

Mendota Pool Bypass and Reach 2B Improvements Project

**Final
Environmental Impact Statement/Report**

Part IV – Revisions to the Draft EIS/R (electronic only)



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The San Joaquin River Restoration Program is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from Interim and Restoration flows.

Mission Statements



The mission of the Bureau of Reclamation is to manage, develop and protect water and related resources in an environmentally and economically sound manner in the interest of the American Public.



The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

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List of Abbreviations and Acronyms

°C	degree Centigrade
°F	degree Fahrenheit
µg/L	microgram per liter
µg/m ³	micrograms per cubic meter
µS/cm	microsiemens per centimeter
4,4'-DDD	dichlorodiphenyldichloroethane
4,4'-DDE	dichlorodiphenyldichloroethylene
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
Act	San Joaquin River Restoration Settlement Act
ADRP	Archaeological Data Recovery Program
ADT	average daily traffic
AIA	Air Impact Assessment
alpha-HCH	alpha-hexachlorocyclohexane
APE	Area of Potential Effect
ARB	California Air Resources Board
B.P.	Before Present
BACT	Best Available Control Technology
Basin Plan	Water Quality Control Plan for the Sacramento and San Joaquin River Basins
BMP	Best Management Practice
CAA	Federal Clean Air Act
CAAA	Federal Clean Air Act Amendments of 1990
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
Cal/EPA	California Environmental Protection Agency
Cal/OSHA	California Occupational and Health Administration
CAL-IPC	California Invasive Plant Council
CalRecycle	California Department of Resources, Recycling, and Recovery
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CCID	Central California Irrigation District
CDF	California Department of Finance
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act

List of Abbreviations and Acronyms

CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHP	California Highway Patrol
CNDDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	Carbon monoxide
CO ₂ e	Carbon dioxide equivalent
Corps	U.S. Army Corps of Engineers
Court	U.S. Eastern District Court of California
<u>CPT</u>	<u>cone penetrometer test</u>
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
CT	Census Tract
CTR	California Toxics Rule
CVFED	Central Valley Floodplain Evaluation and Delineation
CVFPB	Central Valley Flood Protection Board
<u>CVFPP</u>	<u>Central Valley Flood Protection Plan</u>
CVHM	Central Valley Hydrologic Model
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DDT	dichlorodiphenyltrichloroethane
Delta	Sacramento-San Joaquin Delta
DFW	California Department of Fish and Wildlife
DHS	California Department of Health Services
DMC	Delta-Mendota Canal
DOC	California Department of Conservation
DOE	California Department of Water Resources, Division of Engineering
DOGGR	California Department of Conservation Division of Oil, Gas, and Geothermal Resources
DOT	U.S. Department of Transportation
DPR	California Department of Pesticide Regulation
DSOD	California Department of Water Resources, Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources

San Joaquin River Restoration Program

EA	Environmental Assessment
EC	electrical conductivity
EDD	California Employment Development Department
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EIS/R	Environmental Impact Statement/Environmental Impact Report
EMFAC	Emission Factors Modeling Software
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
ESU	Evolutionarily Significant Unit
Exchange Contractors	San Joaquin River Exchange Contractors
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
Flood Control Project	Lower San Joaquin River Flood Control Project
Flood Operation Manual	Flood Control Project's Operation and Maintenance Manual for Levee, Irrigation and Drainage Structures, Channels and Miscellaneous Facilities
FMMP	California Farmland Mapping and Monitoring Program
FONSI	Finding of No Significant Impact
fps	feet per second
FR	Federal Register
Fresno COG	Fresno County of Government
FTA	Federal Transit Administration
FWA	Friant Water Authority
FWCA	Fish and Wildlife Coordination Act
FY	Fiscal Year
g	acceleration due to Earth's gravity
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GCM	Global Climate Model
GHG	greenhouse gas
GIS	Geographic Information System
<u>GPS</u>	<u>global positioning system</u>
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HEC-RAS	Hydrologic Engineering Center River Analysis System
HSG	Hydrologic Soils Group
IMPLAN	Impact Analysis for Planning
I-O	input-output

IEPR	Integrated Energy Policy Report
in/year	inches per year
IPCC	Intergovernmental Panel on Climate Change
IS	Initial Study
ISMP	Invasive Species Management Plan
ISR	Indirect Source Review
Ldn	Day-Night Noise Level
Leq	Equivalent Noise Level
LESA	Land Evaluation and Site Assessment
Levee District	Lower San Joaquin Levee District
<u>LiDAR</u>	<u>Light Detection and Ranging</u>
Lmax	Maximum Noise Level
LN	The sound level exceeded N percent of the time
LOS	Levels of Service
LSJLD	Lower San Joaquin Levee District
MBTA	Migratory Bird Treaty Act
mg/L	milligram per liter
mm/year	millimeters per year
MMRP	Mitigation Monitoring and Reporting Program
MND	Mitigated Negative Declaration
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
N2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAL	Numeric Action Limit
NEPA	National Environmental Policy Act
NGO	Non-governmental organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO	Nitric oxide
NO2	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOE	Notice of Exemption
NOI	Notice of Intent
NOP	Notice of Preparation
NOx	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NRHP	National Register of Historic Places

NTU	nephelometric turbidity unit
<u>NULE</u>	<u>Non-Urban Levee Evaluation</u>
NWP	Nationwide Permit
OEHHA	California Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OHV	off-highway vehicle
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PCB	polychlorinated biphenyl
PEIS/R	Program Environmental Impact Statement/ Environmental Impact Report
PG&E	Pacific Gas and Electric Company
PIT	passive integrated transponder
PM10	particulate matter with an aerodynamic resistance diameter of 10 micrometers or less
PM2.5	Fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less
Pool	Mendota Pool
ppb	parts per billion
ppm	parts per million
PRD	Permit Registration Documents
Project	Mendota Pool Bypass and Reach 2B Improvements Project
RA	Restoration Administrator
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
Restoration Area	the San Joaquin River Restoration area from Friant Dam to the Merced River confluence
RHA	Rivers and Harbors Act
RHJV	Riparian Habitat Joint Venture
RM	river mile
RoadMod	Roadway Construction Emissions Model
ROD	Record of Decision
ROG	Reactive Organic Gases
RTP	Regional Transportation Plan
RWA	Recovered Water Account
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCADA	supervisory control and data acquisition
Secretary	Secretary of the U.S. Department of the Interior
Settlement	Stipulation of Settlement
SFEI	San Francisco Estuary Institute

SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJRRP	San Joaquin River Restoration Program
<u>SJRRPGW</u>	<u>San Joaquin River Restoration Program Groundwater Model</u>
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SJVDP	San Joaquin Valley Drainage Program
SMARA	California Surface Mining and Reclamation Act
SO ₂	Sulfur dioxide
SR	State Route
SRH-1DV	Sedimentation and River Hydraulics One Dimensional Vegetation Model
State	State of California
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T-BACT	Best Available Control Technology for toxic air contaminants
TAC	Technical Advisory Committee
TAF	thousand acre-feet
TDS	Total Dissolved Solids
Tg	teragram
TM	Technical Memorandum
TMDL	Total Maximum Daily Load
UCMP	University of California Museum of Paleontology
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels
<u>VERA</u>	<u>Voluntary Emission Reduction Agreement</u>
VMC	Visual Modification Class
VP	Viewing Position
WHR	California Wildlife Habitat Relationship System
WNV	West Nile Virus

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Final

Mendota Pool Bypass and Reach 2B Improvements Project Environmental Impact Statement/ Environmental Impact Report



SCH # 2009072044

July 2016

The San Joaquin River Restoration Program is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from Interim and Restoration flows.

Mission Statements



The mission of the Bureau of Reclamation is to manage, develop and protect water and related resources in an environmentally and economically sound manner in the interest of the American Public.



The California State Lands Commission ~~serves~~ provides the people of California ~~by providing~~ with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, ~~protection,~~ preservation, and restoration; the promotion of public access.

Executive Summary



Introduction and Background



Mendota Pool

The Mendota Pool Bypass and Reach 2B Improvements Project (Project) includes the construction, operation, and maintenance of the Mendota Pool Bypass and improvements in the San Joaquin River channel in Reach 2B (Figure S-1). The Project consists of a floodplain width that conveys at least 4,500 cubic feet per second (cfs), a method to bypass Restoration Flows around Mendota Pool, and a method to deliver water to Mendota Pool.

The Project footprint and vicinity (Figure S-2) extend from approximately 0.3 mile above the Chowchilla Bifurcation Structure to approximately 1.0 mile below the Mendota Dam. The Project footprint comprises the area that could be directly affected by the Project. The Project study area or “Project area” includes areas directly and indirectly affected by the Project. The Project area is in Fresno and Madera counties, near the town of Mendota, California.

The Mendota Pool Bypass and Reach 2B improvements, defined in the Stipulation of Settlement in *Natural Resources Defense Council, et al., v. Kirk Rodgers, et al.* (Settlement), are (Settlement Paragraph 11[a]):

- (1) *Creation of a bypass channel around Mendota Pool to ensure conveyance of at least 4,500 cfs from Reach 2B downstream to Reach 3. This improvement requires construction of a structure capable of directing flow down the bypass and allowing the Secretary [of the Interior] to make deliveries of San Joaquin River water into Mendota Pool when necessary;*
- (2) *Modifications in channel capacity (incorporating new floodplain and related riparian habitat) to ensure conveyance of at least 4,500 cfs in Reach 2B between the Chowchilla Bifurcation Structure and the new Mendota Pool bypass channel.*

Because the functions of these channels may be inter-related, the design, environmental compliance, and construction of the two are being addressed as one project. The Project would be implemented consistent with the Settlement and the San Joaquin River Restoration Settlement Act (Act), with implementation dates clarified by the Draft Framework for Implementation (San Joaquin River Restoration Program [SJRRP] 2015).



Mendota Dam

Figure S-1. Overview of the SJRRP Restoration Area and the Project Vicinity

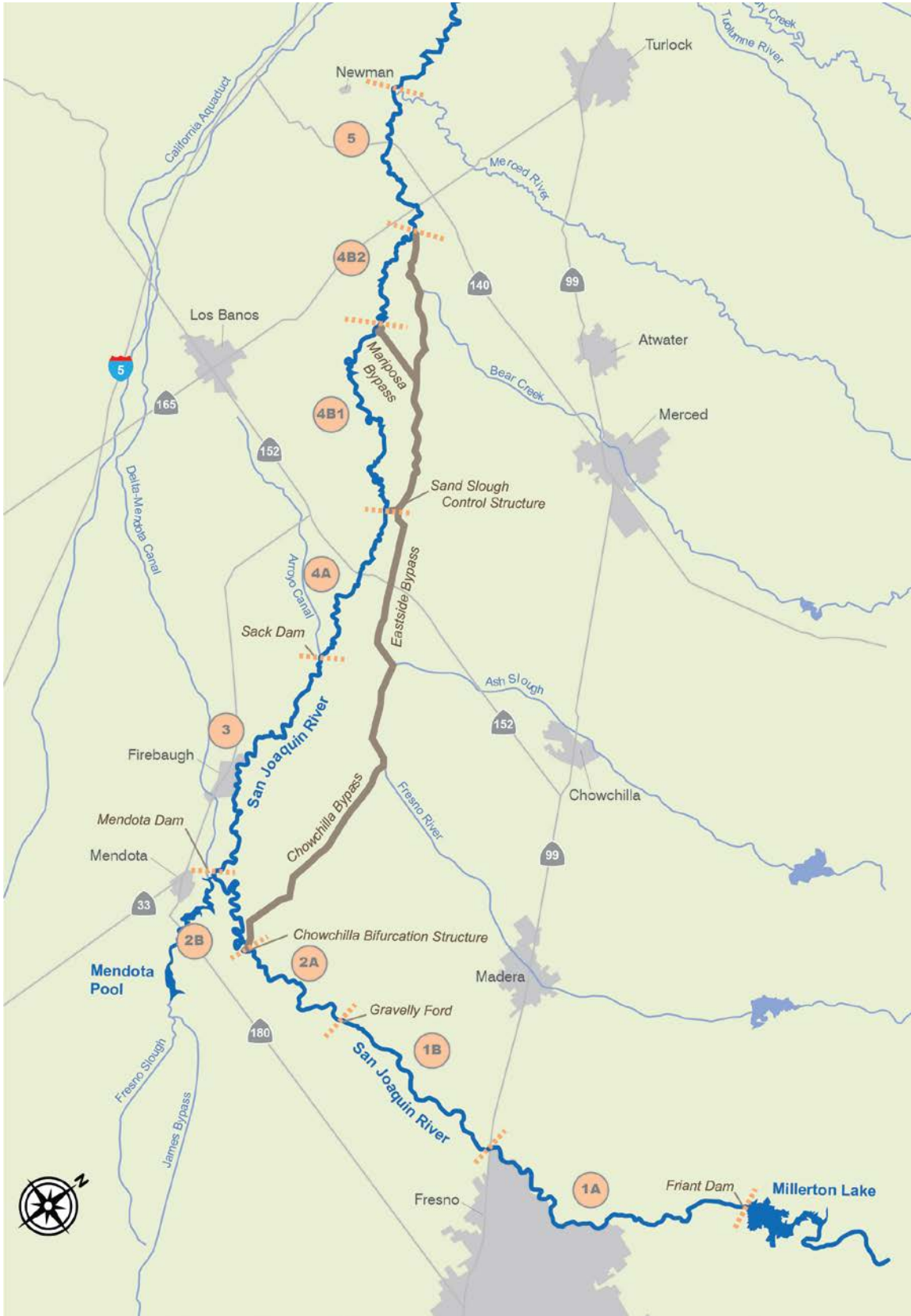
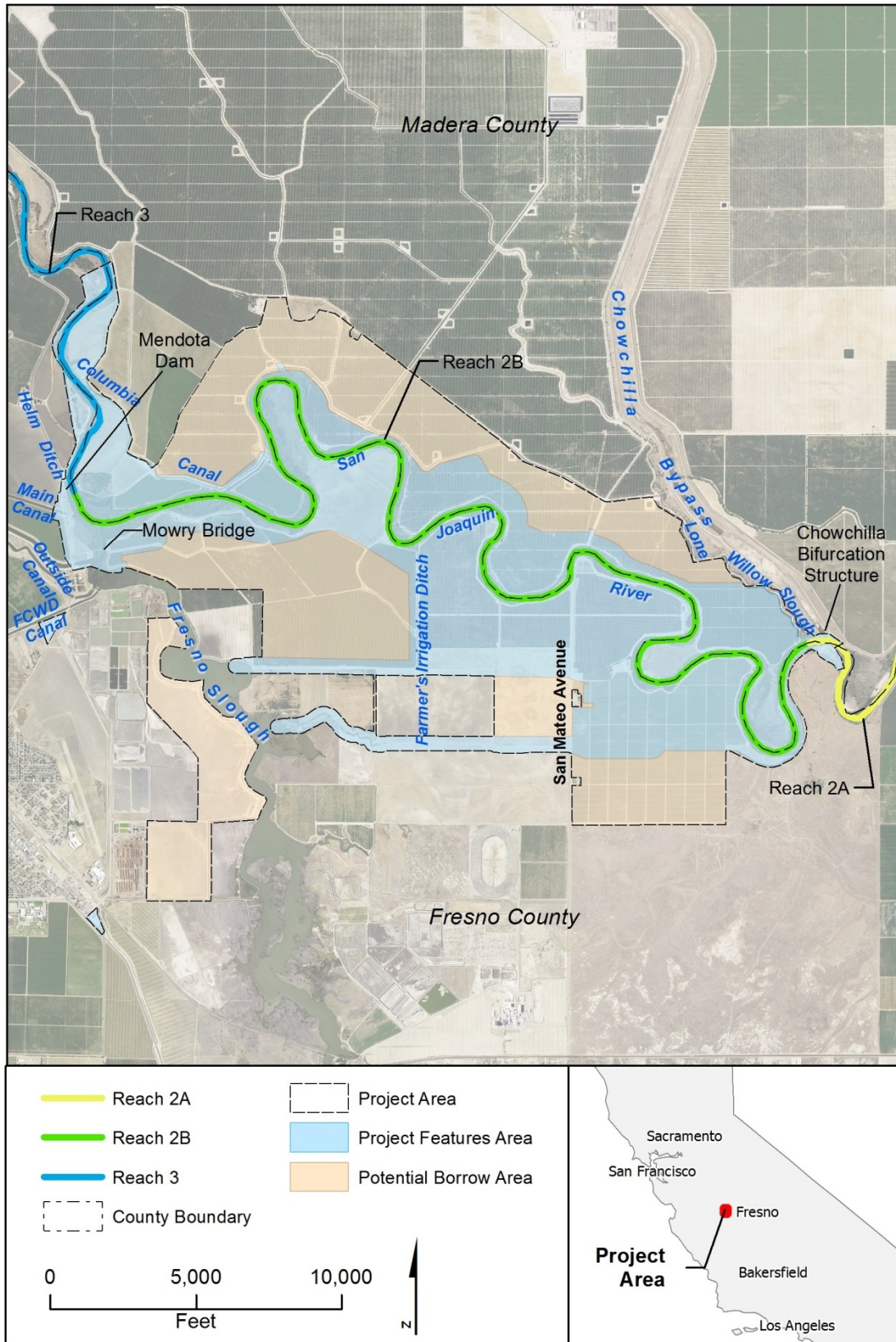


Figure S-2. Project Footprint and Vicinity



The Mendota Pool Bypass would include conveyance of at least 4,500 cfs around Mendota Pool (or the Pool) from Reach 2B to Reach 3 and a fish barrier, if appropriate, to direct upmigrating adult salmon into the bypass. The bypass could be accomplished by constructing a new channel around Mendota Pool or by limiting Mendota Pool to areas outside of the San Joaquin River. This action would include the ability to divert 2,500 cfs to the Pool if water deliveries are required for the San Joaquin River Exchange Contractors (Exchange Contractors) and may consist of a bifurcation structure in Reach 2B. The bifurcation structure would include a fish passage facility to enable up-migrating salmon to pass the structure and a fish screen, if appropriate, to direct out-migrating fish into the bypass channel and minimize or avoid fish entrainment to the Pool.

Improvements to Reach 2B would include modifications to the San Joaquin River channel from the Chowchilla Bifurcation Structure to the new Mendota Pool Bypass to provide a capacity of at least 4,500 cfs with integrated floodplain habitat. The options under consideration include potential levee setbacks along Reach 2B to increase the channel and floodplain capacity and provide for floodplain habitat. Floodplain habitat is included along the Reach 2B portion of the Project as required by the Settlement; floodplain habitat is being considered along the Mendota Pool Bypass channel because Central Valley floodplains have been shown to be of value to rearing juvenile salmon as they migrate downstream. In addition, the SJRRP Fisheries Management Plan (SJRRP 2010a) and Minimum Floodplain Habitat Area for Spring and Fall-Run Chinook Salmon report (SJRRP 2012) describe that sufficient floodplain habitat is an important feature for meeting salmon population targets.

This Executive Summary provides an overview of the Environmental Impact Statement/Environmental Impact Report (EIS/R) prepared pursuant to the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). This EIS/R evaluates alternative ways to implement Paragraphs 11(a)(1) and 11(a)(2) of the Settlement, consistent with the Act in Public Law 111-11. U.S. Department of the Interior, Bureau of Reclamation (Reclamation) is the lead NEPA agency and California State Lands Commission (CSLC) is the lead CEQA agency in preparing this EIS/R.



Headworks of the Main Canal



Chowchilla Bifurcation Structure

Stipulation of Settlement

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit, known as *NRDC, et al., v. Kirk Rodgers, et al.*, challenging the renewal of long-term water service contracts between the United States and Central Valley Project (CVP) Friant Division contractors. On September 13, 2006, after more than 18 years of litigation, the Settling Parties, including NRDC, Friant Water Authority (FWA), and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of a Settlement subsequently approved by the U.S. Eastern District Court of California on October 23, 2006. The Act, included in Public Law 111-11 and signed into law on March 30, 2009, authorizes and directs the Secretary of the Interior (Secretary) to implement the Settlement. The Settlement establishes two primary goals:

- **Restoration Goal** – To restore and maintain fish populations in “good condition” in the main stem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.
- **Water Management Goal** – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim and Restoration flows provided for in the Settlement.



Chinook salmon

To achieve the Restoration Goal, the Settlement calls for releases of water from Friant Dam to the confluence of the Merced River (referred to as Interim and Restoration flows), a combination of channel and structural modifications along the San Joaquin River below Friant Dam, and reintroduction of Chinook salmon. Restoration Flows are specific volumes of water to be released from Friant Dam during different water year types, according to Exhibit B of the Settlement. Interim Flows are experimental flows that began in 2009 and ended December 2013 with the purpose of collecting relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, recapture, and reuse. Restoration Flows began January 1, 2014.

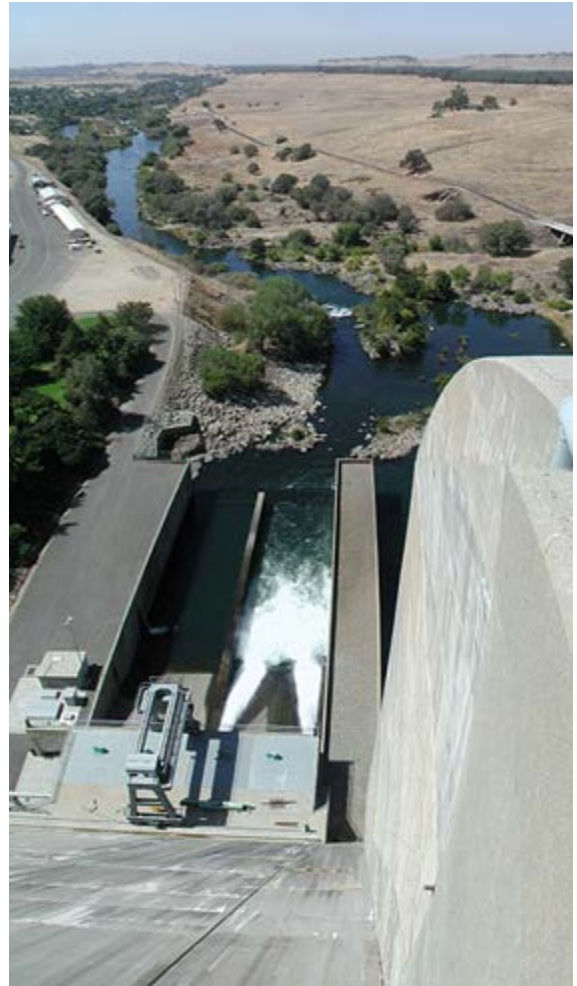


Orange groves within the Friant Division of the Central Valley Project



San Joaquin River Restoration Program

The SJRRP comprises several Federal and State of California (State) agencies responsible for implementing the Settlement. Implementing Agencies include Reclamation, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Water Resources (DWR), and California Department of Fish and Wildlife (DFW). In addition, the Settlement stipulates that a Technical Advisory Committee be established, comprising six members appointed by NRDC and FWA. The Settlement also calls for a Restoration Administrator (RA) to provide specific recommendations to the Secretary in coordination with the Technical Advisory Committee. The RA is responsible for consulting with the Secretary on implementing actions under Paragraph 11 of the Settlement, and for identifying and recommending additional actions under Paragraph 12 of the Settlement. In addition, the RA is responsible for consulting with the Secretary on the reintroduction of Chinook salmon under Paragraph 14 of the Settlement and flow releases under Paragraphs 13 and 15.



Releases from Friant Dam

Purpose and Uses of this Project EIS/R

The purpose of this EIS/R is to analyze the project-specific direct, indirect, and short term/long term impacts of implementing the Project as directed by the Act, consistent with NEPA/CEQA requirements. This EIS/R serves as an informational document for decision makers, public agencies, non-government organizations, and the general public regarding the potential direct and indirect environmental consequences of implementing any of the alternatives. This EIS/R supports the needed permits, petitions, and similar compliance, coordination, and consultation efforts for the Project actions.

As previously described, Reclamation is the lead NEPA agency and CSLC is the lead CEQA agency in preparing this EIS/R. The actions identified in this EIS/R include actions to be undertaken by Reclamation, as approved by CSLC. No sooner than 30 days after the final EIS/R is published, Reclamation will prepare a Record of Decision. Similarly, CSLC will take actions on whether to certify the EIR, approve the Project, and file a Notice of Determination.

The Settlement identifies the Secretary as the lead Federal entity responsible for implementation of the terms and conditions of the Settlement and USFWS as the lead Federal agency responsible for reintroduction of spring-run and fall-run Chinook salmon. The Secretary has designated Reclamation to act as the lead Federal entity responsible for implementation of the Settlement. The Settlement also identifies the Secretary of the U.S. Department of Commerce, through NMFS, as a necessary participant to allow for permitting the reintroduction of spring-run Chinook salmon. The Settlement also anticipated involvement of the California Natural Resources Agency through DWR and DFW. Therefore, the Settlement Implementing Agencies are Reclamation, USFWS, NMFS, DWR, and DFW.

Reclamation and CSLC have coordinated with the Settling Parties and Implementing Agencies in preparation of this EIS/R. In addition, several agencies accepted the invitation to participate as cooperating agencies under NEPA, including U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), NMFS, and Central California Irrigation District. The cooperating agencies have provided input that ~~is being~~ **has been** considered in preparation of this EIS/R.



San Joaquin River and Chowchilla Bypass

Scoping and Public Involvement Process

The lead agencies conducted public and stakeholder outreach activities to engage and inform all interested parties of Project activities. Engaging those interested parties helped to inform the process for scoping the Project alternatives and development of this EIS/R. Reclamation initiated the NEPA process by issuing a Notice of Intent on July 13, 2009, and DWR initiated the CEQA process by issuing a Notice of Preparation on the same day, to prepare an EIS/R and hold public scoping meetings. (Although initial CEQA actions were conducted by DWR, subsequent actions during the EIS/R process have been conducted by the CSLC as the State lead agency.)

The EIS/R scoping comment period began the date the Notice of Intent was issued and ended on August 14, 2009. The comments received were summarized in a Public Scoping Report released February 2010 (SJRRP 2010b). The NEPA scoping process also serves as the scoping process for compliance with other Federal laws such as the National Historic Preservation Act, Section 106.

Public involvement and outreach activities have enabled the Implementing Agencies to involve stakeholders and incorporate public and stakeholder input into the development of major Project documents, including this EIS/R. These activities seek to create an open and transparent process through which the general public, stakeholders, affected Third Parties, and other interested parties can track and participate in SJRRP activities, including the formulation of alternatives for this EIS/R. Ongoing public outreach activities conducted in support of the Project include the following:

- Hosting Project-specific landowner meetings as well as participating in SJRRP Technical Feedback Meetings with subject-matter experts, Settling Parties, affected stakeholders, and the general public to obtain information and viewpoints from individual attendees; provide updates on the status of Project work products; keep the Technical Feedback Group up-to-date with the current status of the Project; gather feedback on Project documents; and discuss potential opportunities and constraints that may arise.
- Making available technical memoranda and other milestone Project documents to the general public, stakeholders, affected Third Parties, and other interested parties on the SJRRP website.



Ornamental Palms in the Project Area

Purpose and Need for Action and Project Objectives

The purpose and objective of the Project are to implement portions of the Settlement consistent with the Act. The Act authorizes and directs the Secretary to implement the Settlement. Specifically, this Project is intended to implement Paragraphs 11(a)(1) and 11(a)(2) of the Settlement, which are authorized in Section 10004(a)(1) of the Act.

Paragraph 11(a)(1)

Creation of a bypass channel around Mendota Pool to ensure conveyance of at least 4,500 cfs from Reach 2B downstream to Reach 3. This improvement requires construction of a structure capable of directing flow down the bypass and allowing the Secretary to make deliveries of San Joaquin River water into Mendota Pool when necessary;

Paragraph 11(a)(2)

Modifications in channel capacity (incorporating new floodplain and related riparian habitat) to ensure conveyance of at least 4,500 cfs in Reach 2B between the Chowchilla Bifurcation Structure and the new Mendota Pool bypass Channel;

The Settlement specifies the need, which requires modifications to Reach 2B and construction of a bypass around Mendota Pool in support of achieving the Restoration Goal (Settlement Paragraph 2):

... a goal of this Settlement is to restore and maintain fish populations in "good condition" in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally-reproducing and self-sustaining populations of salmon and other fish (the "Restoration Goal").

The purpose of providing increased channel capacity and floodplain and riparian habitat in Reach 2B responds to the need to restore and maintain fish populations in "good condition" by providing fish passage and rearing habitat which benefit salmon and other native fish. Without the Project in Reach 2B, restoration activities would be unlikely to achieve the Settlement goals.



Reach 2B Channel prior to Interim Flows



Project Study Area

The Project study area or “Project area” includes areas that may be affected directly or indirectly by the Project alternatives. The Project footprint (township 13S, range 15E), shown in Figure S-1, has two major components: Reach 2B and the Mendota Pool Bypass. Reach 2B generally includes the area from the San Joaquin River Control Structure near the Chowchilla Bypass downstream to Mendota Dam. Potential Project improvements in Reach 2B, which vary by alternative, extend from the Chowchilla Bifurcation Structure on the upstream end to the head of the potential Mendota Pool Bypass channel or to Mendota Dam on the downstream end. However, Reach 2B improvements may also include areas just upstream of the Chowchilla Bifurcation Structure and may continue downstream of the head of the Mendota Pool Bypass or Mendota Dam, including the Pool area, as necessary to meet Project goals and objectives. The lateral extent of potential Project Reach 2B improvements, which varies by alternative, includes lands to the north and south of the San Joaquin River in Reach 2B.



San Joaquin River near San Mateo Road

PROJECT STUDY AREA

The Mendota Pool Bypass element of the Project alternatives generally includes the area from the downstream end of the Reach 2B improvements to a tie-in location in Reach 3. Improvements for the Mendota Pool Bypass, which vary by alternative, extend from the area south of Mowry Bridge over Fresno Slough to the area north of Mendota Dam where the bypass ties into Reach 3. The Mendota Pool Bypass element of the Project alternatives also includes areas adjacent to and on the west side of Mendota Pool and Fresno Slough and areas to the south of the potential Project Reach 2B improvements. Areas indirectly affected by this Project include portions of Reach 3 downstream and Reach 2A upstream that are outside the direct Project footprint.

The Project area reflects current estimates of areas that may be affected by the Project alternatives. In this EIS/R, the area where direct and indirect effects may occur differs according to resource area; therefore, the geographic range and environmental conditions described herein vary by resource.

Alternatives Evaluated in this EIS/R

This EIS/R presents a No-Action/No-Project Alternative (hereafter called the No-Action Alternative) and four Action Alternatives to implement the Project:

- No-Action Alternative
- Alternative A (Compact Bypass with Narrow Floodplain and South Canal)
- Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the Preferred Alternative
- Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)
- Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)

Each Action Alternative includes the actions called for in the Settlement for the Mendota Pool Bypass and Reach 2B. Action Alternatives would be designed to provide:

- Conveyance of at least 4,500 cfs in Reach 2B and ~~through the~~ around Mendota Pool
- Fish passage around Mendota Pool ~~Bypass~~
- Diversion ~~and screening, if appropriate,~~ of up to 2,500 cfs from Reach 2B into Mendota Pool

Of the four Action Alternatives, there are two methods of bypassing Restoration Flows around Mendota Pool, two floodplain widths, and four ways to divert water into Mendota Pool (Table S-1).



Reach 2B during Interim Flows



Table S-1. Additional Activities Common or Related to Action Alternatives

ACTIVITY	ACTION ALTERNATIVE			
	A	B	C	D
Constructing a channel and structures capable of conveying up to 4,500 cfs of Restoration Flows around the Mendota Pool	◆	◆		
Constructing a dam capable of containing Mendota Pool within Fresno Slough so that 4,500 cfs of Restoration Flows can be conveyed around the Mendota Pool			◆	◆
Restoring floodplain habitat an average of approximately 3,000 feet wide to provide benefit to salmonids and other native fishes	◆		◆	
Restoring floodplain habitat an average of approximately 4,200 feet wide to provide benefit to salmonids and other native fishes		◆		◆
Constructing the South Canal and structures capable of conveying up to 2,500 cfs from Reach 2B to Mendota Pool	◆			
Constructing the Bifurcation structure capable of conveying up to 2,500 cfs from Reach 2B to Mendota Pool		◆		
Constructing the Short Canal and structures capable of conveying up to 2,500 cfs from Reach 2B to Mendota Pool			◆	
Constructing the North Canal and structures capable of conveying up to 2,500 cfs from Reach 2B to Mendota Pool				◆
Building levees capable of conveying flows up to 4,500 cfs with 3 feet of freeboard	◆	◆	◆	◆
Providing upstream and downstream fish passage for adult salmonids and other native fishes, and downstream fish passage for juvenile salmonids, between Reach 2A and Reach 3	◆	◆	◆	◆

Key:

- Alternative A (Compact Bypass with Narrow Floodplain and South Canal)
- Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure)
- Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal)
- Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal)
- cfs = cubic feet per second

No-Action/No-Project Alternative

Under this alternative, the Project would not be implemented. The No-Action Alternative is not consistent with the Settlement.

Existing conditions were developed for each resource area based on the availability of historical data and recent observations. Future conditions were based on reasonably foreseeable actions that would occur without the Project. The conditions under the No-Action Alternative are the conditions that are predicted to exist in the Project area during the planning period if the Project is not implemented. If the Project were not implemented, the components described in the Action Alternatives would not be implemented; however, the No-Action Alternative assumes that other components of the SJRRP, as described in the 2012 Record of Decision, and other reasonably foreseeable actions consistent with current management direction expected to occur in the Project area, would be implemented.



California Kingsnake in Reach 2B

The No-Action Alternative generally assumes no channel or structural improvements would be made in Reach 2B, and Restoration Flows would be reduced to not exceed

the existing Reach 2B capacity. It is assumed for the No-Action condition that agriculture would continue, and cropland would be the dominant cover type, consistent with the existing condition.

Alternative A

Alternative A (Compact Bypass with Narrow Floodplain and South Canal) would construct a channel between Reach 2B and Reach 3, the Compact Bypass channel, in order to bypass the Mendota Pool. Restoration Flows would enter Reach 2B, flow through the reach, then downstream to Reach 3 via the Compact Bypass channel. A canal to convey San Joaquin River water deliveries to Mendota Pool, the South Canal, would be built. The San Joaquin River control structure at the Chowchilla Bifurcation Structure would be removed, and a bifurcation structure would be built at the head of the South Canal to control flood diversions into the Chowchilla Bypass and water delivery diversions into Mendota Pool. Fish passage facilities and, if appropriate, a fish screen would be built at the South Canal bifurcation structure to provide passage around the structure and prevent fish being entrained in the diversion. A fish barrier would be built in Reach 3 to direct up-migrating fish into the Compact Bypass channel. A new crossing would be built at the San Mateo Avenue crossing. See Figure S-3 and Figure S-4 for a plan view of the alternative's features.



Leopard Frog in Reach 2B

Alternative B

Alternative B (Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure), the preferred alternative, would construct a channel between Reach 2B and Reach 3, the Compact Bypass channel, in order to bypass the Mendota Pool. Restoration Flows would enter Reach 2B at the Chowchilla Bifurcation Structure, flow through Reach 2B, then downstream to Reach 3 via the Compact Bypass channel. The existing Chowchilla Bifurcation Structure would continue to divert San Joaquin River flows into the Chowchilla Bypass during flood operations, and a fish passage facility and control structure modifications would be included at the San Joaquin River control structure at the Chowchilla Bifurcation Structure. A bifurcation structure would be built at the head of the Compact Bypass channel to control diversions into Mendota Pool. Fish passage facilities would be built at the Compact Bypass bifurcation structure to provide passage around the structure, and a fish screen would be built to prevent fish being entrained in the diversion to Mendota Pool. The existing San Mateo Avenue crossing would be removed. See Figure S-5 and Figure S-6 for a plan view of the alternative's features.

Alternative C

Alternative C (Fresno Slough Dam with Narrow Floodplain and Short Canal) would build a dam across Fresno Slough, the Fresno Slough Dam, to contain the Mendota Pool, and it would utilize the existing river channel in order to bypass the Mendota Pool. Restoration Flows would enter Reach 2B at the Chowchilla Bifurcation Structure, flow through Reach 2B, then downstream to Reach 3 over the sill at Mendota Dam. Mendota Pool would be contained south of the Fresno Slough Dam. The existing Chowchilla Bifurcation Structure would continue to divert San Joaquin River flows into the Chowchilla Bypass during flood operations, and a fish passage facility and control structure modifications would be included at the San Joaquin River control structure

at the Chowchilla Bifurcation Structure. A canal to convey San Joaquin River water deliveries to Mendota Pool, the Short Canal, would be built adjacent to the Fresno Slough Dam. The Mendota Dam along with a control structure built at the head of the Short Canal would be used to control diversions into Mendota Pool through the Short Canal. Fish passage facilities at Mendota Dam and, if appropriate, a fish screen on the Short Canal would be built to provide passage around Mendota Dam and prevent fish from being entrained in the diversion. A fish barrier would be built downstream of the Fresno Slough Dam to keep up-migrating fish in Reach 2B. A new crossing would be built at the San Mateo Avenue crossing. See Figure S-7 and Figure S-8 for a plan view of the alternative's features.

Alternative D

Alternative D (Fresno Slough Dam with Wide Floodplain and North Canal) would build a dam across Fresno Slough, the Fresno Slough Dam, to contain the Mendota Pool, and it would utilize the existing river channel in order to bypass the Mendota Pool. Restoration Flows would enter Reach 2B, flow through the reach, then downstream to Reach 3 over the sill at Mendota Dam. Mendota Pool would be contained south of the Fresno Slough Dam. A canal to convey San Joaquin River water deliveries to Mendota Pool, the North Canal, would be built. The San Joaquin River control structure at the Chowchilla Bifurcation Structure would be removed, and a bifurcation structure would be built at the head of the North Canal to control flood diversions into the Chowchilla Bypass and water delivery diversions into Mendota Pool. Fish passage facilities and, if appropriate, a fish screen would be built at the North Canal bifurcation structure to provide passage around the structure and prevent fish being entrained in the diversion. A fish barrier would be built downstream of the Fresno Slough Dam to keep up-migrating fish in Reach 2B. The existing San Mateo Avenue crossing would be removed. See Figure S-9 and Figure S-10 for a plan view of the alternative's features.



White-faced Ibis

Elements Common to All Action Alternatives

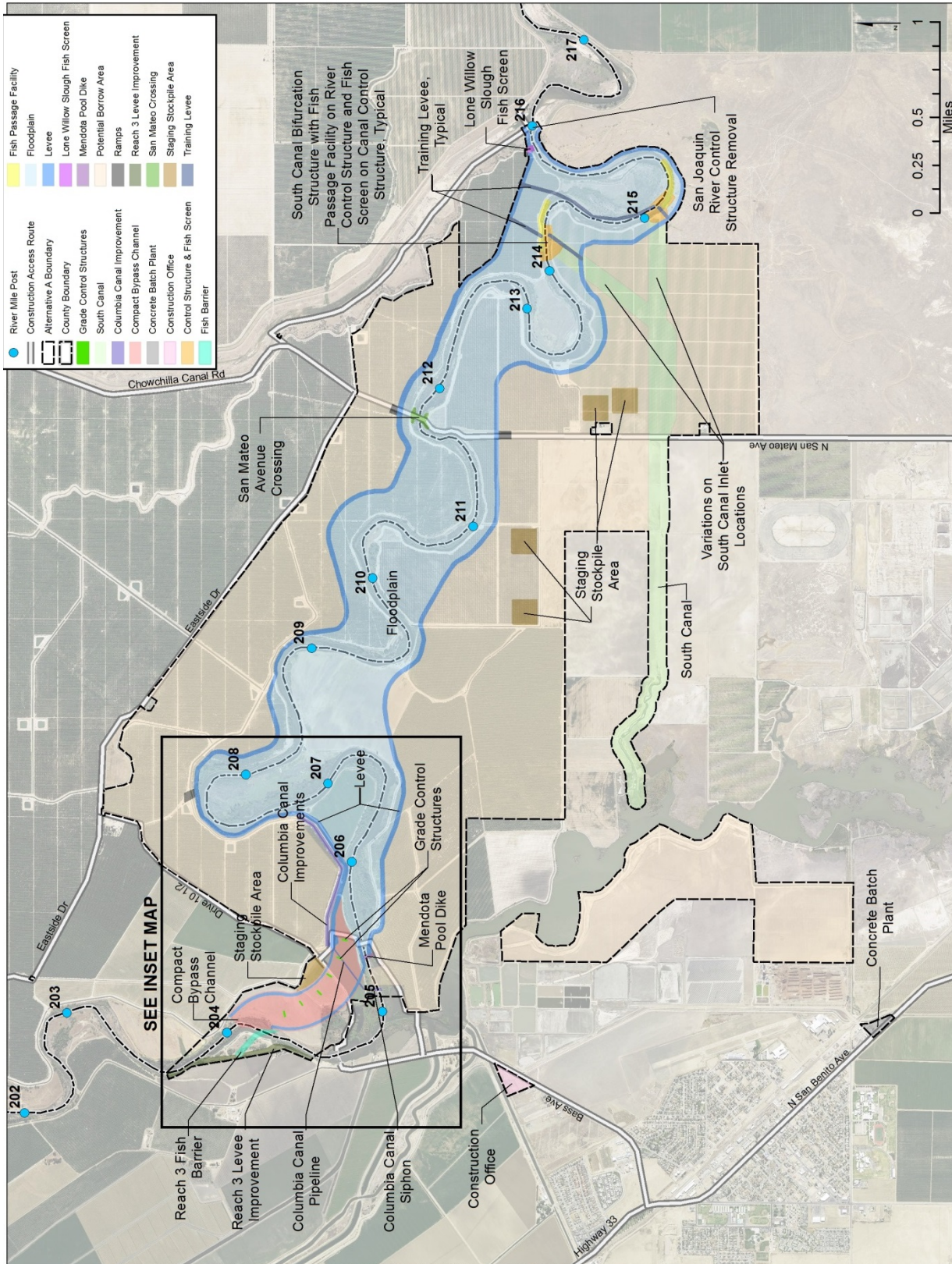
Some constructed elements are common to all Action Alternatives. Those elements are:

- Fish ~~Habitat and~~ Passage Criteria– One of the primary focuses of the Action Alternatives Project is to provide floodplain and riparian habitat to benefit migrating juvenile and adult salmonids and other native fishes. Floodplain and riparian habitats in the Action Alternatives would include a variety of native plant communities suited to the hydrology, soils, and climate of Reach 2B and the San Joaquin Valley. The Action Alternatives also include provision of fish passage at structures for salmonids and other native fish. These structures vary by alternative, but overall include fish screens, fish passage facilities, grade control structures, and bifurcation structures (under certain flows).
- Levees – Setback Levees would be required along the Project area to contain Restoration Flows. While the height and footprint of the levees vary according to their locations along the channel and the ground elevation, the capacity, freeboard, and cross-section would be consistent. Localized backwater and redirection effects at Project structures would be considered during design of levee heights. Levees would be designed to maintain 3 feet of freeboard on the levees at 4,500 cfs. Levee alignments maintain a 300-foot buffer zone, where appropriate, between the levee and river channel to avoid impact to levees over time due to potential channel migration.
- Seepage Control Measures – Seepage of river water through or under levees is a concern for levee integrity and adjacent land uses. Through-seepage, water that seeps laterally through the levee section, would be addressed through proper levee design and construction (e.g., selection of low porosity materials and proper compaction). Under-seepage, water that seeps laterally by traveling under the levee section, is primarily controlled by the native soils beneath the levee, and seepage control measures would be included where native soils do not provide sufficient control.
- Borrow – Borrow material (suitable soils) would primarily be required for the construction of the levees, but it may also be used in the construction of other structures for foundation or backfill material. Levees may be constructed entirely of local borrow material, a mix of local and imported borrow material, or just imported borrow material.
- Levee and Structure Protection – Action Alternatives generally provide a minimum 300-foot buffer between the existing channel and the proposed levee, where appropriate and feasible. Locations that require erosion protection in the form of revetment include areas where the 300-foot buffer was not included due to the proximity of existing infrastructure, near the proposed structures, and along river bends less than 300 feet from the levee.



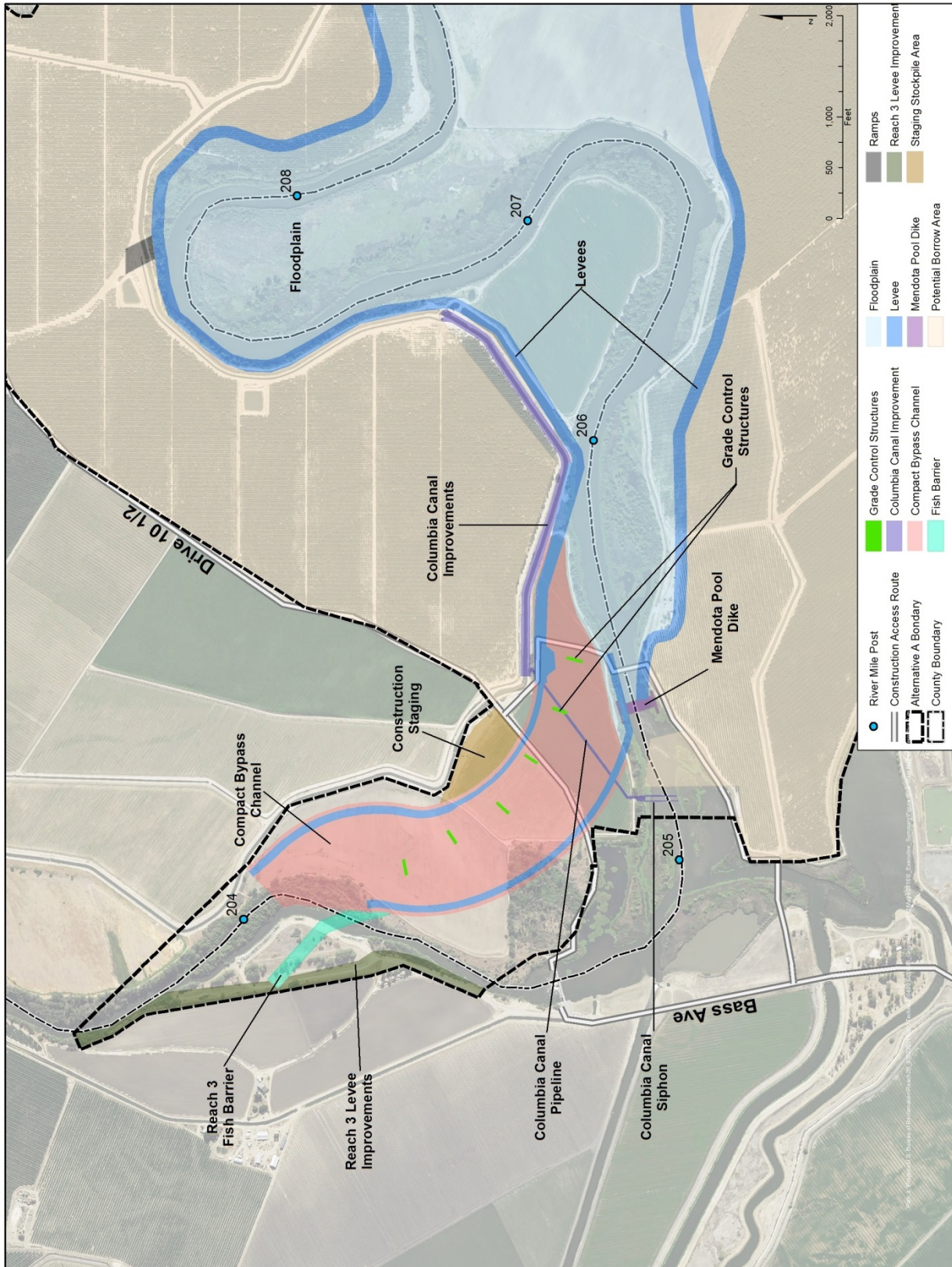
Chinook salmon

Figure S-3. Plan View of Alternative A
(Compact Bypass with Narrow Floodplain and South Canal)



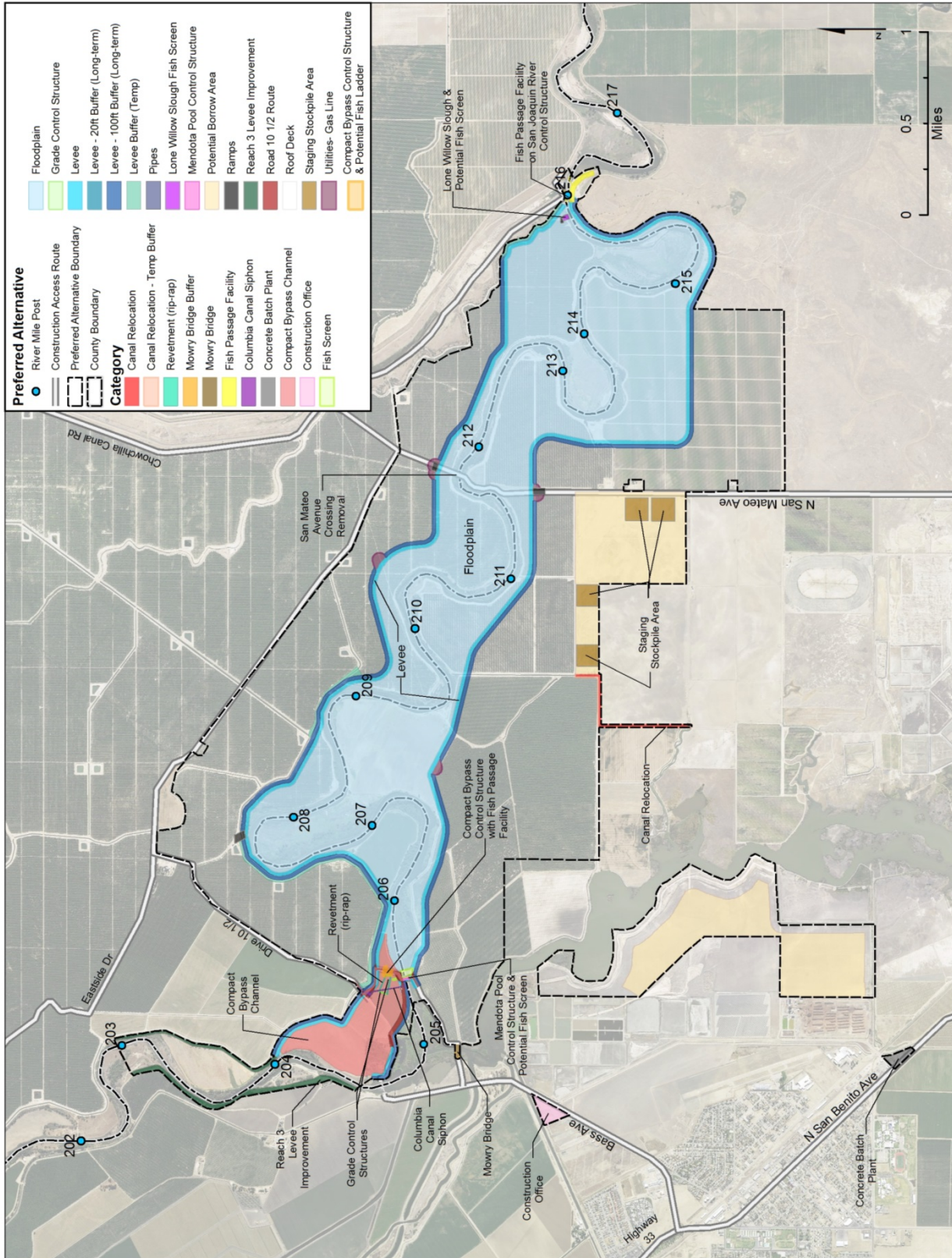
ALTERNATIVES
IN THIS EIS/R

Figure S-4. Inset Map of Alternative A
(Compact Bypass with Narrow Floodplain and South Canal)



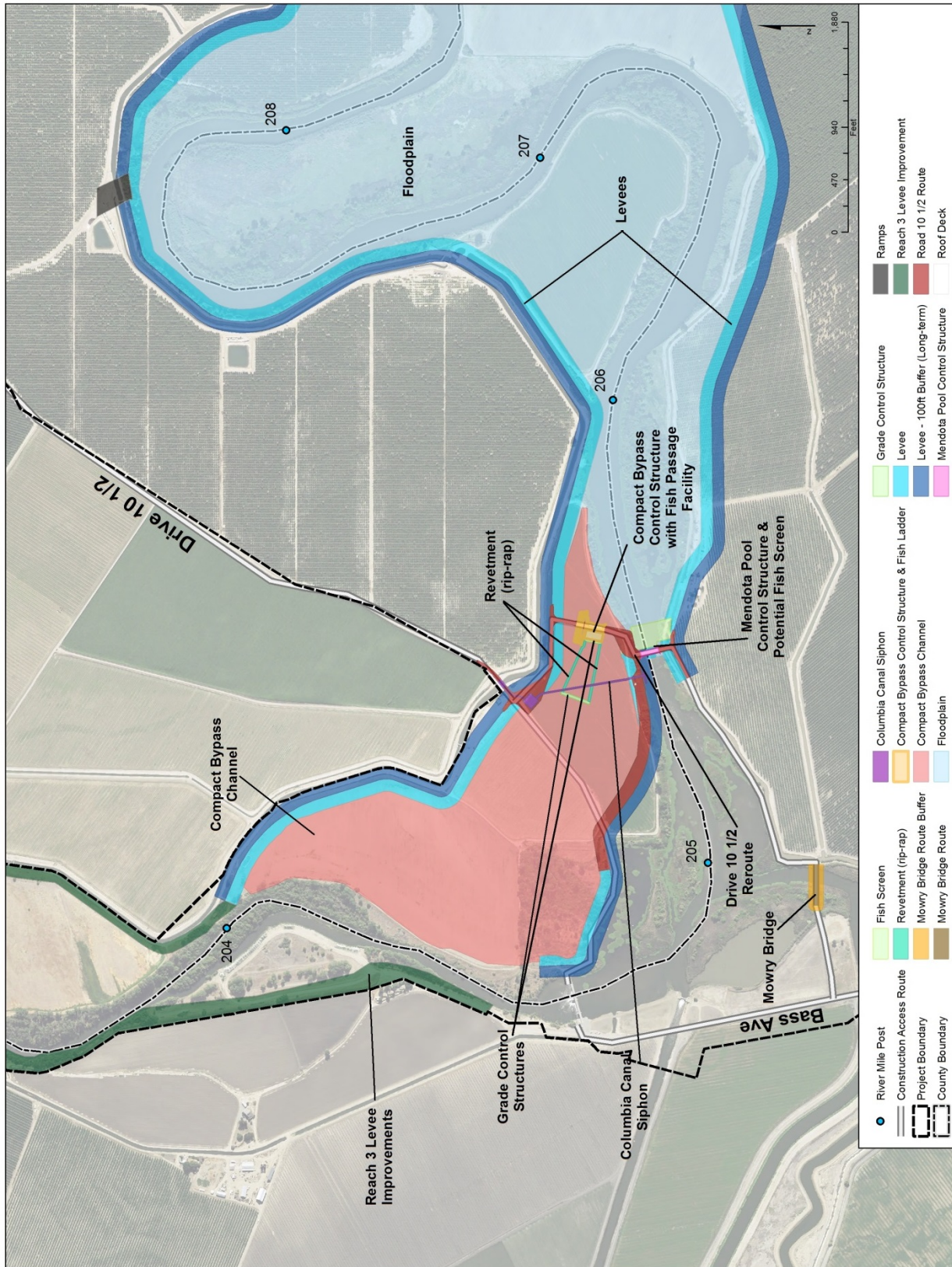
ALTERNATIVES
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Figure S-5. Plan View of Alternative B
(Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure)



ALTERNATIVES
IN THIS EIS/R

Figure S-6. Inset Map of Alternative B
(Compact Bypass with Consensus-Based Floodplain and Bifurcation Structure)



ALTERNATIVES
IN THIS EIS/R