were established specifically to protect water quality, including beneficial uses for fish and wildlife and agricultural and urban uses. The Proposed Project would not result in a violation of any water quality standard or waste discharge requirement, or otherwise substantially degrade water quality. Therefore, changes to water quality are less than significant.	Same as Existing Conditions	Alternative 2a would increase salinity during the late fall and early winter in years following wet and above normal water years. Operations to meet D-1641 requirements would be similar to the Proposed Project and the impacts to surface water quality would remain less than significant.	Refined Alternative 2b would increase salinity during the late fall and early winter in years following wet and above normal water years. Operations to meet D-1641 requirements would be similar to those of the Proposed Project and the impacts to surface water quality would remain less than significant.	Alternative 3 would increase salinity during the late fall and early winter in years following wet and above normal water years. Alternative 3 would have surface water quality similar to that found under existing conditions and Proposed Project, and impacts to surface water quality would remain less than significant.	Alternative 4 operations would reduce salinity in the western Delta compared to the Proposed Project during the summer and fall months. The reduced salinity would result from the proposed X2 requirements and Belden's Landing salinity requirements in the Suisun Marsh. Potential impacts to surface water quality would be potentially significant caused by reduced availability of cold water and reservoir storage needed to meet water quality criteria during years following below normal water years.

Environmental Topic	Proposed Project	No Project Alternative	Alternative 2a- Proposed Project with Additional Spring Delta Outflow	Refined Alternative 2b – Proposed Project with Dedicated Water for Delta Outflow from SWP	Alternative 3 – Installation of Spring Head of Old River Barrier and Non-Physical Barrier at Georgiana Slough	Alternative 4 – Alternative Summer-Fall Action
Biological Resources	The analyses conducted for each life stage of Delta Smelt, Longfin Smelt, Winter-run Chinook Salmon, Fall-run and Late Fall-run Chinook Salmon, and Central Valley Steelhead, Central California Coast Steelhead, Green Sturgeon, White Sturgeon, Pacific Lamprey and River Lamprey, native minnows, including Sacrament Splittail, Striped Bass, American Shad, non-native freshwater Bass, and Killer Whale conclude that implementing the Proposed Project would not cause a substantial adverse impact on designated aquatic species relative to existing conditions. Therefore, the impacts would be Less than Significant.	Same as Existing Conditions. The No Project Alternative would not include the actions included in the Proposed Project that could minimize effects of SWP long term operation on aquatic resources.	Alternative 2a would provide additional benefits to some aquatic biological resources compared to the Proposed Project. However, species such as Delta Smelt, could be adversely impacted by possible changes in food availability. Alternative 2a would not cause a substantial adverse impact on special status aquatic species, relative to existing conditions and are considered Less than Significant.	Refined Alternative 2b would provide additional benefits to some aquatic biological resources compared to the Proposed Project. Alternative 2b provides reduced exports during the spring and increased Delta outflow during the April–May period or June–September (initially focusing on August) periods, which would positively affect species and life stages, or habitat components during those periods. The effects of Refined Alternative 2b would be less than significant for all special status species evaluated.	Lower south Delta exports would result in greater Delta outflow during April/May, but the differences would be only on the order of a few hundred cfs and therefore Delta outflow-related effects would be essentially the same as the Proposed Project. Impacts of Alternative 3 on aquatic resources would be similar to those of the Proposed Project. and would remain less than significant.	Alternative 4 would be expected to have impacts similar to those of the Proposed Project except during the summer-fall period when the operations and hydrology criteria described above would be implemented and would remain less than significant.
Tribal Cultural Resources	Consultation with the Fernandeño Tataviam Band of Mission Indians, the Karuk Tribe, United Auburn Indian Community of the Auburn Rancheria, Wilton Rancheria, and the Yocha Dehe Wintun Nation has been performed and has not resulted in the identification of Tribal Cultural Resources as described under AB 52 and PRC Section 21074. As a result of this consultation process, it is concluded that the Proposed Project would have no impact on Tribal Cultural Resources.	Same as Existing Conditions.	Same as Proposed Project. Alternative 2a would have no impact on Tribal Cultural Resources.	Same as Proposed Project Refined Alternative 2b would have no impact on Tribal Cultural Resources.	Same as Proposed Project Alternative 3 would have no impact on Tribal Cultural Resources.	Same as Proposed Project. Alternative 4 would have no impact on Tribal Cultural Resources.

I.6.2 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Section 15126.6(e) of the State CEQA Guidelines sets forth the circumstances in which CEQA lead agencies must identify the "environmentally superior alternative" prior to making a decision on a project.

> *(2) If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.*

The State CEQA Guidelines assume that, for many projects, the No Project Alternative would typically be environmentally superior to alternatives that involve implementing an activity that causes physical change in some form. The assumption is that the choice of doing nothing will result in fewer environmental impacts than implementing an activity that causes physical change of some kind. As summarized in Table 1.6-1, based on the results of the various technical analyses presented in this FEIR, the No Project Alternative is not the environmentally superior alternative.

As shown in Table 1.6-1, the Proposed Project and other alternatives could be implemented without resulting in significant environmental impacts. The FEIR also describes potential environmental benefits that would result from implementing additional measures or enhancements associated with each alternative that would further contribute to protecting designated aquatic species.

The DEIR concluded that, from a CEQA standpoint, the impacts of the Proposed Project and Alternative 2b are essentially equivalent (all less than significant) and both the Proposed Project and Alternative 2b are considered to be the environmentally superior alternatives. Modifications to Alternative 2b that are included in the Refined Alternative 2b in this FEIR would provide additional environmental benefits for CESA-listed fish species, making Refined Alternative 2b more likely to be permitted under CESA than the Proposed Project. Therefore, Refined Alternative 2b is the environmentally superior and preferred alternative selected by DWR for the long-term operations of the SWP. The following discussion characterizes the measures and benefits associated with Refined Alternative 2b.

The Refined Alternative 2b is considered the environmentally superior alternative because it includes all the elements identified in the Proposed Project to minimize impacts on aquatic species and includes additional actions to benefit CESA-listed fish species in the Delta that would not be implemented by the Proposed Project or Alternatives 2a, 3, or 4.

With implementation of Refined Alternative 2b, seasonal timing of exports differs from the Existing Condition, but the total volume of exports would generally be expected to remain the same. Additionally, Refined Alternative 2b includes a collaborative real-time risk assessment approach to Old Middle River (OMR) management that provides CDFW with greater authority to curtail exports to minimize entrainment-related effects on CESA-listed fish species. Refined Alternative 2b also commits DWR to implementing its proportional share of OMR restrictions when such restrictions are recommended by the Water Operations Management Team (WOMT) or required by CDFW.

Refined Alternative 2b also includes additional adaptive management actions not included in the Proposed Project or Alternatives 2a, 3, and 4. These adaptive management actions include convening an Adaptive Management Team (AMT) that will develop and implement an AMP.

The AMT will oversee efforts to monitor and evaluate SWP operations and related activities, use structured decision-making to assess the relative costs and benefits of those operations and activities, and will identify changes to those operations and activities.

The major environmental benefits associated with implementing the AMP include the shifting of spring maintenance flows to develop up to 150 Thousand Acre-Feet (TAF) of water for use in the Summer-Fall period of the current year or spring-fall of the following year (except if the following year is a "critical" water year) and providing an adaptively-managed 100 TAF block of water to supplement Delta outflow any time between June and October of "wet" and "above normal" water years.

I.7 FINAL EIR ORGANIZATION

The FEIR is organized into the following parts:

- Part I, Introduction, summarizes the refinements to Alternative 2b following circulation of the DEIR in response to input from CDFW, and provides an overview of additional technical studies and analyses conducted after the DEIR was circulated to the public. The Introduction also summarizes the findings and conclusions of the FEIR.
- Part II, Comments and Responses, provides responses to verbal and written comments received on the DEIR during the public review period. This chapter is organized into sections, as follows:
  - Master Comment Responses – addresses common themes or concerns repeated in the comment letters received on the DEIR through a series of master responses.
  - Federal Agency Comments and Responses
  - State Agency Comments and Responses
  - Regional and Local Agency Comments and Responses
  - Tribal Comments and Responses
  - Organizational Comments and Responses
  - Individual Comments and Responses
- Part III, Revisions to the DEIR, presents the DEIR with revisions to text made in response to comments or as a result of additional technical information that is now available.
  - Updated Appendices include:
    - Appendix C: Hydrology Model Results
    - Appendix E: Biological Modeling Methods and Selected Results
    - Appendix F: Climate Change Sensitivity Analysis
    - Appendix H: CalSim II and DSM2 Model Descriptions and Assumptions
  - New Appendices include:
    - Appendix J: Adaptive Management Plan
    - Appendix K: Framework of Voluntary Agreements
- Part IV, FEIR References
- Attachment 1, NRDC Form Letters
- Attachment 2, Sierra Club Form Letters
- Attachment 3, Comment Letter Attachments