

TISDALE WEIR REHABILITATION AND FISH PASSAGE PROJECT

Draft Environmental Impact Report
State Clearinghouse Number 2019049093

Prepared for
California Department of Water Resources

November 2020



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Acronyms and Other Abbreviations

Acronym	Definition
°F	degrees Fahrenheit
1987 Manual	<i>1987 Corps of Engineers Wetland Delineation Manual</i>
µg/m ³	micrograms per cubic meter
µPa	micropascal(s)
AB	Assembly Bill
ACE	annual chance exceedance
Arid West Supplement	<i>Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)</i>
basin plan	water quality control plan
Basin Plan	<i>Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins</i>
BMP	best management practice
BP	Before Present
C-APE	California Environmental Quality Act Area of Potential Effects
CAAQS	California ambient air quality standards
CalEEMod	California Emissions Estimator Model
California Register	California Register of Historical Resources
Caltrans	California Department of Transportation
CAP	climate action plan
CARB	California Air Resources Board
CCP	Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges Final Comprehensive Conservation Plan
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
Central Valley Regional Water Board	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHRIS	California Historical Resources Information System
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
County	Sutter County
CropScape Data	CropScape–Cropland Data Layer
CRPR	California Rare Plant Rank
CVFPB	Central Valley Flood Protection Board
CWA	Clean Water Act
CY	cubic yard(s)
dB	decibel(s)
dBA	A-weighted decibels

Acronym	Definition
DDT	dichlorodiphenyltrichloroethane
DEIR	draft environmental impact report
Delta	Sacramento–San Joaquin Delta
DOC	California Department of Conservation
DPM	diesel particulate matter
DPS	distinct population segment
DWR	California Department of Water Resources
EC	electrical conductivity
EFH	essential fish habitat
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
ESA	Environmental Science Associates
ESU	evolutionarily significant unit
FEIR	final environmental impact report
FESA	federal Endangered Species Act
Flow Impacts Analysis	TUFLOW Model Results and CEQA Impacts Analysis
FRAQMD	Feather River Air Quality Management District
GGERP	Greenhouse Gas Emissions Reduction Plan
GGS	giant garter snake
GHG	greenhouse gas
GIS	geographic information system
GWP	global warming potential
HAP	hazardous air pollutant
HCP	habitat conservation plan
Hz	hertz
km	kilometer(s)
lb/day	pounds per day
LiDAR	Light Detection and Ranging
LS	Less than Significant impact conclusion
LSM	Less than Significant with Mitigation Measures impact conclusion
MT	metric tons
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NEIC	Northeast Information Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO ₂	nitrogen dioxide
NOP	notice of preparation
NO _x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPDES General Stormwater Permit	National Pollutant Discharge Elimination System General Construction Permit for Discharges of Stormwater Associated with Construction Activities
NRCS	U.S. Natural Resources Conservation Service
NSVPA	Northern Sacramento Valley Planning Area

Acronym	Definition
NTU	nephelometric turbidity unit(s)
NWIC	Northwest Information Center
O&M	operations and maintenance
PCB	polychlorinated biphenyl
PM	particulate matter
PM _{2.5}	particulate matter that is 2.5 microns or less in diameter
PM ₁₀	particulate matter that is 10 microns or less in diameter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
ppb	parts per billion
ppm	parts per million
PRC	California Public Resources Code
Proposed Project	Tisdale Weir Rehabilitation and Fish Passage Project
RCC	roller-compacted concrete
regional water board	regional water quality control board
ROG	reactive organic gases
SB	Senate Bill
SBWA	Sutter Bypass Wildlife Area
Scoping Plan	<i>Climate Change Scoping Plan: A Framework for Change</i>
SHPO	State Historic Preservation Officer
SIP	state implementation plan
SLC	California State Lands Commission
SNWR	Sutter National Wildlife Refuge
SO ₂	sulfur dioxide
SR	State Route
SRFCP	Sacramento River Flood Control Project
State CEQA Guidelines	<i>Guidelines for Implementing the California Environmental Quality Act</i>
State Water Board	State Water Resources Control Board
Sutter Mutual	Sutter Mutual Water Company
SVAB	Sacramento Valley Air Basin
SWPPP	storm water pollution prevention plan
TAC	toxic air contaminant
TMDL	total maximum daily load
TUFLOW	TUFLOW HPC commercial software package
UAIC	United Auburn Indian Community of the Auburn Rancheria
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
VdB	vibration decibel(s)
VELB	valley elderberry longhorn beetle

EXECUTIVE SUMMARY

ES.1 Introduction

The California Department of Water Resources (DWR) Division of Flood Management proposes to construct, operate, and maintain the Tisdale Weir Rehabilitation and Fish Passage Project (Proposed Project). The Tisdale Weir and Bypass are critical components of the Sacramento River Flood Control Project (SRFCP).

Tisdale Weir is one of five major overflow weirs in the SRFCP. It is generally the first to overflow and the last to stop flowing. The weir is a fixed-elevation, ungated overflow structure that was originally designed to spill and convey up to 38,000 cubic feet per second (cfs) of excess Sacramento River floodwaters into the Tisdale Bypass, a 4-mile-long channel that flows eastward to the Sutter Bypass.

DWR operates and maintains the Tisdale Bypass in accordance with Section 8361 of the California Water Code. Maintenance activities include clearing sediment and vegetation, repairing and guarding against erosion and subsidence, repairing flood risk reduction facilities, and conducting other maintenance of State facilities as needed. The Proposed Project would allow these maintenance activities to continue within the regulatory limitations imposed by the required permits. It also would integrate structural rehabilitation of Tisdale Weir with the installation of fish passage facilities to reduce fish stranding at the weir and improve fish passage through the weir to the Sacramento River.

ES.2 Project Objectives

The primary objectives of the Proposed Project are:

- Structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.
- Reduce fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

Tisdale Weir is a federally authorized structure for which the State, through the Central Valley Flood Protection Board (formerly known as The Reclamation Board), has given assurances to the federal government regarding State operation and maintenance. The Proposed Project would support DWR in meeting its responsibilities under California Water Code Section 8361 to operate and maintain the SRFCP by extending the useful life of the weir.

ES.3 Summary of the Proposed Project

The Proposed Project consists of rehabilitation and reconstruction of Tisdale Weir, installation and operation of fish passage facilities, and associated project site improvements. Weir rehabilitation and reconstruction would consist of repairing the weir crest and reconstructing the two abutments and the energy dissipation basin. The fish passage facilities would include reconstruction of a fish collection basin; installation of a notch, an operable gate (for flow regulation), and attendant facilities; and construction of a channel connecting the notch in the weir to the Sacramento River. The proposed improvements to the project site would facilitate weir rehabilitation and reconstruction and the installation of fish passage facilities, and would enhance the protection of existing project site features.

ES.4 Alternatives to the Proposed Project

The alternatives evaluated in this Draft EIR include:

- **No Project Alternative.** Under this alternative, DWR would not repair Tisdale Weir's existing structural problems as identified during site inspections, and would not construct fish passage facilities at the weir or low-flow bypass channel connection facilities. DWR would continue to conduct operations and maintenance (O&M) activities at the weir and within the bypass, including grading to level and fill scour holes, off-hauling of excess sediment near the weir as necessary, and removal of sediment and large wood debris.
- **South Notch Alternative.** Under this alternative, DWR would construct a single notch with an operable gate at the southern end of Tisdale Weir with a connection channel to the Sacramento River. The gate would be operated in the same manner as under the Proposed Project. The gate would generally begin in an upright, closed position as the Sacramento River stage rises. Once the river stage exceeds the elevation of the weir crest, the gate would be fully opened (into the Tisdale Bypass) to allow fish passage as water stages fluctuate in the river-weir-bypass system. The gate would be closed again when the river stage falls below the bottom of the notch opening. This cycle would repeat as necessary, triggered by the frequency of weir overflow events in a given water year.

An equipment pad would be constructed on the south abutment to place the compressor and other mechanical and electrical equipment and facilitate gate O&M. The existing energy dissipation basin would be extended farther east to accommodate the dissipation of energy under this alternative. The basin would be reconstructed as a wide trapezoidal channel to provide fish passage past debris and sediment deposits; it also would be sloped to the south to facilitate drainage to the notch opening and enable fish to pass through the weir as Sacramento River elevations decrease.

A bridge would be constructed over the southern notch connection channel to allow vehicles to access Sutter County's Tisdale Boat Launch Facility.

The South Notch Alternative would include all weir rehabilitation and reconstruction activities and associated project site improvements described for the Proposed Project in Chapter 2, *Project Description*. Maintenance activities for the weir notch, gate, and connection channel would be similar to the activities described for the Proposed Project in Chapter 2.

- North and South Notches Alternative.** Under this alternative, DWR would construct two notches with operable gates, one each at the northern and southern ends of Tisdale Weir. Each notch would include a connection channel to the Sacramento River and would be equivalent in size to the notch for the Proposed Project. The gates would be operated in a manner similar to operation under the Proposed Project or the South Notch Alternative: The gates would be fully opened (into the Tisdale Bypass) to allow fish passage at the weir as the river stage exceeds the weir crest elevation.

Equipment pads would be constructed on both abutments to facilitate gate O&M. The existing energy dissipation basin would be extended farther east to accommodate dissipation of energy under this alternative. The basin would be reconstructed as a wide channel to provide fish passage past debris and sediment deposits. The basin also would be sloped to both the north and south, from a high point at approximately the midpoint of Tisdale Weir, to facilitate drainage from across the weir's width to the respective notch openings and enable fish to pass through the weir as Sacramento River elevations fall.

A bridge over the southern notch connection channel would allow vehicles to access the Tisdale Boat Launch Facility.

The North and South Notches Alternative would include all proposed weir rehabilitation and reconstruction activities and associated project site improvements described for the Proposed Project in Chapter 2, *Project Description*. Maintenance activities for the weir notches, gates, and connection channels would be similar to the activities described for the Proposed Project in Chapter 2.

- North Notch with Modified Gate Operation Alternative.** Under this alternative, DWR would construct the fish passage facilities described for the Proposed Project in Chapter 2, *Project Description*, including a notch on the north side of Tisdale Weir. However, under this alternative, the gate would remain in an upright, closed position as the Sacramento River stage rises and exceeds the elevation of the weir crest. Once the river stage recedes below the Tisdale Bypass's topographic "hinge point" (approximately 1,000–2,000 feet east of the weir sill, at elevation 37 feet North American Vertical Datum of 1988) and the eastward flow of water through the bypass ends, the gate would be opened to allow stranded fish to exit to the Sacramento River. The gate would be closed once the river stage falls below the bottom of the notch opening and fish have passed from the bypass into the river. This cycle would repeat as necessary, triggered by the frequency of weir overflow events in a given water year.

The North Notch with Modified Gate Operation Alternative would include all proposed weir rehabilitation and reconstruction activities and associated project site improvements described for the Proposed Project in Chapter 2, *Project Description*. Maintenance activities for the weir notch, gate, and connection channel would be similar to the activities described for the Proposed Project in Chapter 2.

- Tisdale Weir Structural Improvements Alternative.** Under this alternative, DWR would rehabilitate and reconstruct Tisdale Weir and construct the project site improvements described for the Proposed Project in Chapter 2, *Project Description*. The Tisdale Weir Structural Improvements Alternative would not include fish passage facilities at the weir.

As discussed in Chapter 5, *Alternatives*, and shown in **Table ES-2**, the No Project Alternative would result in less severe impacts on agricultural resources, hydrology and water quality, and recreation than those identified for the Proposed Project because the alternative would not include a notch in the bypass that would change flow through the weir compared to current conditions. Impacts on air quality, terrestrial biological resources, cultural and tribal cultural resources, and

greenhouse gas (GHG) emissions would also be less severe than those identified for the Proposed Project because the No Project Alternative would not include ground disturbance. With the No Project Alternative, fish passage and fish stranding at Tisdale Weir would continue, which would result in greater impacts on aquatic biological resources (specifically on special-status fish) than those identified for the Proposed Project. The No Project Alternative would not meet either of the project objectives.

The South Notch Alternative and the North and South Notches Alternative would result in more severe impacts on recreation than those identified for the Proposed Project, given the limitations on recreational river access associated with the south notch location. The South Notch Alternative and the North and South Notches Alternative also would have more severe impacts on air quality and GHG emissions than those identified for the Proposed Project, given the increased project area and complexity of construction associated with the alternatives. The South Notch Alternative would result in similar impacts on agricultural resources, biological resources, cultural and tribal cultural resources, and hydrology and water quality compared to the Proposed Project. The North and South Notches Alternative would result in greater impacts on agricultural resources, terrestrial biological resources, cultural and tribal cultural resources, and hydrology and water quality, given that construction activities would be on a greater scale than the Proposed Project and would include operation of two notches that would result in greater flow changes than under the Proposed Project.

The South Notch Alternative and the North and South Notches Alternative would meet the project's objective to structurally rehabilitate Tisdale Weir. The alternatives would also conceptually meet part of the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access. However, under both alternatives, the south notch location could result in larger and/or more frequent debris accumulation and entrain additional debris into the Tisdale Bypass compared to the Proposed Project. This ultimately could restrict fish passage, increase fish stranding and facility maintenance, and limit the ability to fully achieve the project objective. Both alternatives are more likely to result in damage to the notch or gate(s) or delays in conducting O&M activities because of the presence of debris.

The North Notch with Modified Gate Operation Alternative would result in less severe impacts on agricultural resources, hydrology and water quality, and recreation than those identified for the Proposed Project; the alternative would include modified gate operations that would result in a similar frequency, duration, and extent of inundation downstream of the project area compared to existing conditions. Impacts on air quality, terrestrial biological resources, cultural and tribal cultural resources, and GHG emissions would be similar to those identified for the Proposed Project because the North Notch with Modified Gate Operation Alternative would include the same project footprint and similar construction and O&M activities. This alternative would provide fewer opportunities for fish passing through the Tisdale Bypass from the Sutter Bypass to return to the Sacramento River and would result in more limited fish passage, which would result in greater impacts on aquatic biological resources (specifically on special-status fish) than those

identified for the Proposed Project. The North Notch with Modified Gate Operation Alternative would result in more limited fish passage and an increased risk of fish stranding compared to the Proposed Project, thus limiting the ability of this alternative to meet the project's objectives relative to the Proposed Project.

The Tisdale Weir Structural Improvements Alternative would result in less severe impacts on agricultural resources, hydrology and water quality, and recreation than those identified for the Proposed Project because the alternative would not include a notch in the bypass. Impacts on air quality, terrestrial biological resources, cultural and tribal cultural resources, and GHG emissions would also be less severe than those identified for the Proposed Project because the Tisdale Weir Structural Improvements Alternative would include less construction and a smaller project footprint than the Proposed Project. Fish passage and fish stranding at the weir would continue with the Tisdale Weir Structural Improvements Alternative, which would result in greater impacts on aquatic biological resources (specifically on special-status fish) than under the Proposed Project. The Tisdale Weir Structural Improvements Alternative would only meet the project objective to structurally rehabilitate Tisdale Weir, and would not meet the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River by improving fish passage through Tisdale Weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

None of the alternatives would fully achieve the project objectives. Although the No Project Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative would result in a reduction in the severity of some environmental impacts, each alternative would result in at least one more severe impact than those identified for the Proposed Project. Therefore, the Proposed Project is identified as the environmentally superior alternative.

ES.5 Potential Areas of Controversy and Concern

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, DWR prepared a notice of preparation (NOP) of an EIR and published the NOP on April 15, 2019 (State Clearinghouse #2019049093). DWR provided the NOP to federal, State, and local agencies (i.e., reclamation and levee districts); to landowners adjacent to the location of the Proposed Project; and to other interested parties. The NOP was circulated for 30 days ending on May 15, 2019. The NOP briefly described the Proposed Project and summarized the potential environmental impacts to be evaluated in the DEIR. The NOP is included in **Appendix A** of this DEIR.

Comment letters received in response to the NOP were considered during preparation of this DEIR and are included in Appendix A. A public scoping meeting was held at DWR's Sutter Maintenance Yard on April 25, 2019, to provide a forum for the public to comment on the proposed scope and content of the EIR.

Table ES-1 summarizes the comments received on the NOP.

**TABLE ES-1
WRITTEN COMMENTS RECEIVED ON THE NOTICE OF PREPARATION**

Organization	Name	Title	Summary of Comments
California Department of Conservation	Charlene Wardlow	Northern District Deputy	Identifies four known abandoned dry holes and one suspended well location (never drilled) within or adjacent to the project area. One well is within the proposed spoils storage area; however, no impact is likely because anticipated work involves placement of soil over the well, not excavation. Requests that local permitting agencies and property owners be aware of, and fully understand, that significant and potentially dangerous issues may be associated with development near oil and gas wells. Recommends that access to a well be maintained in the event re-abandonment of the well becomes necessary. States that no well work may be performed on any oil or gas well without written approval from the Division of Oil, Gas, and Geothermal Resources in the form of an appropriate permit.
California Department of Fish and Wildlife	Colin Purdy	Acting Environmental Program Manager	Supports integrating the weir rehabilitation and fish passage improvements with Tisdale Bypass management planning. The Proposed Project may be subject to CDFW's lake and streambed alteration regulatory authority, may result in incidental take of listed species protected under the California Endangered Species Act, and may impact nesting birds. The EIR should include an in-depth discussion and analysis on how weir rehabilitation and fish passage improvements are being designed, and recommends that the following be analyzed: <ul style="list-style-type: none"> • An operation plan that addresses fish passage for different scenarios • Weir stilling basin and apron design progression • Current fish passage design progression • Current endangered, threatened, candidate, and locally unique species with potential to be impacted by the Project Requests that the EIR clearly identify and describe all short-term, long-term, permanent, or temporary impacts to biological resources under their jurisdiction; define thresholds of significance for each impact; and assess cumulative impacts. Requests written notification of proposed actions and pending decisions regarding the Proposed Project.
Central Valley Regional Water Quality Control Board	Jordan Hensley	Environmental Scientist	Comments that the Proposed Project should evaluate potential impacts on surface water and groundwater quality and describes the permits that may be required for the Proposed Project, such as the Construction Storm Water General permit, Clean Water Act Section 404 and Section 401 permits, National Pollutant Discharge Elimination System permit, and Dewatering permit.
Native American Heritage Commission	Gayle Totton	Associate Governmental Program Analyst	Summarizes Assembly Bill 52 requirements and recommends early consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the Proposed Project. Recommendations for cultural resources assessments include the following: <ul style="list-style-type: none"> • Contact the appropriate regional California Historical Research Information System Center for an archaeological records search. • If an archeological inventory survey is required, prepare a professional report detailing the findings and recommendations of the records search and field survey. • Contact the NAHC for a Sacred Lands File search and Native American Tribal Consultation list. • Include mitigation for inadvertently discovered archaeological resources and Native American human remains.

TABLE ES-1 (CONTINUED)
WRITTEN COMMENTS RECEIVED ON THE NOTICE OF PREPARATION

Organization	Name	Title	Summary Comments
Oji Bros Farm, Inc.	John Oji	Owner of Oji Bros Farm	<p>Requests that the EIR:</p> <ul style="list-style-type: none"> Analyze all other potential solutions that can address the problem. Analyze potential impacts to downstream property owners, water rights owners, current land use practices, and maintenance operations. Expand the study area to include the Tisdale and Sutter Bypasses downstream of the weir and the Sacramento River directly upstream and downstream of the weir. Take into consideration existing issues that may be exacerbated as a result of the Proposed Project, such as erosion caused by the Sutter County boat ramp. Model and document changes in the amount and duration of flow through the proposed notch. Discuss how and which agency(s) will monitor the condition of the weir and notch during high-water events. Analyze potential impacts of operation and maintenance activities.
Reclamation District 1500	Brad Mattson	General Manager	<p>Requests that the EIR:</p> <ul style="list-style-type: none"> Expand the study area to include the Tisdale and Sutter Bypasses downstream of the weir and the Sacramento River directly upstream and downstream of the weir. Model and document changes in the volume, duration, and frequency of flow through the proposed notch. Assess potential impacts within the Tisdale and Sutter Bypasses and the Sacramento River that may be caused by proposed changes in the flow regime (e.g., erosion, siltation, vegetation management practices, farming operations, and access to, from, and through the bypass system). Analyze other potential uses/purposes for the notch, such as juvenile fish rearing, juvenile fish passage back to the river, and how notch operations may be modified to accommodate other uses. Discuss how and which agency(s) will monitor the condition of the weir and notch during high-water events. Analyze potential impacts of operation and maintenance activities.
Somach Simmons & Dunn	Kelly Taber	Attorney	<p>Requests that the EIR describe and analyze the entire project, including reasonable foreseeable future phases that could increase inundation of lands within the Sutter Bypass. States that the EIR should evaluate and mitigate potentially significant impacts to Sutter Bypass agricultural resources, recreational uses, including the effects of the Proposed Project on waterfowl habitat within the Sutter Bypass, and levees and other infrastructure. States that use of project facilities for habitat purposes would require changes to flowage easements and that changes in the inundation pattern of the Sutter Bypass could reduce habitat for terrestrial species and disturb fish species and their habitat. Requests that the EIR identify if a water right change petition is needed for future floodplain habitat creation.</p>

TABLE ES-1 (CONTINUED)
WRITTEN COMMENTS RECEIVED ON THE NOTICE OF PREPARATION

Organization	Name	Title	Summary Comments
State Lands Commission	Eric Gillies	Acting Chief	<p>States that the Sacramento River at the project site is State sovereign land under the jurisdiction of the State Lands Commission and will require a lease.</p> <p>Requests that the EIR include a complete and thorough project description that describes proposed activities and their timing and length of activities (e.g., types of equipment, methods that may be used, maximum area of impact or volume of sediment removed or disturbed, seasonal work windows, and locations for material disposal). The EIR should also:</p> <ul style="list-style-type: none"> • Disclose and analyze potentially significant effects on sensitive species and habitats and identify applicable mitigation measures. • Consider the project's potential to encourage the establishment or proliferation of aquatic invasive species and the potential for the Proposed Project to favor non-native fish species. • Evaluate noise and vibration impacts on fish and birds from construction and operation and maintenance activities. • Include a greenhouse gas emissions analysis that identifies a threshold for significance for greenhouse gas emissions, calculates the level of greenhouse gases that would be emitted as a result of construction, and identifies applicable mitigation measures to reduce impacts to extent feasible. • Discuss how the Tisdale Weir is designed to be resilient to future climate change effects. • Evaluate potential impacts to submerged cultural resources in the project area and mention that title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California are vested in the state and under the jurisdiction of the State Lands Commission. • Discuss Tribal engagement efforts and demonstrate compliance with Assembly Bill 52. • Include performance standards in mitigation measures and analyze a range of reasonable alternatives that would attain most of the project objectives while avoiding or reducing one or more potentially significant impacts.
Not applicable	James Evens	Not applicable	Requests to be added to list to receive project updates.

NOTES:

CDFW = California Department of Fish and Wildlife; EIR = environmental impact report; NAHC = Native American Heritage Commission; NOP = Notice of Preparation

ES.6 Public Review of Draft EIR

This DEIR will be published and made available to federal, State, and local agencies and interested organizations and individuals who may want to review and comment on the adequacy of the analysis. Public notice of this DEIR will be sent directly to all responsible and trustee agencies, and to agencies and other stakeholders who attended the scoping meeting and commented on the NOP.

The DEIR is available for review online at DWR's website at:

<https://water.ca.gov/Programs/Flood-Management/Flood-Projects/Tisdale-Weir>

Paper copies of the DEIR are available for review during normal business hours at:

California Department of Water Resources
Division of Flood Management, Flood Maintenance Office
3310 El Camino Avenue, Room 140
Sacramento, CA 95821

DWR will host a virtual public meeting for the DEIR on December 8, 2020, from 10 a.m. to 12 p.m. The meeting will provide information on the CEQA process and the DEIR and offer an opportunity to provide verbal comments on the DEIR. Please register in advance of the meeting at the following link. Registration will be open until the start of the meeting on December 8.

https://zoom.us/webinar/register/WN_qW2ySC4RSOqEVYrckM_qWw

The public review period for the DEIR will be November 20, 2020, through January 15, 2021. During the public comment period, written comments should be mailed or emailed to:

California Department of Water Resources
Division of Flood Management
Attention: Stephanie Ponce, Environmental Scientist
3310 El Camino Avenue, Room 140
Sacramento, CA 95821

Email: TisdaleWeirRehabProject@water.ca.gov

If comments are provided via email, please include the project title in the subject line, attach comments in Microsoft Word format, and include the commenter's U.S. Postal Service mailing address.

All comments received will be made available for public review in their entirety, including the names and addresses of the respondents. Individual respondents may request that their name and/or address be withheld from public disclosure. DWR will honor such requests to the extent allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.

ES.7 Summary of Impacts

Table ES-2 presents a summary of the impacts and mitigation measures identified for the Proposed Project and the alternatives evaluated in this Draft EIR. The complete impact statements and mitigation measures are presented in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, and the alternatives are evaluated in Chapter 5, *Alternatives*. The level of significance for each impact was determined using standards of significance presented in each technical section of Chapter 3. Significant impacts are those adverse environmental impacts that meet or exceed the standards of significance; less-than-significant impacts would not exceed the standards of significance. For each impact identified, Table ES-2 presents: (1) the environmental impact; (2) the level of significance before mitigation measures for the Proposed Project and the alternatives; (3) recommended mitigation measures for the Proposed Project and the alternatives; and (4) the level of significance after mitigation for the Proposed Project and the alternatives.

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

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.2 Agricultural Resources	3.2-1: Implementation of the Proposed Project could convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.2-2: Operation and maintenance of the Proposed Project could contribute to cumulative impacts on agricultural resources through the conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
3.3 Air Quality	3.3-1: Implementation of the Proposed Project could conflict with or obstruct implementation of the applicable air quality plan.	LS	LS-	LS	LS	LS	LS-	None required.	LS	LS-	LS	LS	LS	LS-
	3.3-2: Construction of the Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard.	LSM	LS	LSM+	LSM+	LSM	LS	<p>Mitigation Measure 3.3-1a (Proposed Project, South Notch Alternative, North and South Notches Alternative, and North Notch with Modified Gate Operation Alternative): To the greatest extent practicable, off-road diesel construction equipment shall be equipped with the most effective verified diesel emissions control strategies available for the engine type. In this case, the best available control strategy is implementation of Tier 4 Final engines as certified by CARB and EPA. The contractor shall ensure that all construction equipment is properly maintained and tuned in accordance with the manufacturer's specifications. DWR will verify compliance by submitting an equipment inventory and certification statement prepared by the contractor to FRAQMD.</p> <p>Mitigation Measure 3.3-1b (Proposed Project, South Notch Alternative, North and South Notches Alternative, and North Notch with Modified Gate Operation Alternative): Once the environmental analysis has been completed and the project is approved, DWR and the construction contractor shall implement the following measures, with oversight by FRAQMD:</p> <ol style="list-style-type: none"> <i>Implement Mitigation Measure 3.3-1a;</i> use low-emissions construction equipment (verified diesel emissions control strategies) to the maximum extent feasible and estimate the NO_x emissions reductions associated with such equipment. <p>If DWR is unable to secure Tier 4 Final engines for the emissions reductions required to reduce NO_x emissions to below the significance threshold, FRAQMD's off-site mitigation program (described below) shall be engaged to meet these additional emission reduction requirements. The precise amount of off-site mitigation will be determined through the submittal of an equipment inventory and certification statement to FRAQMD as discussed above.</p> <ol style="list-style-type: none"> <i>Pay Voluntary Off-Site Mitigation Program fees to FRAQMD,</i> currently estimated at \$30,000 per weighted ton of NO_x emissions in excess of the significance threshold, plus an administrative fee of no more than 10 percent of the total fee. These fees shall fund one or more emissions reduction projects in the northern SVAB (Yuba and Sutter Counties) to offset NO_x emissions exceeding the threshold. The exact fee shall be determined by FRAQMD and shall be based on the types of projects available at the time of payment. 	LS	LS	LS	LS	LS	LS

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.3 Air Quality (cont.)	3.3-2 (cont.)							<p>3. <i>Once the project is approved, submit a memorandum of understanding to FRAQMD containing the following information:</i></p> <ul style="list-style-type: none"> • Source of emissions • Estimate of emissions • Amount of off-site mitigation requested to be purchased • Date the off-site mitigation fee will be provided to FRAQMD (either as a one-time payment before the start of project work or as a down payment, with the remainder due at the end of the construction season) <p>Once the MOU is submitted, a mitigation agreement between DWR and FRAQMD will be finalized. The agreement will specify the fees and timing of payment and will be executed by DWR and FRAQMD. FRAQMD shall calculate the total Voluntary Off-Site Mitigation Program fee by summing the maximum daily construction emissions of NO_x (lb/day) in excess of the significance threshold (i.e., 25 lb/day) after implementation of all other available on-site mitigation, and multiplying by the final estimate of construction workdays per year in addition to the 10 percent administrative fee. The fee represents the offset of any remaining NO_x emissions above the threshold by funding emissions reduction programs in the SVAB (e.g., replacing old diesel-powered school buses with low-emissions models).</p> <p>Mitigation Measure 3.3-1c (Proposed Project, South Notch Alternative, North and South Notches Alternative, and North Notch with Modified Gate Operation Alternative): As part of the project, DWR will implement the following FRAQMD best management practices (BMPs), which are required by FRAQMD for projects that exceed one or more of its significance thresholds:</p> <p>BMP 1: All grading operations on the project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.</p> <p>BMP 2: Construction sites shall be watered as necessary to prevent fugitive dust violations.</p> <p>BMP 3: An operational water truck should be available at all times. Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts.</p> <p>BMP 4: On-site dirt piles or other stockpiled particulate matter should be covered, windbreaks installed, and water and/or soil stabilizers employed to reduce wind-blown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.</p> <p>BMP 5: All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free-fall distance and fugitive dust emissions.</p> <p>BMP 6: Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.</p> <p>BMP 7: To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.</p> <p>BMP 8: Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project area.</p>						

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.3 Air Quality (cont.)	3.3-2 (cont.)							<p>BMP 10: Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage.</p> <p>BMP 11: Reestablish ground cover on the construction site as soon as possible, through seeding and watering.</p> <p>BMP 12: Disposal by Burning: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited in the project area. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et al.) may be conducted in the project area unless the project proponent successfully applies and obtains a burn permit from the FRAQMD, the Levee District, the Water District or Duck Preserve with local jurisdiction and follows all requirements of the FRAQMD Regulation II. DWR must implement all FRAQMD requirements before burning.</p>						
	3.3-3: Construction of the Proposed Project could expose sensitive receptors to substantial pollutant concentrations.	LS	LS-	LS	LS	LS	LS-	None required.	LS	LS-	LS	LS	LS	LS-
	3.3-4: Construction of the Proposed Project could temporarily add to localized and regional cumulative air quality impacts.	LSM	LS	LSM+	LSM+	LSM	LS	Mitigation Measure 3.3-4 (Proposed Project, South Notch Alternative, North and South Notches Alternative, and North Notch with Modified Gate Operation Alternative): Implement Mitigation Measures 3.3-1a through 3.3-1c.	LS	LS	LS	LS	LS	LS
3.4 Biological Resources	3.4-1: Implementation of the Proposed Project could cause loss or modification of habitat for special-status plant species.	LS	LS	LS	LS	LS	LS	None required.	LS	LS	LS	LS	LS	LS
	3.4-2: Implementation of the Proposed Project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.4-2a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): All project activities will avoid suitable elderberry shrubs, defined as shrubs with stem diameters of at least 1 inch when measured at ground level. Shrubs will be flagged or temporarily fenced, as needed, with guidance from a designated biologist. These areas will be avoided by all project personnel and activities. When feasible, fencing will be placed at least 5 feet from the dripline of each shrub, unless otherwise approved by USFWS.</p> <p>Mitigation Measure 3.4-2b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): DWR will not use insecticides, herbicides, or other chemicals that might harm the beetle or its host plant within established buffers (20 feet) around elderberry shrubs. Mowing will not occur within 5 feet of any suitable elderberry stem (i.e., a stem 1 inch in diameter or greater).</p> <p>Mitigation Measure 3.4-2c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If it is determined that any project activity has the potential to result in the incidental take of VELB despite implementation of Mitigation Measures 3.4-2a and 3.4-2b, DWR will obtain take authorization under the FESA. DWR will implement all measures developed through consultation with USFWS to mitigate the authorized take. The mitigation approach will conform to requirements stipulated by USFWS in its <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (USFWS, 2017a).</p>	LS	LS	LS	LS	LS	LS-

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-3: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for giant garter snake.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.4-3a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): To the extent feasible, DWR will limit project construction and maintenance activities within the project footprint outside the Tisdale Bypass to the active season for GGS, May 1 to October 1. DWR may also conduct work between October 2 and November 1 or between April 1 and April 30 if ambient air temperatures exceed 75°F during the work and maximum daily air temperatures have exceeded approximately 75°F for at least 3 consecutive days immediately preceding the work.</p> <p>Mitigation Measure 3.4-3b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): A designated biologist will present a worker education and awareness program to all on-site construction personnel before materials staging or ground-disturbing activities begin. The program will describe how best to avoid impacts on GGS and will address the topics of species descriptions and identification, life history, and habitat requirements during various life stages. This education program can include handouts, illustrations, photographs, and project maps showing areas of minimization and avoidance measures. All construction personnel will sign a sign-in sheet documenting that they received the training.</p> <p>Mitigation Measure 3.3-3c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): DWR will ensure that a designated biologist surveys the project footprint for burrows, soil cracks, crevices, and other features potentially suitable for use by GGS within terrestrial habitat located within 200 feet of suitable aquatic habitat in the Oji Ditch and seasonal wetland, excluding any areas within this buffer that may overlap the Tisdale Bypass. Surveys will be completed no more than 3 days before construction or maintenance activities in terrestrial habitat that could support GGS. Any identified burrows, soil cracks, crevices, or other habitat features will be flagged by the designated biologist or otherwise identified as biologically sensitive areas. DWR will avoid these biologically sensitive areas during construction and subsequent maintenance. If activities temporarily stop for more than 7 days, the designated biologist will repeat the surveys for soil cracks and similar features, as described above, before construction work resumes.</p> <p>If feasible and accepted by CDFW and USFWS, DWR may also use other survey techniques (e.g., scent-detection dogs) as an alternative or supplement to surveys conducted by the designated biologist. Such surveys will identify cracks and burrows to help determine occupancy by GGS, and these burrows will be flagged as biologically sensitive areas to be avoided during subsequent work as described above.</p> <p>Mitigation Measure 3.4-3d (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): GGS exclusion fencing will be installed consistent with USFWS and CDFW guidance to divert moving snakes from the active construction zone during periods when GGS are active. This exclusion fencing will be installed south of the Oji Ditch between the ditch and the staging area; north of the Sutter Mutual Main Canal between the staging area and the canal; and between the canal that runs along the west side of Reclamation Road and the spoils site (Figure 3.4-2). DWR will also install and regularly maintain exclusion fencing around the southern and western margins of the seasonal wetland to redirect any GGS using the pond away from Garmire Road and the nearby construction access route on the Tisdale Bypass north levee.</p>	LS	LS	LS	LS	LS	LS

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-3 (cont.)							<p>Figure 3.4-2 delineates the maximum anticipated GGS fencing needed to ensure that there is a barrier between any active construction work areas within the action area and any potential GGS aquatic habitat within 200 feet (note that natural features such as dense riparian forest also can function as adequate barriers to ingress of GGS into active work areas). If further engineering analysis determines that a smaller spoils area will be needed to accommodate the Proposed Project, a smaller extent of GGS exclusion fencing may potentially be utilized. Upon agreement with USFWS, DWR will ensure that any reduction in the extent of GGS fencing will still ensure that GGS fencing is installed along the margins of any potential GGS aquatic habitat located within 200 feet of active work areas (unless already obviated by the presence of natural buffers to GGS movement).</p> <p>The exclusion fencing will be installed before the start of construction. DWR will maintain the exclusion fencing for the duration of the Proposed Project's construction activities. A designated biologist will inspect the exclusion fence daily to verify the condition and function of the fence and to verify that snakes are not becoming trapped in the excluded areas.</p> <p>Mitigation Measure 3.4-3e (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If a GGS individual is observed within the project footprint, DWR will stop work and notify a designated biologist immediately. The snake will be allowed to leave on its own, and the designated biologist will remain in the area for the remainder of the workday to ensure that the snake is not harmed. Alternatively, with prior approval by CDFW and USFWS, the designated biologist may capture the snake and relocate it unharmed to suitable habitat at least 200 feet from the project area. DWR will notify CDFW and USFWS by telephone or email within 24 hours of a GGS observation during project activities. If the snake does not voluntarily leave the project area and cannot be captured and relocated unharmed, project activities will remain halted to prevent harm to the snake, and CDFW and USFWS will be consulted to identify next steps. DWR will implement the measures recommended by CDFW and USFWS before resuming project work in the area.</p>						
	3.4-4: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for western pond turtle.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.4-4a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operations Alternative, and Tisdale Weir Structural Improvements Alternative): A designated biologist will present a worker education and awareness program to all on-site personnel before materials staging or ground-disturbing activities begin. The biologist will explain to construction workers how best to avoid impacts on western pond turtle and will address the topics of species descriptions and identification, life history, and habitat requirements during various life stages. This education program can include handouts, illustrations, photographs, and project mapping showing areas of minimization and avoidance measures. The crew members will sign a sign-in sheet documenting that they received the training.</p> <p>Mitigation Measure 3.4-4b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): A designated biologist will conduct a preconstruction survey within 7 days before the establishment of staging areas and the start of construction and maintenance activities.</p>	LS	LS	LS	LS	LS	LS

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-4 (cont.)							<p>Mitigation Measure 3.4-4c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Should a western pond turtle be observed during the preconstruction survey, the biologist will identify the location using GPS coordinates. DWR will revisit these locations within 8 hours of ground disturbance. A designated biologist may relocate the turtle found within the construction footprint to suitable habitat away from the construction zone.</p> <p>Mitigation Measure 3.4-4d (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If a western pond turtle is observed on land within the active construction zone, specifically in areas of ground disturbance, access routes, stockpile areas, or staging areas, DWR will immediately stop work within approximately 200 feet of the turtle and notify a designated biologist. If possible, the turtle will be allowed to leave on its own, and the designated biologist will remain in the area for the remainder of the workday to ensure that the turtle is not harmed. Alternatively, with prior CDFW approval, the designated biologist may capture the turtle and relocate it unharmed to suitable habitat at least 200 feet from the project area. If the turtle does not voluntarily leave the project area and cannot be captured and relocated unharmed, construction activities within approximately 200 feet of the turtle will stop to prevent harm to the turtle, and CDFW will be consulted to identify next steps. DWR will implement the measures recommended by CDFW before resuming project activities in the area.</p>						
	3.4-5: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for bird species.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.4-5a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If vegetation removal is to begin during the nesting season (February 15 to August 31), a designated biologist will conduct a preconstruction nesting survey before the vegetation is removed. The preconstruction survey will be conducted within 14 days before the start of ground-disturbing activities. If the survey shows no evidence of active nests, no additional measures are recommended. If construction does not begin within 14 days of the preconstruction survey, or if it halts for more than 14 days, an additional preconstruction survey is recommended.</p> <p>Mitigation Measure 3.4-5b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If any active nests are located in the project area, the construction contractor will establish an appropriate buffer zone around the nests, as determined by a designated biologist. Typical buffer zones are 100 feet for migratory bird nests, 250 feet for raptor nests, and 500 feet for western yellow-billed cuckoo, unless a qualified CDFW biologist determines that smaller buffers would be sufficient to avoid impacts. Factors to be considered for determining buffer size will include the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained until a qualified CDFW biologist has determined that the young have fledged and are no longer reliant upon parental care for survival. The designated biologist will monitor nests daily during construction to evaluate whether construction activities have the potential to disturb nesting. All feasible avoidance measures will be implemented (e.g., vehicle and pedestrian access under the Garmire Road Bridge will be reduced). If any project construction work is to occur within 100 feet of swallow nests located under the Garmire Road Bridge, the designated biologist will elect to implement a stop-work authority until concerning swallow behavior is alleviated if there is concern that the construction activities may result in incidental take of the migratory species.</p>	LS	LS	LS	LS	LS	LS

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**TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-5 (cont.)							<p>Mitigation Measure 3.4-5c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If mountain plovers are observed foraging in the project area or adjacent agricultural fields during project construction or maintenance activities, activities within 100 feet will cease until they disperse. This species will be covered under the working training classes presented to construction crews by a designated biologist.</p> <p>Mitigation Measure 3.4-5d (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If vegetation removal is to begin during the nesting season for Swainson's hawk (between March 1 and September 15), a designated biologist will conduct a minimum of one protocol-level preconstruction survey. The survey(s) will occur during the recommended survey periods for the nesting season that coincides with the start of construction activities, in accordance with the <i>Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley</i> (Swainson's Hawk Technical Advisory Committee, 2000). Where legally permitted, the designated biologist will conduct surveys for nesting Swainson's hawk within 0.25 mile of the project area.</p> <p>Mitigation Measure 3.4-5d (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If active Swainson's hawk nests are found within 0.25 mile of construction or maintenance activities, the findings will be reported to CDFW following the preconstruction survey. For purposes of this avoidance and minimization requirement, "construction activities" are defined to include the operation of heavy equipment during construction (use of cranes or draglines, new rock-crushing activities) or other project-related activities that could cause nest abandonment or forced fledging within 0.25 mile of a nest site between March 1 and September 15. Should an active nest be present within 0.25 mile of a construction area, DWR will consult with CDFW to establish appropriate avoidance measures; determine whether high-visibility construction fencing will be erected around the buffer zone; and implement a monitoring and reporting program before any construction activities occur within 0.25 mile of the nest. Should the designated biologist determine that the construction activities are disturbing the nest, the biologist will halt construction activities until DWR consults with CDFW. The construction activities will not resume until CDFW determines that they will not result in abandonment of the nest site. Should the designated biologist determine that construction activities within the buffer zone have not disturbed the nest, DWR will report to CDFW summarizing the survey results within 30 days after the final monitoring event, and no further avoidance and minimization measures for nesting habitat are recommended.</p>						
	3.4-6: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable roosting habitat for special-status bats.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.4-6a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Within 14 days before the beginning of removal of suitable bat roosting trees (larger than 24 inches in diameter at breast height), a designated biologist will conduct a preconstruction survey for special-status bats. If no special-status bats are observed roosting, no additional measures are required for the tree removal. If tree removal does not begin within 14 days of the preconstruction survey, or if removal halts for more than 14 days, a new survey will be conducted.</p>	LS	LS	LS	LS	LS	LS

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TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-6 (cont.)							<p>Mitigation Measure 3.4-6b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If bats are found in the area where construction-related activities will occur, a minimum 100-foot avoidance buffer will be established around the roost/maternity area until it is no longer occupied. High-visibility fencing will be installed around the buffer and will remain in place until bats no longer occupy the tree or structure. The tree or structure will not be removed or modified until a designated biologist has determined that the bats are no longer occupying the roost. If construction activities must occur within the avoidance buffer, a designated biologist will monitor the activities either continuously or periodically during work, as determined by the biologist. The designated biologist will be empowered to stop activities that, in the biologist's opinion, threaten to cause unanticipated and/or unpermitted adverse effects on special-status bats. If construction activities are stopped, the designated biologist will consult with CDFW to determine appropriate measures that DWR will implement to avoid adverse effects.</p> <p>Within 14 days before the start of work within 100 feet of the Garmire Road Bridge, a designated biologist will conduct a preconstruction emergence survey for special-status bats. If avoidance of maternity roosts is not feasible, additional mitigation will be developed in consultation with CDFW.</p> <p>Mitigation Measure 3.4-6c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If construction activities must occur within the avoidance buffer, a designated biologist will monitor the work either continuously or periodically, as determined by the biologist. The designated biologist will be empowered to stop activities that, in the biologist's opinion, threaten to cause unanticipated and/or unpermitted adverse effects on special-status bats. If construction activities are stopped, the designated biologist will consult with CDFW to determine the appropriate measures to implement to avoid adverse effects.</p>						
	<p>3.4-7: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by causing changes in water quality.</p>	LSM	LS	LSM	LSM	LSM	LSM	<p>Mitigation Measure 3.4-7a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Work will be suspended if Tisdale Weir is forecast to be overtopped during the construction window.</p> <p>Mitigation Measure 3.4-7b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): DWR and its construction contractor will implement the following best management practices to protect water quality:</p> <ul style="list-style-type: none"> The construction contractor will develop and implement a spill prevention, control, and countermeasure plan to minimize the potential for, and effects from, spills of hazardous, toxic, and petroleum substances during construction and maintenance. The plan will be completed before construction activities begin. The spill prevention, control, and countermeasure plan will describe containment facilities and practices, including refueling procedures and spill response actions for each material or waste and procedures for notifying the appropriate agencies. Diesel fuel and oil will be used, stored, and disposed of in accordance with standard protocols for handling of hazardous materials. All personnel using hazardous materials will be trained in emergency response and spill control. 	LS	LS	LS	LS	LS	LS

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TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-7 (cont.)							<ul style="list-style-type: none"> All concrete washing and spoils dumping will occur in a designated location outside of jurisdictional waters, including the Tisdale Bypass. Construction stockpiles will be covered or protected with soil stabilization measures (e.g., protection of seeding by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) and a temporary sediment barrier to prevent blowoff or runoff during weather events. Erosion control materials and devices for severe-weather events will be stored on-site for use as needed. All work will occur when the Tisdale Bypass is dry. Areas with permanent open water will be protected from disturbance during excavation by installing silt fencing or other suitable best management practices around the features, or by leaving a buffer of 15 feet from the ponded areas that will be identified by stakes and flagging. Shallow ponded areas will not be affected until they have dried down. Any excavated areas will be reseeded with an appropriate seed mix or otherwise treated to reduce erosion and/or siltation. Erosion control measures will be placed in areas that are upslope of aquatic habitat, to prevent any soil or other materials from entering aquatic habitat. Silt fencing and/or natural/biodegradable erosion control measures (i.e., straw wattles and hay bales) will be used. Plastic monofilament netting (erosion control matting) will not be allowed because wildlife can become entangled in this type of erosion control material. To address potential effects on receiving water quality during the construction period, DWR will prepare and comply with any requirements identified in a storm water pollution prevention plan to maintain water quality. <p>Mitigation Measure 3.4-7c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): DWR will conduct turbidity monitoring in the Sacramento River. <i>The Basin Plan for the Sacramento River and San Joaquin River Basins (Fifth Edition)</i> (Basin Plan) (Central Valley Regional Water Board, 2018) contains turbidity objectives. Specifically, the plan states:</p> <ul style="list-style-type: none"> Where natural turbidity is between 5 and 50 nephelometric turbidity units (NTU), turbidity levels may not be elevated by 20 percent above ambient conditions. Where ambient conditions are between 50 and 100 NTU, conditions may not be increased by more than 10 NTU. Where natural turbidity is greater than 100 NTU, increases will not exceed 10 percent. <p>A sampling methodology for turbidity monitoring will be developed and implemented based on specific site conditions, project activities, and in consultation with the Central Valley Regional Water Board. If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities will slow to a point that will alleviate the problem.</p>						

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**TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-8: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by modifying aquatic habitat.	LSM	LSM+	LSM	LSM	LSM+	LSM+	<p>Mitigation Measure 3.4-8a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If project activities must occur during non-daylight hours, a designated biologist will establish monitoring measures, including frequency and duration, based on fish species, individual behavior, and type of construction activities. When nighttime work cannot be avoided, nighttime lighting will be used only in the portion of the project area actively being worked on (limited to a minimum distance of 200 feet from habitat for FESA-listed fish species), and will be focused directly on the work area. Lights on work areas will be shielded and focused to minimize lighting of FESA-listed fish species habitat. If the work area is located near surface waters, the lighting will be shielded to avoid shining directly into the water.</p> <p>Mitigation Measure 3.4-8b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): DWR will submit a dewatering and fish rescue plan to NMFS and CDFW before construction. NMFS- and CDFW-approved fish biologists will conduct fish rescues in isolated pools and channels in the project area. These biologists will also rescue any fish trapped in the cofferdam area before dewatering. Fish rescue will also occur in the unlikely event that Sacramento River flows overtop the cofferdam. Methods used for capturing fish could include seining and dip netting. Water will be pumped and discharged back into the Sacramento River from the cofferdam areas as needed to facilitate fish collection activities. Pump intakes will be fitted with appropriately sized, NMFS- and/or CDFW-approved fish screens to prevent fish from becoming entrained.</p> <p>Mitigation Measure 3.4-8c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): The Technical Working Group, consisting of qualified technical experts from DWR, NMFS, and CDFW, will develop triggers for fish rescue events to occur during operation of the Proposed Project. A fish rescue could be needed because of a physical obstruction, adverse water quality within the fish passage facilities, observations that fish in the basin are in poor health, or other reasons. If deemed necessary, a fish rescue plan will be developed and will include the same elements as described in Mitigation Measure 3.4-8b.</p>	LS	LS	LS	LS	LS	LS
	3.4-9: Construction of the Proposed Project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.	LSM	LS	LSM	LSM	LSM	LS	<p>Mitigation Measure 3.4-9 (Proposed Project, South Notch Alternative, North and South Notches Alternative, and North Notch with Modified Gate Operation Alternative): To avoid or minimize the potential for injury or mortality of listed fish species caused by pile-driving noise, all pile driving will be restricted to the in-water work period (July 1 to October 1). Non-impact pile driving methods (e.g., vibratory) or other attenuation methods, as needed, will be used to avoid or minimize noise levels that exceed the current thresholds established by NMFS. A vibratory hammer is preferred; however, if an impact hammer is needed to drive piles, noise levels should not exceed the following threshold levels (for fish greater than 2 grams):</p> <ul style="list-style-type: none"> • Peak sound pressure level = 206 decibels (dB re 1 micropascal [μPa]) • Accumulated sound exposure level = 187 decibels (dB re 1 μPa²-s) <p>A designated biologist will be present during cofferdam installation and removal to monitor construction work and compliance with the terms and conditions of permits. If required by permit conditions, hydroacoustic monitoring will be performed to monitor underwater sound levels and ensure compliance with established thresholds. If any salmonids, sturgeon, or lamprey are found dead or injured during pile-driving activities, NMFS will be notified immediately and in-water pile driving will cease. To comply with the thresholds, DWR will employ the following mitigation measures:</p> <ul style="list-style-type: none"> • An impact hammer cushion block will be used. 	LS	LS	LS	LS	LS	LS

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TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-9 (cont.)							<ul style="list-style-type: none"> Impact hammers will be used only during daylight hours, and will initially be used at low energy levels and reduced impact frequency. (Applied energy and frequency will be gradually increased until the necessary full force and frequency are achieved.) If noise thresholds are not met using the above measures, DWR will consult with the regulatory agencies on applying other mitigation methods, as feasible (e.g., bubble curtains and/or reducing the daily duration of pile-driving activities). 						
	3.4-10: Implementation of the Proposed Project could increase the potential for predation on native fish from alterations in aquatic habitat structure.	LS	LS+	LS	LS	LS+	LS+	None required.	LS	LS+	LS	LS+	LS+	LS
	3.4-11: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by affecting fish passage conditions.	LS	LS+	LS	LS	LS+	LS+	None required.	LS	LS+	LS	LS+	LS+	LS
	3.4-12: Construction of the Proposed Project could cause the loss or degradation of riparian forest.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.4-12a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Stakes and flagging will be used at the edge of the construction footprint if work is anticipated to occur within 50 feet of riparian areas that are proposed for avoidance. A biological monitor will be present during initial grading or vegetation-clearing activities within 50 feet of riparian areas proposed for avoidance.</p> <p>Mitigation Measure 3.4-12b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Tree mitigation will be based on the number or area of trees actually affected by project construction, as determined by a certified arborist. DWR will catalog affected trees before project construction, and will prepare a compensatory mitigation plan for the trees that includes monitoring and reporting. Compensatory mitigation may include the purchase of credits from an approved off-site bank or on-site tree plantings.</p> <p>Mitigation Measure 3.4-12c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Should removing vegetation within the riparian forest be necessary, DWR will prepare an invasive plant management plan for the plants identified by the California Invasive Plant Council as having a moderate or high level of invasiveness and plants considered locally invasive. The contractor will implement the management plan's recommendations for the affected riparian forest in the construction area. In addition, the contractor will implement the following best management practices to prevent the introduction and spread of invasive plant species during construction:</p> <ul style="list-style-type: none"> All construction equipment will be washed and cleaned of debris before entering the project area to prevent new invasive plant species from entering the project site. Straw bales and other vegetative materials used for erosion control will be certified weed-free. All revegetation materials (e.g., seed mixes and mulches) will consist of plant species native to Sutter County, certified weed-free. All seeds and container plants will be obtained from locally adapted genetic stock that is free from fungal pathogens. 	LS	LS	LS	LS	LS	LS

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TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

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3.4 Biological Resources (cont.)	3.4-12 (cont.)							<ul style="list-style-type: none"> In areas requiring weed control, effective methods for removal may vary depending on the species being controlled. Typical methods include hand removal, mowing, or application of herbicides. Herbicides will be used consistent with federal, State, and local requirements. These requirements include the restrictions on herbicide use specified by resource agencies to prevent impacts on aquatic habitats, listed plant or wildlife species, or their habitats. All herbicides will be used in accordance with any guidance on the label that takes into consideration water quality and wildlife concerns. Any areas to be revegetated will be replanted with a native vegetation plant and/or seed mix. 						
	3.4-13: Construction of the Proposed Project could cause the loss or deterioration of wetlands and waters of the United States and State.	LSM	LS	LSM	LSM	LSM	LSM-	<p>Mitigation Measure (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measure 3.4-7b.</p> <p>Mitigation Measure 3.4-13 (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Silt fencing will be erected at the edge of the construction/maintenance footprint in advance of work anticipated to occur within 50 feet of the Sacramento River or the seasonal wetland. A biological monitor will be present during fence installation and during initial grading or vegetation clearing activities within 50 feet of the potentially jurisdictional features proposed for avoidance.</p>	LS	LS	LS	LS	LS	LS
	3.4-14: Implementation of the Proposed Project could cause interference with the movement of native resident or migratory terrestrial wildlife species.	LS	LS-	LS	LS	LS	LS	None required.	LS	LS-	LS	LS	LS	LS
	3.4-15: Implementation of the Proposed Project could conflict with provisions of local policies or ordinances protecting biological resources.	LS	LS-	LS	LS	LS	LS	None required.	LS	LS-	LS	LS	LS	LS
	3.4-16: Implementation of the Proposed Project could contribute to cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.	LSM	LSM+	LSM	LSM+	LSM+	LSM+	<p>Mitigation Measures (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measures 3.4-2a, 3.4-2b, 3.4-2c, 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, 3.4-3e, 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, 3.4-5e, 3.4-6a, 3.4-6b, 3.4-6c, 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, 3.4-9, 3.4-12a, 3.4-12b, 3.4-12c, and 3.4-13.</p>	LS	LS	LS	LS	LS	LS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.5 Cultural Resources	3.5-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.5-1a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Before construction, a qualified archaeologist shall prepare a cultural resources awareness and sensitivity training program for all construction and field workers involved in ground-disturbing activities. A "qualified archaeologist" is defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology and has expertise in California archaeology. Before DWR provides this training, an advance copy shall be shared with culturally affiliated California Native American Tribes to confirm that it captures all the elements of awareness and sensitivity training associated with the work. The training program developed shall include a presentation that covers, at minimum, the types of cultural resources common to the area, regulatory protections for cultural resources, and the protocol for unanticipated discovery of archaeological resources (see Mitigation Measure 3.5-1b). Written materials associated with the program shall be provided to project personnel as appropriate. Personnel assigned to work in areas of ground-disturbing activities shall receive the training before starting work in these areas.</p> <p>Mitigation Measure 3.5-1b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If historic-era archaeological resources are encountered during Project development or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. DWR and a qualified archaeologist shall be immediately informed of the discovery. A "qualified archaeologist" is defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology and has expertise in California archaeology. The qualified archaeologist shall inspect the discovery and shall notify DWR of their initial assessment. Historic-era materials might include building or structure footings and walls, and deposits of metal, glass, and/or ceramic refuse.</p> <p>If DWR determines, based on recommendations from the qualified archaeologist, that the resource may qualify as a historical resource or unique archaeological resource (as defined in State CEQA Guidelines Section 15064.5), then the resource shall be avoided if feasible. Avoidance means that no activities associated with the project may affect cultural resources within the boundaries of the resource or any defined buffer zones.</p> <p>If avoidance is not feasible, DWR shall consult with a qualified archaeologist and other appropriate interested parties to determine treatment measures to minimize or mitigate any potential impacts on the resource pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4.</p> <p>Once treatment measures have been determined, DWR shall prepare and implement an Archaeological Resources Management Plan that outlines the treatment measures for the resource. Treatment measures typically consist of two steps:</p> <ul style="list-style-type: none"> Determine whether the resource qualifies as a historical resource, unique archaeological resource, or tribal cultural resource through historical or ethnographic research, evaluative testing (excavation), and laboratory analysis. If it does qualify as one of these resource types, conduct data recovery (e.g., excavation, documentation, curation) targeting the recovery of the resource's important data. 	LS	LS	LS	LS	LS	LS

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

**TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.5 Cultural Resources (cont.)	3.5-1 (cont.)							<p>The Archaeological Resources Management Plan shall include:</p> <ul style="list-style-type: none"> • Background context. • Research themes and research questions for assessing potential resource significance. • Methods for evaluating the resource for California Register eligibility (e.g., ethnographic or historical research, evaluative test excavations, documentation, laboratory and geoarchaeological analyses, reporting) and, if an archaeological resource, for evaluating its eligibility as a unique archaeological resource under CEQA. • Data recovery methods (e.g., background methods, field methods, laboratory methods, documentation, consultation, curation, reporting), if the resource is determined to be a historical resource, unique archaeological resource, or tribal cultural resource. <p>Any treatment measures implemented shall be documented in a professional-level technical report (e.g., Archaeological Testing Results Report, Archaeological Data Recovery Report, Ethnographic Report) to be authored by a qualified archaeologist and filed with CHRIS. Construction work at the location of the find may commence upon completion of the approved treatment and authorization by DWR. Work may proceed in other parts of the project area while the mitigation is being carried out.</p> <p>Mitigation Measure 3.5-1c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If a shipwreck and associated artifacts or other cultural resources on or in the tide and submerged lands of California are encountered during project development or operation, Mitigation Measure 3.5-1b and the following measures shall be implemented:</p> <ul style="list-style-type: none"> • DWR shall initiate consultation with SLC staff within two business days of the discovery. • Per PRC Section 6313(c), any submerged cultural resource remaining in State waters for more than 50 years is presumed to be archaeologically or historically significant. • If the find is a maritime archaeological resource, the qualified archaeologist with whom DWR consults shall have expertise in maritime archaeology. • DWR shall consult with the SLC regarding assessment of the find and development of any treatment measures to minimize or mitigate potential impacts on the resource, pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4. • DWR shall submit to the SLC any report prepared for the resource as part of the assessment of the find and implementation of treatment measures to minimize or mitigate potential impacts. 						
	3.5-2: Implementation of the Proposed Project could disturb human remains, including those interred outside of dedicated cemeteries.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.5-2 (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If human remains are uncovered during construction, all work shall immediately halt within 100 feet of the find and the Sutter County Coroner shall be contacted to evaluate the remains and follow the procedures and protocols set forth in State CEQA Guidelines Section 15064.5(e)(1). If the County Coroner determines that the remains are Native American, the County shall contact the NAHC, in accordance with Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. See Mitigation Measure 3.9-1c, which pertains specifically to Native American remains.</p>	LS	LS	LS	LS	LS	LS

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: South Notch Alternative	Significance Before Mitigation: North and South Notches Alternative	Significance Before Mitigation: North Notch with Modified Gate Operation Alternative	Significance Before Mitigation: Tisdale Weir Structural Improvements Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: South Notch Alternative	Significance After Mitigation: North and South Notches Alternative	Significance After Mitigation: North Notch with Modified Gate Operation Alternative	Significance After Mitigation: Tisdale Weir Structural Improvements Alternative
3.5 Cultural Resources (cont.)	3.5-3: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	LSM	LS	LSM	LSM+	LSM	LSM-	Mitigation Measures (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c.	LS	LS	LS	LS	LS	LS
	3.5-4: Implementation of the Proposed Project could contribute to significant cumulative damage to unidentified human remains.	LSM	LS	LSM	LSM+	LSM	LSM-	Mitigation Measure (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measure 3.5-2.	LS	LS	LS	LS	LS	LS
3.6 Greenhouse Gas Emissions	3.6-1: Construction of the Proposed Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	LS	LS-	LS+	LS+	LS	LS-	None required.	LS	LS-	LS+	LS+	LS	LS-
	3.6-2: Construction of the Proposed Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LS	LS-	LS+	LS+	LS	LS-	None required.	LS	LS-	LS+	LS+	LS	LS-
	3.6-3: Construction of the Proposed Project could generate greenhouse gas emissions that could contribute considerably to a cumulative impact.	LS	LS-	LS+	LS+	LS	LS-	None required.	LS	LS-	LS+	L+	LS	LS-
3.7 Hydrology and Water Quality	3.7-1: Construction of the Proposed Project would involve activities that could result in a release of sediment and other pollutants that could substantially degrade receiving water quality.	LSM	LS	LSM	LSM+	LSM-	LSM-	Mitigation Measures (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c.	LS	LS	LS	LS	LS	LS
	3.7-2: Operation of the Proposed Project could result in a release of sediment that could substantially degrade receiving water quality.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.7-3: Operation of the Proposed Project could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.7-4: Operation of the Proposed Project could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.7-5: Operation of the Proposed Project could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-

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TABLE ES-2 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

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3.7 Hydrology and Water Quality (cont.)	3.7-6: Construction of the Proposed Project in combination with other projects being constructed in the project area could result in the release of sediment and other pollutants that could cumulatively degrade receiving water quality.	LSM	LS	LSM	LSM+	LSM-	LSM-	Mitigation Measures (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c.	LS	LS	LS	LS	LS	LS
	3.7-7: Operation of the Proposed Project in combination with the operation of other projects in the project area has the potential to release sediment that could cumulatively degrade receiving water quality.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.7-8: Operation of the Proposed Project in combination with other projects in the project area could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.7-9: Operation of the Proposed Project in combination with other projects in the project area could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
	3.7-10: Operation of the Proposed Project in combination with other projects in the project area could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk.	LS	LS-	LS	LS+	LS-	LS-	None required.	LS	LS-	LS	LS+	LS-	LS-
3.8 Recreation	3.8-1: Implementation of the Proposed Project could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	LS-	LS+	LS+	LS-	LS-	None required.	LS	LS-	LS+	LS+	LS-	LS-
	3.8-2: Implementation of the Proposed Project could potentially result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.	LS	LS-	LS+	LS+	LS-	LS-	None required.	LS	LS-	LS+	LS+	LS-	LS-

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TABLE ES-2 (CONTINUED)
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3.8 Recreation (cont.)	3.8-3: Implementation of the Proposed Project in conjunction with past, present, and potential future development in the surrounding region could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	LS-	LS+	LS+	LS-	LS-	None required.	LS	LS-	LS+	LS+	LS-	LS-
	3.8-4: Operation and maintenance of the Proposed Project in conjunction with past, present, and potential future development in the surrounding region could result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.	LS	LS-	LS+	LS+	LS-	LS-	None required.	LS	LS-	LS+	LS+	LS-	LS-
3.9 Tribal Cultural Resources	3.9-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.	LSM	LS	LSM	LSM+	LSM	LSM-	<p>Mitigation Measure 3.9-1a (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Before construction, DWR will prepare a cultural resources awareness and sensitivity training program for all construction and field workers involved in ground-disturbing activities. Before DWR provides this training, an advance copy of the material will be shared with culturally affiliated California Native American Tribes to confirm that it captures all elements of the awareness and sensitivity training associated with the work. The training program developed will include a presentation and awareness brochure that covers, at minimum, the types of potential tribal cultural resources common to the area; consequences of violating State laws and regulations; regulatory protections for tribal cultural resources; and the protocol for inadvertent discovery of archaeological resources (see Mitigation Measures 3.9-1b and 3.5-1b). Written materials associated with the program will be provided to project personnel as appropriate. Personnel assigned to work in areas of ground-disturbing activities will receive the training before starting work in these areas.</p> <p>Mitigation Measure 3.9-1b (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If indigenous archaeological resources are encountered during project development or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. DWR, in consultation with affiliated tribal parties, will develop and implement appropriate protection and avoidance measures, where feasible. Procedures will be developed in accordance with State CEQA Guidelines Section 15126.4, which specifies procedures for post-review discoveries. Treatment may include, as feasible, processing materials for reburial; minimizing handling of cultural objects; leaving objects in place within the landscape; returning objects to a location in the project area where they will not be subject to future impacts; avoidance; and treating with culturally appropriate dignity. "Avoidance" means that no activities associated with the project may affect the tribal cultural resources. "Treating with culturally appropriate dignity" means taking into account the tribal cultural values and meaning of the resource by implementing measures including, but not limited to, the following:</p> <ul style="list-style-type: none"> Protecting the cultural character and integrity of the resource 	LS	LS	LS	LS	LS	LS

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TABLE ES-2 (CONTINUED)
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3.9 Tribal Cultural Resources (cont.)	3.9-1 (cont.)							<ul style="list-style-type: none"> Protecting the traditional use of the resource Protecting the confidentiality of the resource Protecting the resource <p>Construction work at the location of the find may begin upon authorization by DWR. Work may proceed in other parts of the project area while the mitigation is being carried out.</p> <p>Mitigation Measure 3.9-1c (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): If human remains are discovered during construction, all work shall immediately halt within 100 feet of the find and the Sutter County Coroner shall be contacted to evaluate the remains and follow the procedures and protocols set forth in State CEQA Guidelines Section 15064.5(e)(1). If the County Coroner determines that the remains are Native American, the County shall contact the NAHC, in accordance with Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. As required by PRC Section 5097.98, DWR shall ensure that further development activity avoids damage or disturbance in the immediate vicinity of the Native American human remains, according to generally accepted cultural or archaeological standards or practices, until DWR has conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.</p>						
	3.9-2: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of a tribal cultural resource, as defined in PRC Section 21074.	LSM	LS	LSM	LSM+	LSM	LSM-	Mitigation Measure (Proposed Project, South Notch Alternative, North and South Notches Alternative, North Notch with Modified Gate Operation Alternative, and Tisdale Weir Structural Improvements Alternative): Implement Mitigation Measures 3.9-1a through 3.9-1c.	LS	LS	LS	LS	LS	LS

SOURCE: Data compiled by Environmental Science Associates in 2020.

LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

CHAPTER 1

Introduction

The California Department of Water Resources (DWR) Division of Flood Management proposes to construct, operate, and maintain the Tisdale Weir Rehabilitation and Fish Passage Project (Proposed Project). The Proposed Project would integrate structural rehabilitation of Tisdale Weir with installation of fish passage facilities to reduce fish stranding at the weir and improve fish passage through the weir to the Sacramento River. The Tisdale Weir and Bypass are critical components of the Sacramento River Flood Control Project (SRFCP).

1.1 Purpose of the Environmental Impact Report

This draft environmental impact report (DEIR) has been prepared in conformance with the California Environmental Quality Act of 1970 (CEQA) (California Public Resources Code [PRC] Section 21000 et seq.), as amended, and the *Guidelines for Implementing the California Environmental Quality Act* (State CEQA Guidelines) (California Code of Regulations Title 14, Section 15000 et seq.).

Consistent with Section 15121(a) of the State CEQA Guidelines, this DEIR is a public information document that objectively assesses and discloses the potential environmental effects of constructing, operating, and maintaining the Proposed Project. It also identifies feasible mitigation measures and alternatives that would avoid identified adverse environmental impacts or reduce identified impacts to a less-than-significant level.

CEQA requires lead, responsible, and trustee agencies to consider the environmental consequences of projects over which they have discretionary authority. DWR, as the lead agency for the Proposed Project, will use the information in this DEIR for the following purposes:

- Evaluate the Proposed Project’s potential environmental impacts.
- Determine whether any feasible mitigation measures are necessary and available to reduce potentially significant environmental impacts.
- Approve, modify, or deny approval of the Proposed Project.

1.2 Project Background

An early form of Tisdale Weir was built around 1911. The current weir was built by the U.S. Army Corps of Engineers in 1932 with a 50-year life expectancy and is now more than 35 years beyond its original design life. Because of its age and frequent use, the structure has sustained

damage that, if not repaired, could eventually result in weir failure, with subsequent flooding, property damage, and possibly loss of life. Cracking and other signs of damage to the concrete and exposed rebar are present throughout the weir structure.

Rehabilitation of Tisdale Weir as part of the Proposed Project is intended to extend the structure's design life by 50 years or more. This work is necessary to retain the function of the weir. Normal flood operations at Tisdale Weir can result in the stranding and loss of anadromous fish and other fish species in the weir's downstream energy dissipation basin within the Tisdale Bypass. In its current configuration, during certain flow conditions, the weir can prevent fish from passing from the bypass to the Sacramento River. When water stops flowing over the weir, fish can become stranded in the energy dissipation basin. The California Department of Fish and Wildlife has engaged in operations to rescue fish (targeting listed salmonid species and green sturgeon) that become stranded at SRFCP weirs, including Tisdale Weir, and has transported the fish to the Sacramento River.

The Tisdale Bypass is a 4-mile-long, variable-width trapezoidal channel that connects the Sacramento River to the Sutter Bypass. The North and South Levees of the Tisdale Bypass are earthen structures. The levees vary in height from approximately 16 feet at the weir to 21 feet at the transition to the Sutter Bypass. Toe roads run along the base of the levees to provide access for maintenance vehicles.

Under flood conditions, flows from the Sacramento River spill over Tisdale Weir when flood stage reaches higher than 44.07 feet (North American Vertical Datum of 1988). The Tisdale Bypass levees contain these floodwaters within the channel of the bypass, conveying flood flows into the Sutter Bypass to the east. From there, flows in the Sutter Bypass reenter the Sacramento River farther south and are further conveyed into the Yolo Bypass. The Tisdale Bypass provides flood protection for the Sutter and Colusa Basins, the towns of Knights Landing and Robbins, the West Side Levee District, Reclamation Districts 108 and 1500, State Routes 45 and 113, and the infrastructure that supports these areas.

The bypass is regularly inundated during high-water events, and flows through the bypass carry a portion of the Sacramento River's sediment load. As floodwaters travel through the bypass, some of that sediment is deposited in the floodway. Over time, the accumulation of sediment may reduce the bypass's conveyance capacity.

DWR operates and maintains the Tisdale Bypass in accordance with Section 8361 of the California Water Code. Maintenance activities include clearing sediment and vegetation, repairing and guarding against erosion and subsidence, repairing flood risk reduction facilities, and conducting other maintenance of State facilities as needed. Many maintenance activities occur annually, but some are performed less frequently, as needs arise and funds become available. DWR recently completed a separate project, the Tisdale Bypass Sediment Removal 2020 Project. Sediment was last removed from the bypass by DWR in 2007, when approximately 1.7 million cubic yards of sediment were removed from within the channel. The Tisdale Bypass Sediment Removal 2020

Project removed approximately 500,000 cubic yards of sediment from the bypass in 2020 to bring the channel back to the “baseline condition” (2007 post-sediment removal project condition) to help restore the maximum flood conveyance capacity to this portion of the SRFCP. The Tisdale Bypass Sediment Removal 2020 Project underwent a separate CEQA review and is not evaluated in this DEIR.

The preparation of an environmental impact report (EIR) involves multiple steps during which the public can review and comment on the scope of the analysis, EIR content, and the results and conclusions presented, and on the document’s adequacy to meet the substantive requirements of CEQA. The following describes the steps in the environmental review process for the Proposed Project.

1.2.1 Notice of Preparation

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, DWR prepared a notice of preparation (NOP) of an EIR and published the NOP on April 15, 2019 (State Clearinghouse #2019049093). DWR provided the NOP to federal, State, and local agencies (i.e., reclamation and levee districts); to landowners adjacent to the location of the Proposed Project; and to other interested parties. The NOP was circulated for 30 days ending on May 15, 2019. The NOP briefly described the Proposed Project and summarized the potential environmental impacts to be evaluated in the DEIR. The NOP is included in **Appendix A** of this DEIR.

Comment letters received in response to the NOP were considered during preparation of this DEIR and are included in Appendix A. A public scoping meeting was held at DWR’s Sutter Maintenance Yard on April 25, 2019, to provide a forum for the public to comment on the proposed scope and content of the EIR.

1.2.2 Draft Environmental Impact Report

This DEIR will be published and made available to federal, State, and local agencies and interested organizations and individuals who may want to review and comment on the adequacy of the analysis. Public notice of this DEIR will be sent directly to all responsible and trustee agencies, and to agencies and other stakeholders who attended the scoping meeting and commented on the NOP.

The DEIR is available for review online at DWR’s website at:

<https://water.ca.gov/Programs/Flood-Management/Flood-Projects/Tisdale-Weir>

Paper copies of the DEIR are available for review during normal business hours at:

California Department of Water Resources
Division of Flood Management, Flood Maintenance Office
3310 El Camino Avenue, Room 140
Sacramento, CA 95821

DWR will host a virtual public meeting for the DEIR on December 8, 2020, from 10 a.m. to 12 p.m. The meeting will provide information on the CEQA process and the DEIR and offer an opportunity to provide verbal comments on the DEIR. Please register in advance of the meeting at the following link. Registration will be open until the start of the meeting on December 8.

https://zoom.us/webinar/register/WN_qW2ySC4RSOqEVYrckM_qWw

The public review period for this DEIR will be November 20, 2020, through January 15, 2021. During the public comment period, written comments should be mailed or emailed to:

California Department of Water Resources
Division of Flood Management
Attention: Stephanie Ponce, Environmental Scientist
3310 El Camino Avenue, Room 140
Sacramento, CA 95821

Email: TisdaleWeirRehabProject@water.ca.gov

If comments are provided via email, please include the project title in the subject line, attach comments in Microsoft Word format, and include the commenter's U.S. Postal Service mailing address.

All comments received will be made available for public review in their entirety, including the names and addresses of the respondents. Individual respondents may request that their name and/or address be withheld from public disclosure. DWR will honor such requests to the extent allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.

1.2.3 Final Environmental Impact Report

A response to comments document will address written and oral comments received on the DEIR during the public review period. Together, the response to comments document, the DEIR, and any changes to the DEIR made in response to comments will constitute the final EIR (FEIR). The DEIR and FEIR together will compose the EIR for the Proposed Project.

1.2.4 Mitigation Monitoring and Reporting Program

PRC Section 21081.6(a) requires lead agencies to “adopt a reporting and monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment.” The State CEQA Guidelines do not require that the DEIR include the reporting and monitoring program.

In compliance with PRC Section 21081.6(a), as part of the approval process, DWR will prepare and adopt a mitigation monitoring and reporting program for the mitigation measures in this DEIR that will be adopted for the Proposed Project.

1.2.5 Approval Process

Before DWR decides whether to approve the Proposed Project, it must 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 DWR's independent judgment.

DWR is also required to adopt findings of fact and, for impacts determined to be significant and unavoidable, to adopt a statement of overriding considerations and file a notice of determination with the Governor's Office of Planning and Research within 5 days after DWR's approval of the Proposed Project.

1.3 Scope of this Environmental Impact Report

The NOP for this DEIR identified the potentially significant impacts of the Proposed Project. As identified in the NOP (Appendix A), DWR determined that this DEIR will address the following resource topics:

- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Recreation
- Tribal Cultural Resources

Other resource topics were evaluated and were determined to result in either no impact or less-than-significant impacts; those other topics are therefore not evaluated further in this DEIR. The analysis is summarized in the Initial Study Environmental Checklist, presented in Appendix B.

1.4 Organization of the Draft Environmental Impact Report

This DEIR is organized as follows:

- The **Executive Summary** summarizes the project description, describes issues to be resolved, and presents a summary table listing the impacts that would result from implementation of the Proposed Project and their levels of significance under CEQA.
- **Chapter 1, Introduction**, describes the intended uses of this EIR, the environmental review and approval process, and document organization.

- **Chapter 2, *Project Description***, presents an overview of the Proposed Project, outlines the project objectives, and presents background information about the Proposed Project.
- **Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures***, describes the existing environmental setting and discusses the environmental impacts of the Proposed Project.
- **Chapter 4, *Other CEQA Considerations***, discusses other CEQA issues, including growth-inducing impacts, cumulative impacts, significant unavoidable impacts on the environment, and significant irreversible environmental changes.
- **Chapter 5, *Alternatives***, describes potential alternatives to the Proposed Project, analyzes the ability of the alternatives to meet the Proposed Project’s objectives, and evaluates differences in environmental impact levels.
- **Chapter 6, *List of Preparers***, identifies the DEIR’s authors and consultants, and the agencies or individuals consulted during preparation of the DEIR.
- **Chapter 7, *References***, lists the references cited in the DEIR.
- The **appendices** present materials that support the findings and conclusions presented in the text of the DEIR.

CHAPTER 2

Project Description

2.1 Project Area and Vicinity

The project area for the Tisdale Weir Rehabilitation and Fish Passage Project (Proposed Project) is located on the east side of the Sacramento River, approximately 13.5 miles southwest of Yuba City in Sutter County, California (**Figure 2-1**). The area is within the U.S. Geological Survey Tisdale Weir 7.5-minute quadrangle map.

Tisdale Weir is one of five major overflow weirs in the Sacramento River Flood Control Project (SRFCP). It is generally the first to overflow and the last to stop flowing. The weir is a fixed-elevation, ungated overflow structure that was originally designed to spill and convey up to 38,000 cubic feet per second (cfs) of excess Sacramento River floodwaters into the Tisdale Bypass, a 4-mile-long channel that flows eastward to the Sutter Bypass.

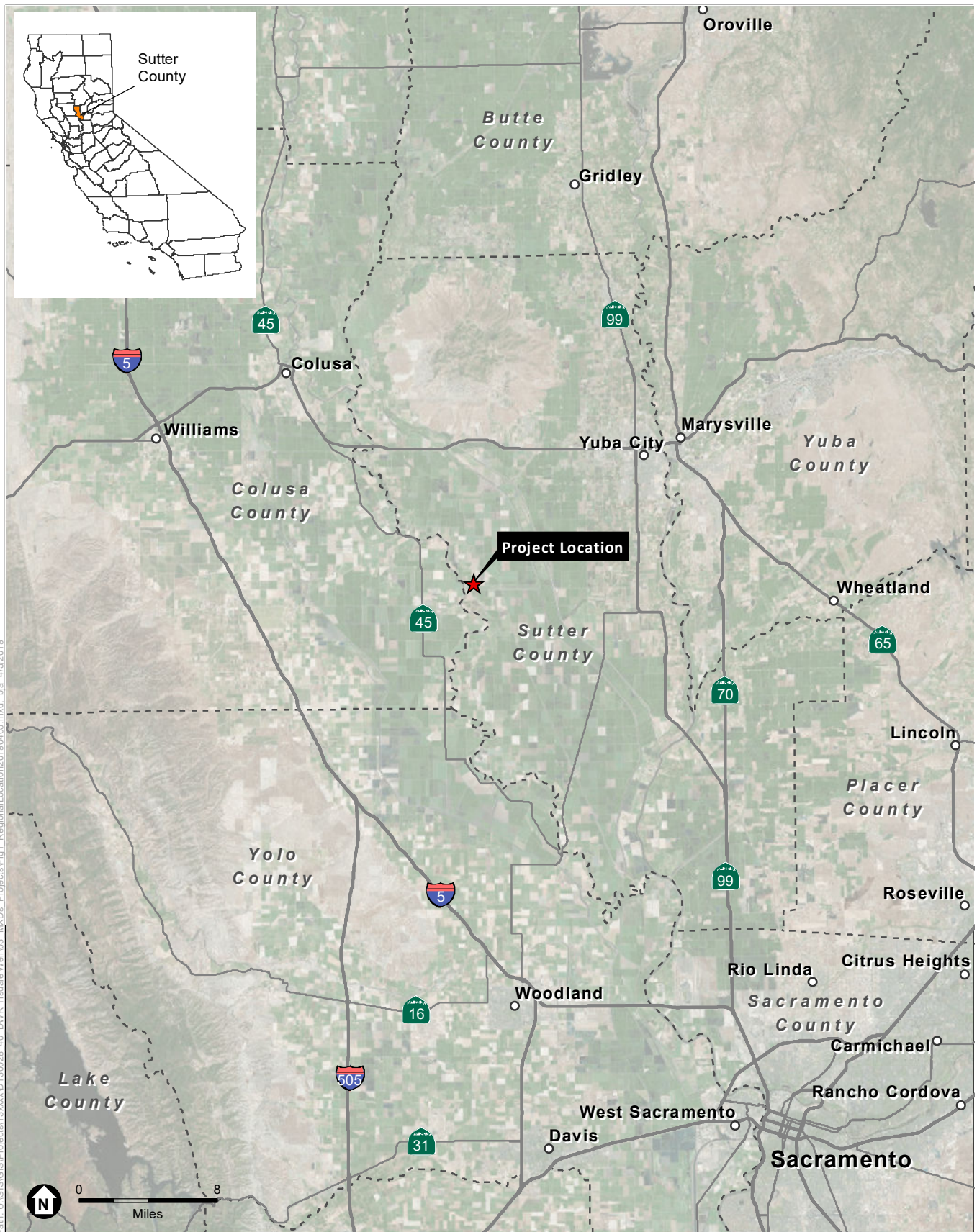
The western boundary of the project area is the Sacramento River immediately west of the existing Tisdale Weir and the parking lot for the Sutter County (County) Tisdale Boat Launch Facility. The eastern boundary of the project area is just east of the Garmire Road Bridge, which traverses the Tisdale Bypass downstream of Tisdale Weir. The spoils storage location for the Proposed Project is north of the Tisdale Bypass, approximately 1.5 miles east of the weir (**Figure 2-2**). The project area includes the project site (i.e., project footprint that contains the staging areas), the spoils storage area and staging area, and the haul route to the spoils storage area, as shown in Figure 2-2.

2.2 Project Objectives

The primary objectives of the Proposed Project are:

- Structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.
- Reduce fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

Tisdale Weir is a federally authorized structure for which the State, through the Central Valley Flood Protection Board (formerly known as The Reclamation Board), has given assurances to the federal government regarding State operation and maintenance. The Proposed Project would support the California Department of Water Resources (DWR) in meeting its responsibilities under California Water Code Section 8361 to operate and maintain the SRFCP by extending the useful life of the weir.



SOURCE: Esri, 2015; ESA, 2019

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 2-1
Regional Location





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SOURCE: USDA, 2014; DWR, 2019; ESA, 2020

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 2-2
Project Elements

2.3 Description of the Proposed Project

The Proposed Project consists of rehabilitation and reconstruction of Tisdale Weir, installation and operation of fish passage facilities, and associated project site improvements. Each of these general actions comprises several project components that are outlined and shown in **Figure 2-3** and described in more detail below.

2.3.1 Project Site Improvements

The proposed improvements to the project site would facilitate weir rehabilitation and reconstruction and the installation of fish passage facilities, and would enhance the protection of existing project site features. Project site improvements would include:

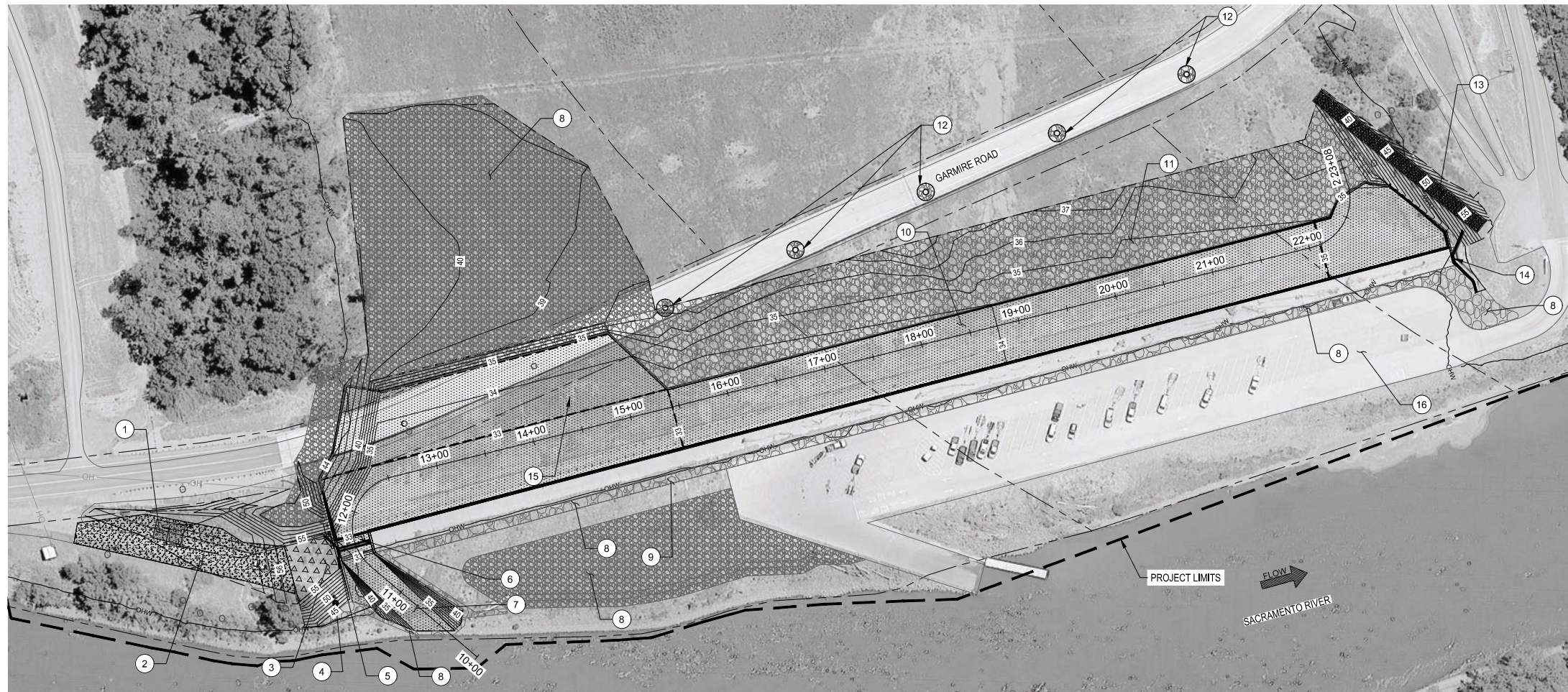
- Removing utility poles from the bypass and relocating power and communication lines to the Garmire Road Bridge through existing utility openings or attached to the outside of the bridge.
- Filling the scoured areas north of the boat launch parking lot and south of the north abutment with scour resistant materials (riprap or large cobble, potentially with grout), while regrading the area to a smooth character to reduce impingement by wood debris and facilitate equipment access to the south side of the connection channel (see Section 2.3.3, *Fish Passage Facilities*).
- Providing scour countermeasures (concrete or riprap, potentially with grout) around the Garmire Road Bridge piers.
- Stabilizing existing cobble along the leading (upstream) edge of the weir or replacing the cobble with erosion protection measures (e.g., riprap, concrete) to resist scour, or both.
- Constructing access ramps from the existing bypass channel berms to the proposed site improvement area downstream of the weir.

See *Construction Activities* in Section 2.3.4, *Proposed Construction Methods*, for additional details about these project site improvements.

2.3.2 Tisdale Weir Rehabilitation and Reconstruction

Weir rehabilitation and reconstruction would focus on addressing documented structural deficiencies in the existing weir. Some components would be rehabilitated through minor modifications to the existing structure, and others would require demolition and full reconstruction. Actions would consist of repairing the weir crest and demolishing and reconstructing the two abutments (south and north) and the energy dissipation basin. The proposed reconstruction of the energy dissipation basin would be directly coupled with the proposed fish passage facilities, as described further in Section 2.3.3, *Fish Passage Facilities*. More specifically, weir rehabilitation and reconstruction would include:

- Removing and replacing the southern abutment in kind and providing scour countermeasures (riprap, potentially with grout) around the reconstructed abutment.

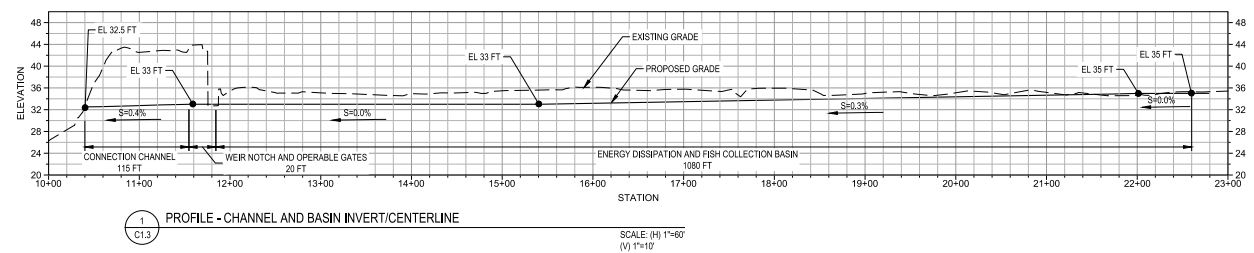


KEYED NOTES

- ① CONSTRUCT CONTROL BUILDING AND FOUNDATION
- ② SITE ACCESS IMPROVEMENTS
- ③ CONSTRUCT EQUIPMENT PAD
- ④ REPLACE TISDALE STREAM GAGE
- ⑤ NORTH ABUTMENT
- ⑥ CONCRETE WEIR NOTCH WITH BOTTOM HINGE GATE.
- ⑦ CONCRETE CONNECTION CHANNEL
- ⑧ REVETMENT ROCK. SEE SHEETS
- ⑨ CONCRETE ACCESS ROAD
- ⑩ CONCRETE ENERGY DISSIPATION AND FISH COLLECTION BASIN
- ⑪ BURIED REVETMENT ROCK
- ⑫ SCOUR PROTECTION FOR SIX PIERS
- ⑬ CONSTRUCT ACCESS ROAD
- ⑭ SOUTH ABUTMENT
- ⑮ REMOVE AND RELOCATE OVERHEAD POWER LINES AND POLES TO GARMIRE ROAD BRIDGE
- ⑯ PROVIDE INFORMATIONAL SIGNAGE FOR PUBLIC AWARENESS OF NEW FACILITIES

LEGEND:

- | | | | |
|--|------------------|--|---------------------------|
| | CONCRETE | | CONSTRUCTION LIMITS |
| | REVETMENT ROCK | | PROPOSED CONTOURS - MAJOR |
| | TAX LOT BOUNDARY | | PROPOSED CONTOURS - MINOR |
| | GRADE BREAK | | EXIST TREE |
| | | | EX BRIDGE PIER |



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- Removing and replacing the northern abutment, which would incorporate an equipment pad to facilitate maintenance of the new connection channel and operable gate (see Section 2.3.3). The existing “Sacramento River at Tisdale Weir” water level (stage) gage in this vicinity would be removed and replaced with a new gage house structure.
- Filling in the depressed area between the existing gravel access road on the north side of the bypass and Garmire Road with engineered backfill material to construct a level area for the control building and equipment pad.
- Patching, resurfacing, and sealing the existing concrete sill surface of the weir with a cementitious or epoxy material.
- Grouting to fill potential voids beneath the existing weir structure.
- Partially demolishing, removing, and reconstructing the existing energy dissipation basin with a basin that would serve an energy dissipation function and also incorporate improvements to fish passage and reduce the potential for fish stranding (see Section 2.3.3).
- Installing provisions for monitoring equipment (e.g., stage gages, cameras, telemetry antennae) in the weir and/or on abutments or adjacent banks.
- Investigating the integrity of the sheet pile wall through excavation and rehabilitating if necessary.

2.3.3 Fish Passage Facilities

The fish passage facilities constructed for the Proposed Project would include reconstruction of an integrated energy dissipation and fish collection basin on the downstream side of the weir; installation of a notch, an operable gate (for flow regulation), and attendant facilities at the north end of the weir; and construction of a channel connecting the notch in the weir to the Sacramento River.

Constructing the fish passage facilities would involve the following steps:

- Improve or reconstruct the entrance road on the north side of the weir from Garmire Road to the north abutment (i.e., the entrance road to the location of the equipment pad and control building).
- Construct an equipment pad immediately above and north of the north abutment face to support the maintenance and removal of debris from the notch and connection channel by equipment accessing this area from Garmire Road, and to facilitate gate maintenance.
- Construct a control building to house electrical, mechanical, and communication equipment for the operable gate and potential monitoring equipment.
- Install site utilities (i.e., power and communication) on the north end of the weir to support the operable gate.
- Install scour countermeasures (e.g., riprap or grout) that would extend from the north abutment into the bypass channel, to provide scour protection from the higher water velocities that would come through the connection channel under certain flow conditions.

- Remove a portion of Tisdale Weir and install a concrete notch structure within the existing weir, approximately 11 feet tall by 33 feet wide, to facilitate fish passage and accommodate the operable gate. The side slopes of the notch would be vertical.
- Construct an approximately 27-foot- to 33-foot-wide by 11-foot-deep connection channel from the Sacramento River to the proposed notch, terminating in the proposed fish collection basin. The channel would have side slopes of approximately 2:1 at the Sacramento River, steepening to vertical at the location of the operable gate. The channel would be constructed with concrete to prevent scour and facilitate fish passage and drainage of the basin. In addition, sub-angular riprap could be installed adjacent to the channel to resist scour.
- Install an operable, bottom-hinged gate in the notch, including utility connections for electrical, mechanical, and controls. The gate would likely be composed of two gate panels, assembled together with an individual air bladder under each panel for raising and lowering the gate. The two separate panels would be assembled together to form a single gate, and thus would be opened and closed together (rather than independently) to minimize structural support requirements, minimize debris impingement, and optimize fish passage performance.
- Excavate soil to construct a concrete or roller-compacted concrete (RCC) basin across the downstream edge of the entire weir. Adjacent scour countermeasures (e.g., riprap or rounded material) would provide a transition from the basin to native ground. The basin would be sloped to the notch to allow water to drain to the notch, to minimize fish stranding.
- On the south side/downstream edge of the basin, fill and smooth undulating topography and install scour countermeasures (e.g., riprap or rounded material, or grout) to provide a transition to native ground and drainage to the notch to minimize fish stranding.
- On the north side/downstream edge of the basin (apron), excavate soil, removing vegetation (including trees), extending and elevating the concrete (or RCC) basin farther downstream, and installing adjacent riprap or grout as a scour countermeasure for the higher water velocities through the notch. This feature would provide scour protection, weir energy dissipation functions, and a transition to native ground and drainage into the basin when the operable gate is open, to minimize fish stranding.
- Install a basin access ramp on the south side of the bypass, likely using riprap and aggregate base for erosion protection. The ramp would provide access into the basin and bypass from the existing levee road to facilitate maintenance activities.
- Install small equipment and devices, or otherwise construct in a way to accommodate future installation, to facilitate both real-time and long-term monitoring (e.g., stream gages, cameras, telemetry antennae).

The fish passage facilities are intended to provide passage for all species; however, designs would focus on Chinook salmon (*Oncorhynchus tshawytscha*) and green sturgeon (*Acipenser medirostris*). The facilities would be designed to meet fish passage criteria for Chinook salmon and green sturgeon migrating upstream from the Tisdale Bypass to the Sacramento River after river flows have overtopped the weir and spilled into the bypass. During and after a spill event, for several days to several weeks or longer, the facilities' gate would be operated to maintain a connection between the bypass and the area behind the weir, and to manage flow and water levels in a manner conducive to fish movement out of the bypass and into the Sacramento River (see Section 2.3.6, *Operation and Maintenance*).

The fish passage criteria identified in **Table 2-1** were adopted from the Fremont Weir Adult Fish Passage Project (DWR and Reclamation, 2017) and reviewed as part of a continuing, multi-agency collaboration and engagement process.

**TABLE 2-1
ADULT FISH PASSAGE CRITERIA**

Species	Adult Migration Time	Minimum Depth of Flow (short distance)	Minimum Depth of Flow (long distance)	Minimum Channel Width	Maximum Velocity (short distance)	Maximum Velocity (long distance)
Adult Sturgeon	January–May	3 feet	5 feet	10 feet	6 feet/second*	4 feet/second
Adult Salmonids	November–May	1 feet	3 feet	4 feet		

NOTE:

* Short-distance velocity is for a maximum length of 60 feet.

SOURCE: DWR and Reclamation, 2017

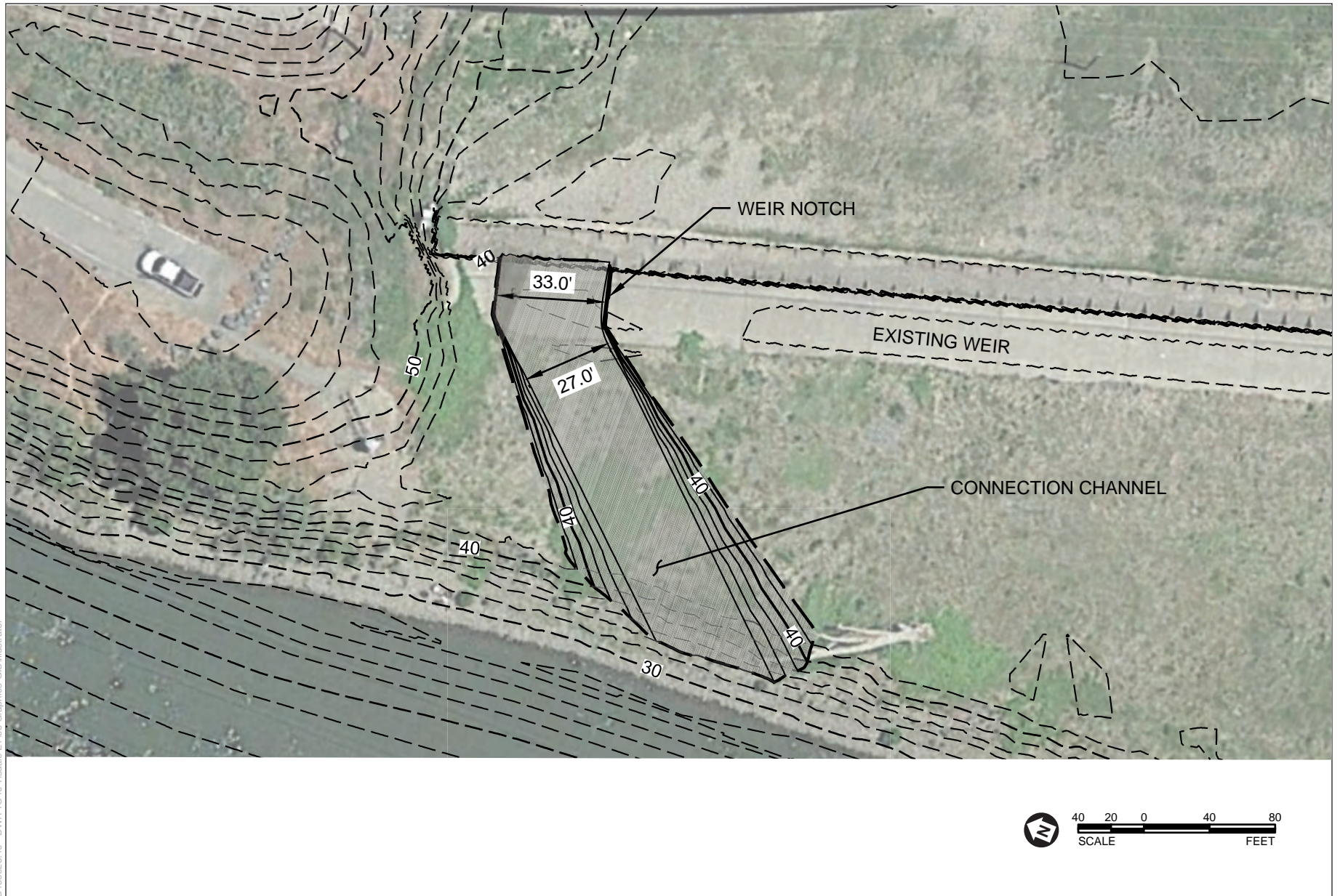
Energy Dissipation and Fish Collection Basin

A concrete or RCC energy dissipation and fish collection basin would be constructed on the downstream side of the weir, occupying approximately 2 acres from the weir downstream (Figure 2-3). The existing energy dissipation basin on the downstream side of the weir would be removed and replaced to provide necessary energy dissipation, reduce fish stranding, support fish passage to the notch, and improve operational flexibility for maintenance and, if necessary, any fish rescues.

The proposed basin would dissipate hydraulic energy when the Sacramento River spills over or through the notch, and would provide a transition and pathway for migrating fish that could be efficiently maintained (e.g., cleared of debris and sediment). The basin would be designed so that when water from the Sacramento River was no longer flowing into the basin, the pool area would recede (drain) concurrent with the recession of the river and encourage fish to move from the basin to the river (i.e., toward deeper water).

The basin would extend outward from the weir. Based on existing observations, each year's accumulated sediment would be deposited farther out into the bypass, forming a low-flow channel directly adjacent to the weir and along the basin's axis (from roughly south to north) with a width of approximately 25–60 feet (**Figure 2-4**). To counter higher flow velocities through the notch, scour protection measures would be incorporated along the trailing (downstream) edge of the basin; at and between the bridge piers; at the southern transition from the basin to the bypass; and farther into the bypass at the northern end (Figure 2-3; see more detail below). Scour countermeasures would consist of riprap or alternative forms of armoring. The basin would slope up from the notch at the north to the transition to the bypass invert at the south. The transition to the bypass at the south would be at an elevation of approximately 35 feet¹; the notch inlet (the

¹ Unless otherwise noted, all elevations reported herein are referenced to the North American Vertical Datum of 1988.



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SOURCE: ESA, 2019

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 2-4
Weir Notch and Connection Channel Conceptual Plan



point at which the basin would connect to the weir/notch) would be at an elevation of approximately 33 feet (see *Weir Notch and Operable Gate* below).

Permanent scour and erosion countermeasures would be designed and included on the north end of the basin (Figure 2-3). The concrete footprint of the basin would extend downstream of Garmire Road in the form of an apron that would contain higher velocity flows passing through the notch. Further, riprap or engineered concrete energy dissipators would be placed along the northern bank of the bypass just downstream of the proposed notch for scour protection, and limited grading would be implemented to prepare the subgrade and facilitate rock placement.

Weir Notch and Operable Gate

A notch (i.e., the fish passage structure) is proposed for installation in the north end of the weir to provide a connection between the Tisdale Bypass (and basin) and the Sacramento River, via a connector channel (Figure 2-3 and Figure 2-4; see *Connection Channel*, below). The concrete, rectangular notch opening would be just over 11 feet tall by approximately 33 feet wide, and the invert (or bottom) of the notch would be at an elevation of 33 feet. With the gate open, when the water surface elevation of the Sacramento River is at or above this level, a connection could be made between the river and the Tisdale Bypass.

Flow through the notch would be controlled by a pneumatically actuated bottom-hinged gate that would span the notch (location shown in Figure 2-3 and example shown in **Figure 2-5**). To raise or lower this type of gate, an air bladder is inflated or deflated, respectively. The notch and connector channel would be designed to maximize the range of flows over which fish could successfully move from the bypass to the river when the gate is open. The gate would be fitted with a cover plate to prevent green sturgeon injuries. Monitoring equipment (e.g., stream gages, cameras, telemetry antennae) may be embedded into the wall(s) of the notch.

Connection Channel

The connection channel would provide a route connecting the notch in the weir to the Sacramento River for fish passage (Figure 2-3 and Figure 2-4). The connection channel would be excavated and constructed within the east bank of the Sacramento River and tied in to the rectangular, 33-foot-wide by 11-foot-tall concrete notch opening. From this tie-in point west (upstream) to the Sacramento River, the connection channel would be angled south (downstream) at approximately 45 degrees (Figure 2-3). The channel would be approximately 130 feet long, with bottom widths of 33 feet at the downstream end (outlet to the Tisdale Bypass) and approximately 27 feet at the upstream end (inlet from the Sacramento River). The side slopes of the connection channel would transition from 2:1 at the Sacramento River end to vertical at the end where the connection channel would tie into the notch. The bottom of the channel would start at the Sacramento River with an invert elevation of 32.5 feet, and would slope slightly upward before terminating at the notch at an elevation of 33 feet. This configuration is modeled to meet the fish passage criteria listed in Table 2-1 for a large range of flood flows, greatly improving fish passage during and after weir spill events.

The slope and configuration of the connection channel and its relationship to the basin would provide continuity and inundation between the Sacramento River and the basin as the river recedes and stops flowing into the bypass (instead remaining backwatered in the basin behind the weir). The slope from the top of the basin to the connection channel at the river would encourage fish to swim from the basin into the river. As the river stage decreases, the inundation area would gradually constrict back toward the river, and the water would be deeper in the parts of the basin/connection channel closer to the river. These conditions would provide an incentive for fish to find these areas and pass to the river.

Riprap would be placed at the inlet to the proposed connection channel in the Sacramento River to prevent scour at the inlet (Figure 2-3). If required because of river stage levels, a cofferdam may be used during construction to isolate the site for the connection channel from the Sacramento River. The connection channel would be excavated to an average depth of 12 feet below the existing grade and would be constructed with scour resistant materials such as concrete. The bed would consist of concrete. Monitoring equipment (e.g., stream gages, cameras, telemetry antennae) may be embedded into the wall(s) of the connection channel.

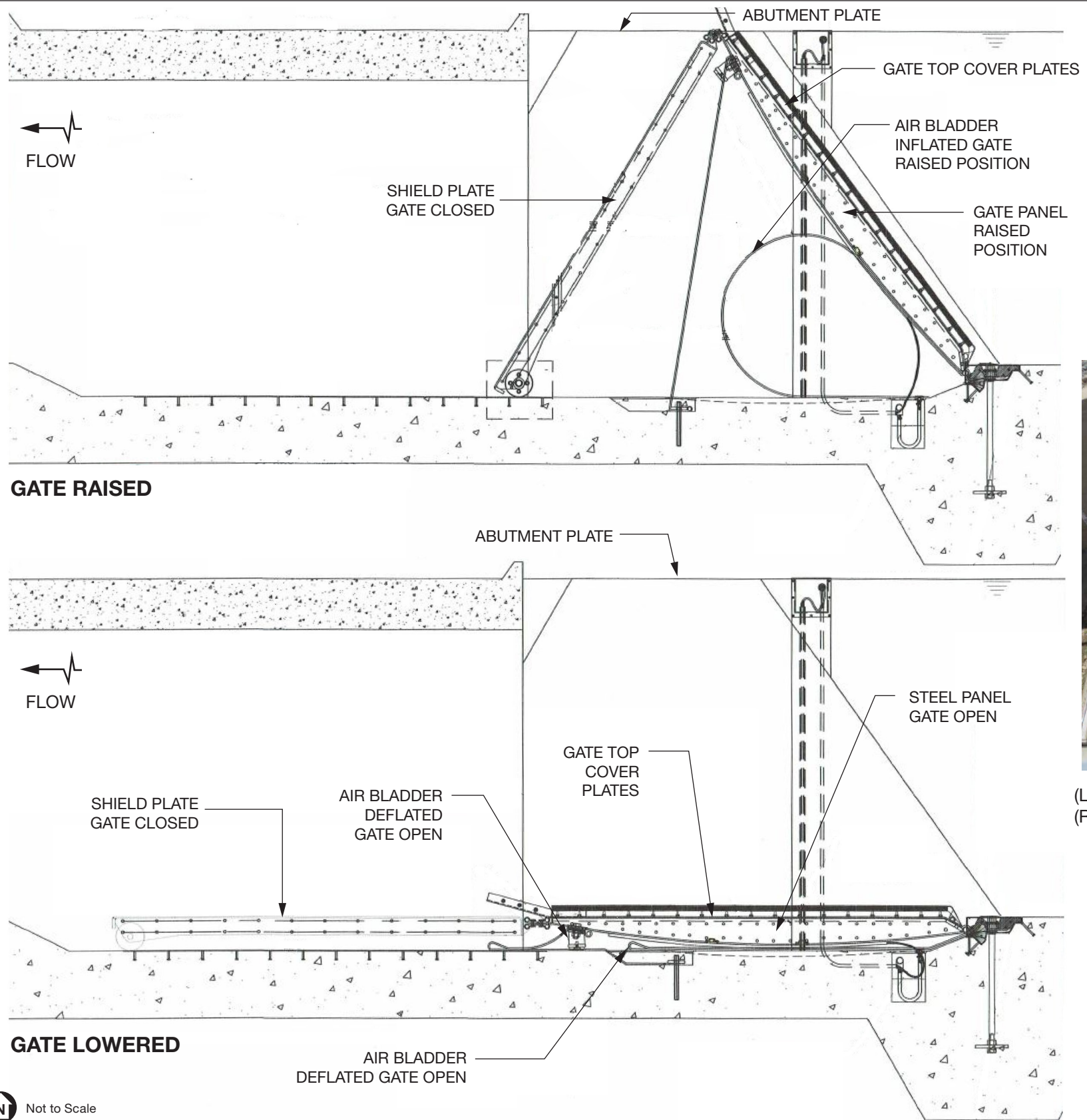
Entrance Road, Equipment Pad, and Control Building

Modifications at the north end of the weir would include construction of an entrance road, equipment pad, and control building for monitoring, operations, and maintenance purposes (Figure 2-3).

An entrance road would be constructed or improved to provide access for the transport of large equipment (e.g., an excavator), and for other vehicles requiring access to the equipment pad and control building area at the north abutment.

An equipment pad would be constructed adjacent to the reconstructed northern abutment and would facilitate northern access for any necessary gate repair, replacement, or maintenance, and access to the notch by emergency equipment (e.g., to remove debris and maintain the gate). (Access for maintenance of the connection channel and/or gate could also be provided by the access road in front of the weir via the boat launch parking lot.) The equipment pad would consist of a reinforced concrete platform measuring approximately 50 feet by 50 feet, supported on grade or on a deep pile foundation. Compacted aggregate gravel and asphalt would be installed surrounding the building, equipment pad, and vehicular access road (see Section 2.3.2, *Tisdale Weir Rehabilitation and Reconstruction*). The existing gravel vehicular access road between Garmire Road and the north abutment would be repaired with additional gravel or replaced with asphalt paving as necessary to support access by heavy equipment and to reduce maintenance at the facility.

An approximately 30-foot by 30-foot control building would be constructed at the north end of the weir (Figure 2-3). The control building would house communication, electrical, mechanical, and monitoring equipment components related primarily to operation and monitoring of the gate, stage gaging, and other monitoring. The building would be enclosed by security fencing for the protection of the building and associated components. A concrete-encased duct bank would connect all electrical, air lines, and controls from the building to the operable gate and/or notch.



(Left) Fremont Weir front-side cover plate (covering stiffening ribs)
 (Right) Fremont Weir back-shield plate, showing top hinge.

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SOURCE: Obermeyer Hydro, Inc., 2017

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 2-5
Operable Gate Examples



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2.3.4 Proposed Construction Methods

Construction Schedule

Construction of the Proposed Project is anticipated to begin in April 2022 and has the potential to last up to two consecutive construction seasons, each approximately 6½ months long (April 16 through October 31). The timing of construction is subject to the availability of project funding; any delays in funding may extend this timeline by 2–3 years.

Construction would typically occur Monday through Friday, up to 12 hours per day between 6 a.m. and 7 p.m. However, construction work may be extended into the night or weekend if needed to meet critical milestones, or at other key points in the construction process. Adjacent landowners and the County would be notified before the start of construction activities.

Site Access, Mobilization, and Staging

The Proposed Project is anticipated to require up to 34 construction workers. Workers would access the project area daily from the south via State Route 113 north to Reclamation Road, or from the north via State Route 20 to Tarke Road to Garmire Road or Reclamation Road. Worker vehicles would be parked in the staging areas (Figure 2-2), or on the levee road where the levee is close to the construction footprint.

Construction trucks would be parked in one of the staging areas shown in Figure 2-2 or within the Tisdale Bypass during work hours. Contractor fuel storage would be isolated to the southernmost staging area outside of in-water areas (Figure 2-2), and fueling would occur within the bypass with the implementation of best management practices.

As necessary, excavated material would be temporarily stockpiled in one or more of the following staging areas (Figure 2-2): (1) Adjacent to the immediate work area inside the Tisdale Bypass; (2) the current parking area/turnout at the north end of the weir; (3) the open area just north of the paved parking lot/boat launch facility; and/or (4) the adjacent Sutter Mutual Water Company maintenance yard. Temporary staging may also occur in the Tisdale Bypass. If needed, borrow material would come from Tisdale Bypass excavation areas inside this project's work area, or imported/engineered fill would be hauled onto the site from an external source.

Staging areas and the construction footprint would be cleared and grubbed before construction.

Spoils would be placed and spread on an existing spoils placement location, a currently fallowed field of approximately 82 acres owned by the Sacramento and San Joaquin Drainage District in the name of the Central Valley Flood Protection Board, located approximately 1.5 miles east of the project site (Figure 2-2). All disturbed dirt would receive hydroseed. The haul route to the spoils area would be along the Tisdale Bypass north levee road, or Garmire Road east of the project site to Tisdale Road to Reclamation Road (Figure 2-2). Up to 330 cubic yards of soil per day could be hauled to the spoils storage area, generating up to 33 truck trips per day based on a

capacity of 10 cubic yards each (over a duration of approximately 110 days, based on estimated excavation volumes; see *Construction Activities*).

All concrete, steel, and demolition debris would be hauled away and disposed of in an approved disposal facility by the contractor.

Portions of the eastern edge of the parking lot for the Tisdale Boat Launch Facility may be blocked off to public access during construction, which would be coordinated with the County. Construction workers would manage the flow of vehicles maneuvering in and out of the parking lot. The boat ramp, which is operated by the County, is anticipated to remain open during construction of the Proposed Project.

The construction area would be clearly marked with fencing and security measures would be implemented to protect the project site and equipment. Security measures would include security-grade fencing and nighttime lighting for areas within the project site (e.g., staging locations with equipment and/or materials, possible concrete batch plant).

Construction Activities

Construction of Project Site Improvements

Existing utility poles (power and communication) within the footprint of the proposed basin would be removed and relocated to the Garmire Road Bridge in existing utility openings that were installed during construction of the bridge or attached to the outside of the bridge. This activity would be coordinated with the County and would include obtaining all necessary County approvals and permits.

Site improvements would also include filling and protecting some existing areas around the weir. Undulating topography north of the boat launch parking lot and south of the north abutment would be filled and smoothed with scour resistant materials (riprap or articulated block mat) and the area would be regraded to a smooth character. Further, the existing cobble along the leading (upstream) edge of the weir would be stabilized through the addition of material, compaction, and/or grouting.

Scour countermeasures would be installed around the Garmire Road Bridge piers. The countermeasures would be concrete in areas where the basin's footprint would extend to or beyond (downstream of) the bridge piers. However, riprap would also be used as needed if concrete were not installed up to the bridge pier(s). The necessary level of scour protection at each pier would be determined through an analysis of hydraulics and scour countermeasures.

Tisdale Weir Rehabilitation

Rehabilitation of the weir's south abutment would involve excavating and removing the existing concrete abutment structure (approximately 900 cubic yards) and constructing a new, similar abutment structure in its place. Surrounding the new south abutment structure, approximately 300 cubic yards of riprap would be placed for scour protection at a thickness of approximately 3 feet.

Rehabilitation of the north abutment would involve excavating and removing the existing concrete abutment structure (approximately 800 cubic yards) and constructing a new, similar abutment structure in its place. The gravel paving for vehicular access to the abutment would be replaced or stabilized with asphalt paving, and a reinforced concrete pad for equipment (crane) access would be constructed. The equipment pad may be partially supported on grade, and may also be supported on a deep pile foundation. To construct level support areas, fill and grading for the control building pad would extend into the small depression between the existing northern access road and Garmire Road; fill and grading for the equipment pad would extend south of the existing northern access road toward the weir. Filling and grading would include maintaining a sloped, surface drainage path in the depressed area between the existing gravel access road and Garmire Road. Surrounding the new north abutment structure, and extending east along the north bank, approximately 450 cubic yards of riprap would be placed for scour protection at a thickness of approximately 3 feet.

To rehabilitate the weir's foundation through a grouting operation, drilling and grout pumping equipment would be used along the crest to fill the voids in the soil beneath the structure. The weir would also be high-pressure blasted (using a sand, glass, or water blasting medium or surface grinding) to remove the surface layer to prepare for resurfacing. The weir would be capped with a cementitious or epoxy-based material to increase durability over the next 50 years.

Construction of Energy Dissipation and Fish Collection Basin

Construction of the concrete energy dissipation and fish collection basin would disturb approximately 2 acres. Construction of this component of the Proposed Project would require excavating approximately 16,500 cubic yards of native soil and the existing concrete energy dissipation basin at an average depth of 4 feet. Up to approximately half of this volume may be used to fill areas of over-excavation and/or complete the finished grade along the eastern (downstream) side of the basin, which would reduce the volume of material to be placed in the spoils storage area.

The proposed basin would be composed of concrete and base rock with a total thickness of approximately 3 feet. Construction would result in the placement of approximately 29,000 cubic yards of concrete, riprap, cobble, and/or engineered streambed material, and gravel. The basin would also provide scour protection for the Garmire Road Bridge piers.

In addition, a basin access ramp would be constructed on the south side, extending from the levee road to the basin/bypass bottom. This would require regrading up to approximately 250 feet of the existing access ramp near the levee and result in the placement of up to approximately 200 cubic yards of riprap and aggregate base for stability and paving on the access ramp.

Although such a scenario is not anticipated, should water be present in the bypass at the start of construction, a fish salvage and dewatering operation with approved screening on pump intakes would be conducted. Pump discharge would comply with approved best management practices. After the initial dewatering, maintenance dewatering would be completed to keep the site dry.

Water from dewatering operations would be discharged directly into the bypass and project area and turbidity would be monitored as appropriate (i.e., the discharged water would likely percolate into the bed of the bypass). Equipment working below ordinary high water would be cleaned to prevent the spread of invasive species.

Limited removal of trees greater than 4 inches in diameter at breast height would occur to accommodate the installation of bank protection/scour countermeasures along the northern bank of the bypass. A limited number of shrubs would be removed for installation of the basin access ramp along the south side of the bypass. Trees would be hauled away and burned at the spoils site.

Construction of Weir Notch and Operable Gate

Construction of the weir notch and operable gate would require excavating approximately 30 cubic yards of existing concrete and native soil at a depth of approximately 12 feet. Construction may also require installing piles and/or a sheet pile cutoff wall. The existing concrete weir structure would be saw-cut to allow clean excavation of the notch.

The notch would be constructed of concrete and base rock with a total thickness of approximately 4.5 feet. Construction would result in the placement of approximately 30 cubic yards of concrete and gravel. Construction would also include installation of the operable bottom-hinged gate and the associated mechanical and electrical equipment.

Connection Channel Construction

Construction of the connection channel would disturb approximately 0.5 acre. The construction would require excavating approximately 3,300 cubic yards of native and fill soils at a depth of approximately 12 feet.

The channel would be constructed of concrete and base rock with a thickness of approximately 3 feet. Construction would result in the placement of approximately 800 cubic yards of concrete and gravel. Scour protection surrounding the connection channel would result in the placement of approximately 300 cubic yards of riprap at a thickness of 3 feet.

Construction of the connection channel may require in-water work and isolation of the work area from the Sacramento River. In this case, a cofferdam may be constructed to isolate the work area from the river if required, based on water elevations during construction. The cofferdam would consist of sheet piles installed through either vibratory or impact driving. The sheet piles would be installed by land-based heavy equipment located on the bank north of the boat launch facility. This temporary work area would be revegetated with hydroseed and/or covered with rock revetment per the project design (see Figure 2-3). Before construction, fish salvage and dewatering with approved screening would be conducted. Initial turbid water would be pumped farther down the Tisdale Bypass.

2.3.5 Anticipated Construction Equipment

Table 2-2 lists the construction equipment that would likely be required to construct the Proposed Project.

**TABLE 2-2
ANTICIPATED CONSTRUCTION EQUIPMENT**

Type of Equipment	Number of Equipment	Average Use (per day/duration) ¹
Excavator	2	12 hours/300 days
Crane	2	12 hours/300 days
Grader and roller	3	12 hours/300 days
Bulldozer	3	12 hours/300 days
Tractor/loader/backhoe	3	12 hours/300 days
Water truck	4	12 hours/300 days
Other equipment (e.g., chain saw)	1	12 hours/300 days
Compressor	6	12 hours/300 days
Generator	5	12 hours/300 days
Dewatering pump	5	12 hours/300 days
Concrete mixing truck	5	12 hours/300 days
Concrete pumping truck	2	12 hours/300 days
Concrete batch plant	1	12 hours/300 days
Forklift	2	12 hours/300 days
Dump/haul truck	4	12 hours/300 days
Grout plant	1	12 hours/300 days
Rock truck (for concrete)	1	12 hours/300 days
Pickup truck	2	12 hours/300 days

NOTE:

¹ Duration assumes a worst-case scenario of two 150-day construction windows, working 7 days a week during those work windows.

SOURCE: Data compiled by Environmental Science Associates in 2019

Up to four water trucks would be used for dust control in the project area and along haul routes. Surface water from the Sacramento River or adjacent canals would be used for dust control; the contractor would make prior arrangements with the reclamation districts or adjacent landowners and appropriately sized intake screens would be used.

A concrete batch plant may be used on-site to facilitate concrete mixing and production. If needed, the concrete batch plant would be located in the southernmost staging area or the spoils site (Figure 2-2) and produce the 10,000 cubic yards of concrete supply estimated to be needed for the Proposed Project. Existing roads and the proposed access ramp would be used to transport material from the batch plant to the basin in 10-yard batches in mixer trucks. Up to 800 total truck trips would be needed to deliver materials from the supplier to the batch plant stockpile,

with a maximum of 32 trips per day transferring approximately 400 cubic yards of concrete material to the project site for a total of 66 concrete pour days (150 cubic yards per day average).

2.3.6 Operation and Maintenance

DWR is responsible for operating and maintaining Tisdale Weir, and would take on new responsibilities to operate and maintain the proposed fish passage facilities. Personnel from DWR's Flood Maintenance Office routinely inspect and evaluate conditions at flood risk reduction facilities to identify areas where maintenance is needed. Accumulated sediment and vegetation or other debris, along with improperly functioning structures, can reduce channel capacity; deflect, divert, and inhibit flows; cause bank and levee erosion; or increase the risk of levee overtopping and failure. Proper operation and maintenance of the proposed fish passage facilities is important to ensuring that the facilities can continuously enable fish to pass back into the Sacramento River during flood flows and when floodwaters recede lower than the notch invert.

Gate Operations

The proposed basin, notch, and connection channel would function collectively to provide fish passage from the Tisdale Bypass to the Sacramento River. The operable gate would control flows through the notch (when the river is high enough), yielding opportunities for fish to pass between the bypass (and basin) and the river via the connection channel. With the gate open, when the water surface elevation of the Sacramento River is at or above the notch invert elevation, a wetted connection could be made between the river and the area behind the Tisdale Weir.

The notch would incorporate a bottom-hinged gate to allow the structure to be opened and closed as necessary for flow control, maintenance, repairs, or any other reason at any time. The notch would operate in conjunction with any Tisdale Weir overtopping event, regardless of season or time of year. During the dry season (after April 15), when overtopping is unlikely and the Sacramento River's water surface elevation is below the notch invert elevation, the gate would be stored in the down position to reduce the risk of vandalism to the air bladders on the back/bypass side of the gate, and to eliminate the energy needed to keep the bladders inflated. The gate would typically be moved to the up (closed) position at the onset of flood season (November 1). If warranted by rainfall or weather forecasts indicating a potential rise in the river, or if otherwise deemed appropriate by DWR, the gate may be moved to the up position before November 1 or after April 15.

In general, during the flood season (November 1 to April 15), the notch gate would be in the up (closed) position, but would be opened shortly after a Tisdale Weir overtopping event (e.g., within approximately 4 hours of the onset of flow into the Tisdale Bypass). The notch gate would be closed once the Sacramento River stage recedes below the notch invert elevation and water has left the basin. However, the Sacramento River hydrograph can be highly variable, even over relatively short time periods (days); thus, a slightly more detailed outline of the proposed gate operations is provided below. (Note, however, that the plan for gate operations may change or evolve based on further agency input or longer-term adaptive management actions, or both.)

Normal Operations

1. If the gate were to be initially closed and (1) the weir was not being overtopped or (2) the Sacramento River discharge shortly after weir overtopping was exceeding or projected to exceed 48,000 cfs—the 10-year design flow (USACE, 2014)—the gate would remain closed. Pending the U.S. Army Corps of Engineers (USACE) Section 408 permitting process, the current assumption is that the Proposed Project would not be permitted to alter the flow split at this location (the proportion of flow in the Sacramento River that overtops the weir) during flood conditions. Therefore, the gate would need to be closed once flow in the Sacramento River exceeds a 10-year flood event.²
2. If the Sacramento River reached, or was projected to reach, approximately 48,000 cfs, the gate would be closed (if it had been in the open position). The gate would be opened again once the river’s flow receded below 48,000 cfs.
3. If the Sacramento River were to fall below a stage of 33 feet, the gate would be closed and would remain closed until the next weir overtopping event.

In some cases, it may be necessary to deviate from or modify normal operations. Some specific, potential variations from normal operations are described in further detail below.

Operations During Very Short Duration Overtopping Events

Should an overtopping event be very short or minor (e.g., lasting for less than 4 hours), the Tisdale Bypass would only briefly and/or barely be inundated. Under such conditions, fish migrating from the Sutter Bypass may be unlikely to navigate the full length of the Tisdale Bypass (if it is inundated) and successfully pass to and through the fish passage facility. Thus, operating the notch gate during brief or minor flow events—even with the intention to enable fish passage—may actually be counterproductive. For example, in such an instance, the additional flow through the notch could be enough to attract fish to the Tisdale Bypass from downstream areas; yet if the Sacramento River stage were to subsequently drop too rapidly, these fish may not have sufficient time to move completely through the Tisdale Bypass and into the river. As a result, opening the notch gate under these conditions could function as a sort of “attractive nuisance” that may increase the risk of stranding downstream in the Tisdale Bypass.

The California Nevada River Forecast Center provides flow forecasting for spill events over Tisdale Weir. Thus, it is feasible to base weir operations criteria for these minor overtopping events on forecasted spill events, and to derive automated weir operations from those forecasts. The California Department of Fish and Wildlife, the National Marine Fisheries Service, and DWR would work together to adaptively manage this aspect of operations over the life of the Proposed Project.

² The exact upper flow limit on the operations, as described herein, has yet to be determined (e.g., 48,000 cfs). While set now at 48,000 cfs, the amount of water that flows through the notch itself actually decreases with increasing stage (mostly because of the increasing downstream backwater effect in the bypass). Thus, the upper limit of operations will ultimately be determined through consultation with USACE as part of the Section 408 permitting process. There may be a flood benefit to keeping the gate open at higher flows to assist the flow split, particularly when LWD is racked on the southern portions of the weir, decreasing conveyance.

Early Closure of the Gate

If for any reason DWR needs to close the gate early, before the Sacramento River recedes below the invert elevation of the notch, the gate would be closed slowly to ramp down notch flows over an extended period (for example, 24 hours, allowing a hydrologic queue for fish to pass to the river). As the Sacramento River stage recedes following gate closure, the gate would be opened again when river stage goes below the 37-foot hinge point.³ This would allow fish to exit into the Sacramento River. The gate closure approach and criteria would be refined and finalized based on agency input. It should be noted that this contingent operation may not be necessary.

Tisdale Weir and Basin Maintenance

Based on past observations, sediment and debris (e.g., large wood) are likely to accumulate on portions of the weir and in the basin. DWR Flood Maintenance Yard staff members adhere to operational guidelines dictated by USACE and document maintenance and operations. Typical maintenance activities would include:

- Removing or leveling sediment deposits, debris, and undesirable vegetation along the weir, in the basin, or within the connection channel and notch (including the gate).
- Removing obstructions and debris from the weir, connection channel, basin, or basin access points (e.g., the proposed basin access ramp).
- Repairing erosion around the structures that could be caused by an increase in flow velocity or direction.
- Repairing damage and performing routine preventive maintenance to the operable weir gate and appurtenant equipment.
- Repairing the weir structure. This could include removing and replacing broken, heaving, or deteriorated concrete; inspecting the concrete superstructure; and patching any cracks and spalls. Concrete would be removed using a jackhammer and/or backhoe. Light grading and form work could also be done to replace the concrete. Activities related to inspection and repair of the weir structure are described further and addressed in the USACE manual *Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project Unit No. 156, Tisdale Weir and Bypass, Sacramento River, California* (USACE, 1955), or in the manual(s) and/or related letter(s) in effect at that time.

³ Historically, a sill elevation, or “hinge point,” has built up and persisted in the Tisdale Bypass, likely because of both natural sediment deposition in the bypass and the influence of the Sutter Bypass backwater from downstream. This hinge point resides approximately 1,000–1,500 feet downstream of Tisdale Weir. Higher than the top (south end) of the energy dissipation and fish collection basin, as stage in the river sufficiently decline (to 37 feet) it generally controls when flow down the Tisdale Bypass would cease, and thus controls water elevations on the downstream side of the weir and within the footprint of the energy dissipation and fish collection basin. The hinge point is currently at an elevation of approximately 37 feet and is anticipated to remain at a similar elevation. The persistence of this controlling feature would be important to the function of the proposed basin during lower flow conditions, when the river would be connected to the basin, yet the weir would not be overtopping. In other words, with an open notch, the Sacramento River would not flow into the Tisdale Bypass if the river’s water surface were below the hinge point elevation (37 feet).

Staging, materials stockpiling, and equipment access for these activities would be carried out in developed or disturbed areas of the project area including the equipment pad area, roads, and level areas that are used regularly for maintenance of the facilities.

Sediment and Debris Removal

Sediment and debris removal would involve removing or displacing accumulated sediment, debris, and/or other live or dead vegetation from within the basin to maintain the energy dissipation and fish passage functions of the weir and basin. Sediment grading would be performed to level and smooth the site, balancing material on-site as much as possible. After removal of the sediment and debris, the basin's elevations and volume would generally be within the specified range defined with the proposed design.

Activities for sediment and debris removal would generally require accessing the basin via the proposed basin access ramp at the south end of the weir. Depending on whether the sediment needs to be removed, sediment may be hauled in trucks to the spoils site; placed on access roads, toe roads, private property, or agricultural lands with appropriate approvals; or disked into the ground or road surface once dry. A water truck may be used to minimize dust during sediment removal and grading or disking, if needed. Scrapers, bulldozers, backhoes, loaders, graders, excavators, skid-steers, pickup trucks, hand tools, or other appropriate equipment would typically be used to level, smooth, and/or remove sediment.

Sediment deposition is anticipated to occur after overtopping events and when the Sacramento River is connected to and flowing into the basin and the Tisdale Bypass. Sediment removal activities would typically be conducted when little to no water is present in the basin. However, in some instances, sediment removal might be needed when water is present.

Frequency and Timing

Sediment and debris removal activities would generally be conducted annually, between April 16 and October 31. However, the frequency may vary based on the type of water year (e.g., very dry or very wet); the rate at which sediment and debris accumulate at the site; and the effects of the magnitude of sediment and debris accumulation on conveyance capacity, energy dissipation, and fish passage conditions. Generally, DWR Flood Maintenance Yard staff members or contractors would conduct this work in dry channels or when the water levels are at their lowest outside the flood season (November 1 through April 15).

Work Area

The annual area of work for sediment and debris removal activities for the Proposed Project would be, at most, equivalent to the footprint of the Proposed Project (Figure 2-2).

Equipment

It is anticipated that maintenance would require the use of one or more light-duty trucks, excavators, loaders, dump trucks, graders, backhoes, skid-steers, bulldozers, and/or chain saws for removal of sediment and large wood debris.

Maintenance of the Weir Notch, Operable Gate, and Connection Channel

The proposed weir notch, gate, and connection channel would be maintained both as needed and at more regular, annual intervals. The connection channel would be monitored regularly during operation. During periods of safe channel access, presumably when Tisdale Weir is not overtopping, any debris lodged in the channel, notch, and/or gate may be cleared. In addition, after each gate operating cycle, when the river stage recedes below the connection channel invert, the gate may be inspected and cleared of debris. The proposed equipment pad at the north end of the weir would facilitate access to the notch and part of the connection channel (e.g., the pad would allow an excavator to access the notch in case of emergency or imminent damage from large debris). Access to the western portion of the connection channel would be across the armored area to the south, located north of the parking lot (Figure 2-4).

Outside of the flood season, routine maintenance would be performed at the fish passage structure. Gate maintenance would include washing the steel components to reduce corrosion; applying corrosion protection coating; inspecting the air bladder and repairing leaks or tears; inspecting air compressor components; and torquing main anchor bolts once in the spring and once in the fall, or as needed. Gate maintenance may also include straightening or welding damaged portions and inspecting, testing, and repairing electrical or hydraulic systems. Maintenance of the equipment atop the equipment pad area would include cleaning exterior and interior equipment and cabinets of dust and debris and checking the tightness of screws and bolts and tightening as needed. Monitoring, stream gaging, and scientific equipment would be inspected and repaired and maintained as appropriate. The concrete through the notch and connection channel would be cleared of debris and sediment and inspected and repaired for cracking, scaling, or spalling.

Sediment and debris may accumulate in the connection channel. However, such accumulation is expected to be comparatively limited, as the connection channel and notch would generally be subjected to relatively high scouring velocities, particularly on the receding limb of the flood hydrograph. Thus, the connection channel is expected to be self-maintaining to a large degree. However, periodic removal of sediment and debris from the connection channel and notch may be required. This work would involve removing accumulated sediment, debris, and/or other live or dead vegetation from within the connection channel, gate, and/or notch to maintain fish passage and avoid structural damage.

Outside of the flood season, and depending on the bed material type, maintenance of the connection channel may also include mowing/cutting vegetation and preventing trees from growing adjacent to or within the channel bed. The connection channel would also be inspected each year for areas of potential scour, and additional riprap (and engineered streambed material, if applicable) would be placed, as needed.

Frequency and Timing

Sediment and debris removal activities would generally be conducted annually, between April 16 and October 31. However, the frequency may vary based on the type of water year (e.g., very dry

or very wet), the rate at which sediment and debris accumulate, and the potential need for emergency maintenance to allow fish passage and/or prevent damage to the gate or connection channel. DWR Flood Maintenance Yard staff members or contractors would attempt to conduct this work when the connection channel is dry or when safe connection channel conditions are present outside of the November 1 to April 15 flood season.

Equipment

It is anticipated that maintenance would require the use of one or more light-duty trucks, cranes, excavators, loaders, dump trucks, graders, bulldozers, and/or chain saws for removal of sediment and large wood debris.

2.4 Anticipated Regulatory Permits and Approvals

As the lead agency, DWR has principal responsibility for approving and carrying out the Proposed Project and for ensuring that the requirements of the California Environmental Quality Act (CEQA), the State CEQA Guidelines, and other applicable regulations are met. The following permitting agencies may have permitting approval or review authority over portions of the Proposed Project:

- **U.S. Army Corps of Engineers:** Federal Clean Water Act Section 404 permit and federal Rivers and Harbors Act Section 408 permission
- **National Marine Fisheries Service:** Federal Endangered Species Act Section 7 consultation
- **U.S. Fish and Wildlife Service:** Federal Endangered Species Act Section 7 consultation
- **Central Valley Flood Protection Board:** California Code of Regulations Title 23 permit
- **California Department of Fish and Wildlife:** California Fish and Game Code Section 1602 streambed alteration agreement and California Endangered Species Act consultation
- **California Office of Historic Preservation:** National Historic Preservation Act Section 106 consultation
- **Central Valley Regional Water Quality Control Board:** Clean Water Act Section 401 water quality certification, Clean Water Act Section 402 general construction stormwater permit, and resolution waiver for waste discharge
- **State Lands Commission:** Lease

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CHAPTER 3

Environmental Setting, Impacts, and Mitigation Measures

3.1 Introduction to the Analysis

3.1.1 Scope of the EIR Analysis

This chapter of this DEIR presents the environmental and regulatory setting, impacts, and mitigation measures for each of the following resource topics, listed in the order in which they are addressed in the DEIR:

- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Recreation
- Tribal Cultural Resources

Other resource topics were evaluated and determined to result in either no impact or less-than-significant impacts; therefore, those topics are not evaluated further in this DEIR. The analysis is summarized in the Initial Study Environmental Checklist, in **Appendix B**.

3.1.2 Section Format

Each section contains the following elements:

- Introduction to the analysis contained in the section
- Environmental setting
- Regulatory setting
- Methodology and results
- Standards of significance used to evaluate the significance of project impacts
- Impacts and mitigation measures

The environmental and regulatory setting descriptions provide a point of reference for assessing the environmental impacts of the Tisdale Weir Rehabilitation and Fish Passage Project (Proposed Project). The setting discussion is followed by a discussion of impacts and mitigation measures. Preceding each impact/mitigation measure discussion is a summary table listing the impacts identified for the Proposed Project and the significance conclusion for each impact with implementation of mitigation measures. Impacts with significance conclusions of “no impact” or “less-than-significant impact,” after consideration of the standards of significance, are summarized in each resource section.

3.1.3 Impacts and Mitigation Measures

Each impact discussion includes an impact statement (in bold text); an explanation of the impact as it relates to the Proposed Project; an analysis of the significance of the impact; relevant mitigation measures, if appropriate; and an evaluation of whether the identified mitigation measures would reduce the magnitude of identified impacts. Cumulative impacts for each technical issue area are discussed in Sections 3.2 through 3.9.

As described in Chapter 2, *Project Description*, the Proposed Project consists of rehabilitation and reconstruction of Tisdale Weir, installation and operation of fish passage facilities, and associated project site improvements. Where necessary, the discussion of potential impacts of project construction is separated from the discussion of the impacts of operations and maintenance.

3.1.4 Terminology

This DEIR uses the following terminology to describe the environmental effects of the Proposed Project in Chapter 3:

- **Standards of Significance:** The set of criteria used by DWR to determine the level or “threshold” at which an impact would be considered significant. The standards of significance used in this EIR fall into several categories:
 - Discussed in Appendix G of the State CEQA Guidelines
 - Based on factual or scientific information
 - Based on regulatory standards of federal, State, and local agencies
 - Adopted by DWR

In determining the level of significance, the analysis assumes that the Proposed Project would comply with relevant federal, State, and local regulations and ordinances.

- **Less-than-Significant Impact:** An impact that does not reach the standard of significance and would therefore cause no substantial change to the environment (no mitigation required).
- **Significant Impact:** An impact that would result in a substantial adverse change to the physical conditions of the environment. Significant impacts are identified by evaluating project effects in the context of specified significance criteria. Mitigation measures and/or project alternatives are identified to reduce these effects on the environment where feasible.

- **Significant and Unavoidable Impact:** An impact that would result in a substantial adverse change to the environment that cannot be feasibly avoided or mitigated to a less-than-significant level if the project is implemented. Findings of fact and a statement of overriding considerations must be adopted if impacts cannot be mitigated.
- **Cumulative Impacts:** Two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts (State CEQA Guidelines Section 15355). CEQA requires that cumulative impacts be discussed when the “project’s incremental effect is cumulatively considerable” (State CEQA Guidelines Section 15130[a]).
- **Mitigation Measures:** Measures to implement mitigation, defined by the State CEQA Guidelines (Section 15370) as follows:
 - (1) Avoiding the impact altogether by not taking a certain action or parts of an action.
 - (2) Minimizing the impact by limiting the degree of magnitude of the action and its implementation.
 - (3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
 - (4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
 - (5) Compensating for the impact by replacing or providing substitute resources or environments.

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3.2 Agricultural Resources

3.2.1 Introduction

This section describes existing agricultural resources in the project area and surrounding region, details the associated regulatory framework, and presents an analysis of potential impacts of the Proposed Project on agricultural resources.

Comments received in response to the Notice of Preparation (NOP) included a comment letter from Somach Simmons & Dunn about potential adverse impacts of the Proposed Project on agricultural resources and related infrastructure in the Sutter Bypass. The comments requested that the EIR analyze the potential for the Proposed Project to cause a reduction in agricultural yields and unintended adverse impacts on agricultural resources. The comment letter also requested an analysis of economic impacts on Sutter Bypass farmers and Sutter County; however, economic impacts are outside of the scope of CEQA and are not covered in this EIR. The NOP comment letters are provided in **Appendix A**.

3.2.2 Environmental Setting

Sutter County is one of California's leading agricultural counties, with more than 90 percent of the county's total land acreage currently being used for agricultural purposes.

Mapped Farmland and Other Land Uses

The California Department of Conservation (DOC) administers the Farmland Mapping and Monitoring Program, California's statewide agricultural land inventory. Through this mapping effort, DOC classifies farmland into the following categories:

- **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 supply¹ to sustain high crop yields when proper management, including water management, and acceptable farming methods are applied.
- **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. This characterization is determined by each county's board of supervisors and a local advisory committee.
- **Unique Farmland** does not meet the definition of either Prime Farmland or Farmland of Statewide Importance, but is used for specific crops of high economic value. This farmland type has a special combination of soil quality, location, growing season, moisture supply,²

¹ In general, Prime Farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime Farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent.

² The water supply is dependable and of adequate quality.

temperature, humidity, air drainage, elevation, and aspect needed to produce sustained high quality or high yields of specific crops when managed properly.

- **Farmland of Local Importance** is land of importance to the local economy, as defined by each county's local advisory committee and adopted by its board of supervisors. Farmland of Local Importance either is currently producing or has the capability to produce, but does not meet the definition of, Prime Farmland, Farmland of Statewide Importance, or Unique Farmland.
- **Grazing Land** is land with existing vegetation that is suitable for grazing.
- **Other Lands** do not meet the criteria for the remaining categories. Common examples include low-density rural developments, vegetative and riparian areas not suitable for livestock grazing, confined-animal agriculture facilities, strip mines, borrow pits, water bodies smaller than 40 acres, and vacant and non-agricultural land surrounded on all sides by urban development and greater than 40 acres.

DOC has not mapped farmland within or immediately adjacent to the Tisdale Bypass, including the project area. The spoils site is designated as Grazing Land. Land immediately adjacent to the Tisdale Bypass (north and south) is designated as Prime Farmland, Farmland of Statewide Importance, and Grazing Land, and land within the Sutter Bypass downstream of the confluence with the Tisdale Bypass is designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Grazing Land (**Figure 3.2-1**; also see the discussion in **Appendix C**).

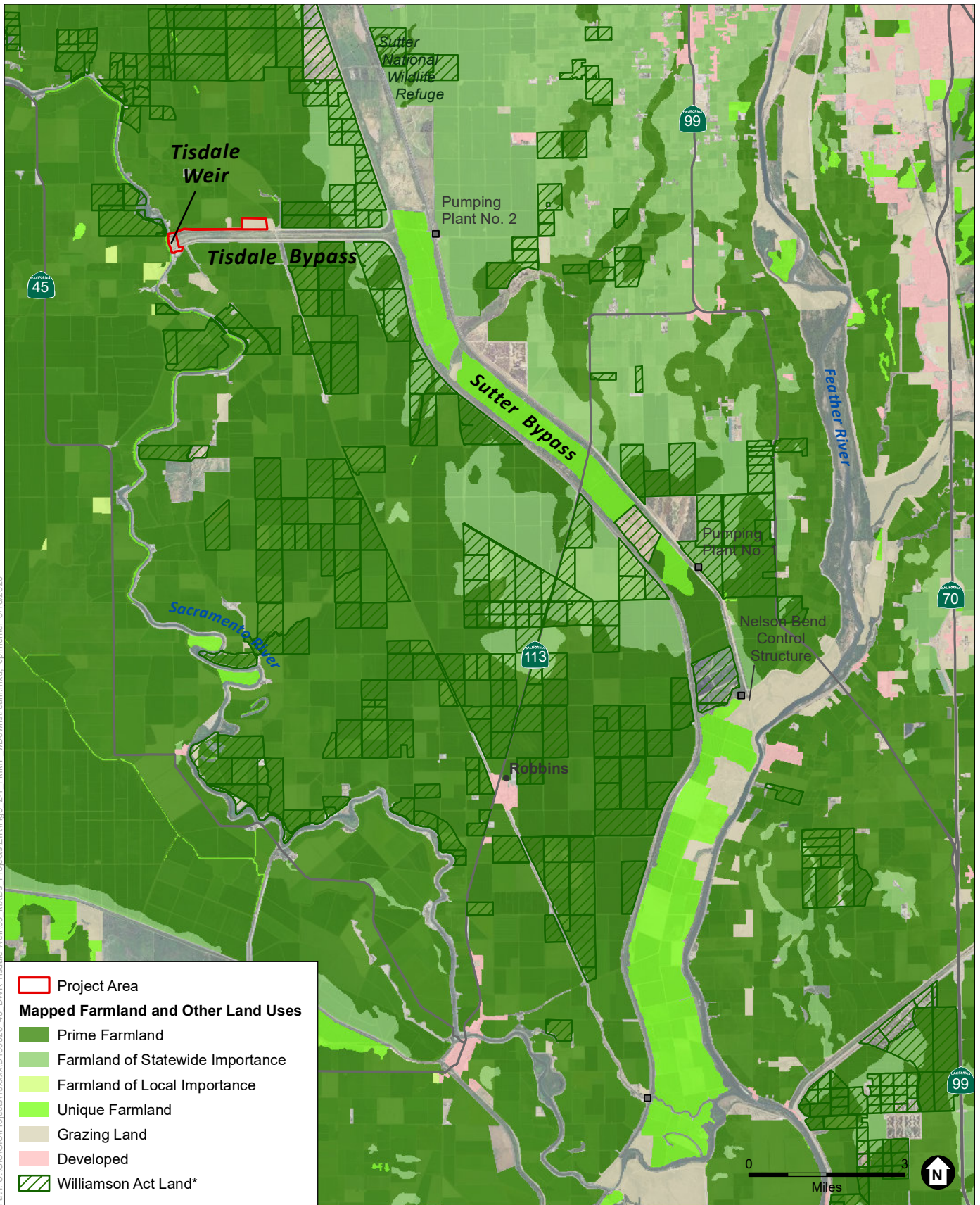
Sutter County has planned and zoned the land adjacent to the Tisdale and Sutter Bypasses for agricultural use. Most of this land is used for growing rice. Other field crops, such as tomatoes, carrots, and beans, as well as walnuts, also grow here. The project area does not contain agricultural land. The land within the Sutter Bypass downstream of the confluence with the Tisdale Bypass is used mainly for growing rice (**Figure 3.2-2**; also see the discussion in Appendix C).

Williamson Act Land

The Williamson Act enables governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use. None of the land in the project area is subject to a Williamson Act contract; however, some lands adjacent to the Tisdale and Sutter Bypasses and within the Sutter Bypass are in Williamson Act contracts (Figure 3.2-1; also see the discussion in Appendix C). Within the Sutter Bypass, two areas, comprising a total of three parcels, are enrolled in Williamson Act contracts. The areas are not in active agricultural production or otherwise being used for commercial agriculture; rather, they are being used as waterfowl hunting clubs (an agricultural compatible use under the contract).

Hydrology of the Sutter Bypass

The Tisdale Bypass and Sutter Bypass systems play an important role in the Sacramento River Valley. The bypasses help provide flood relief for the Sacramento River during major winter flood events, and during the spring and summer, the Sutter Bypass becomes prime land for rice production. As water surface elevations in the Sutter Bypass rise during flood events, the riparian and agricultural areas in the bypass become inundated. DWR currently holds flowage easements on non-State-owned properties in the Sutter Bypass for flood management purposes.



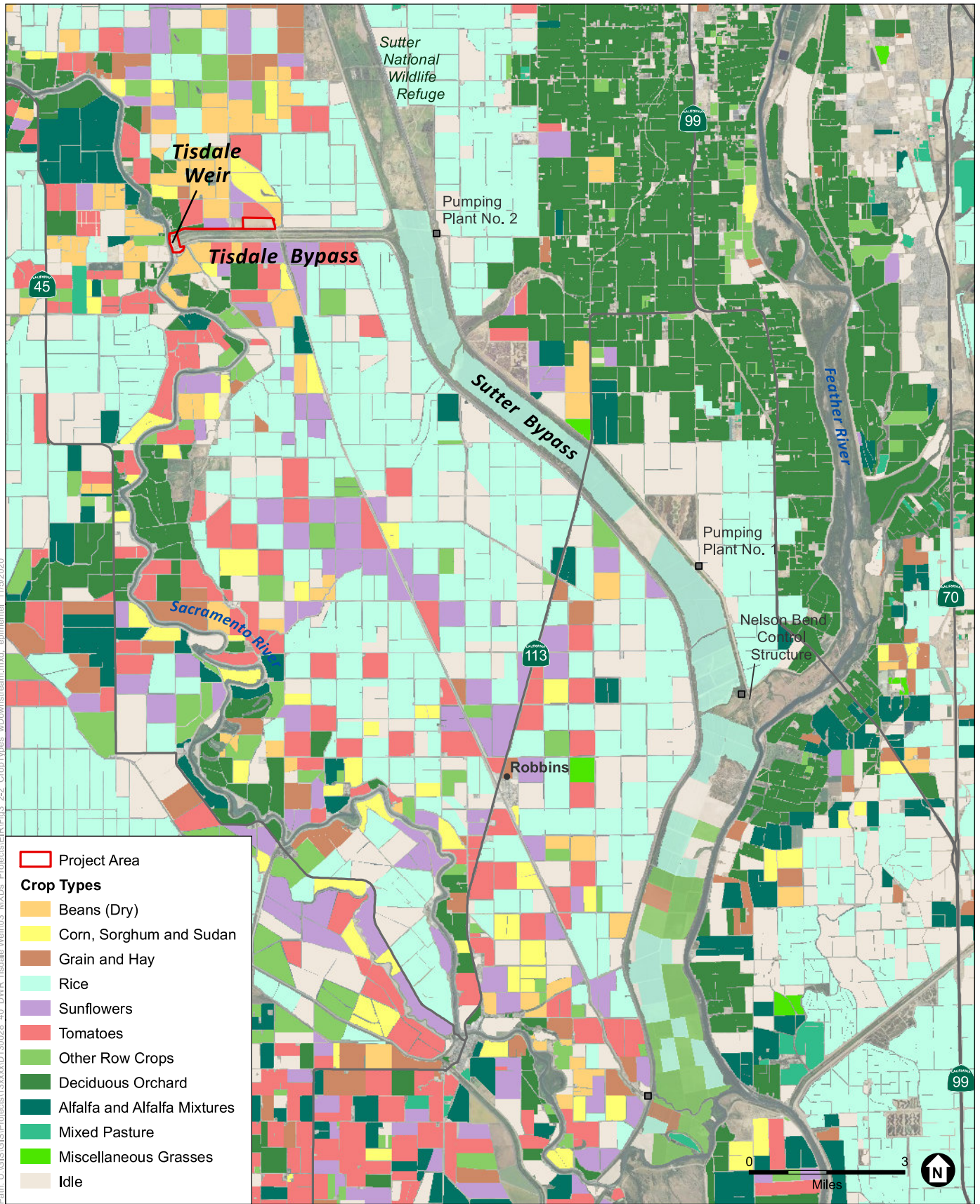
SOURCE: USDA, 2018; DOC, 2016 and 2018; Sutter County, 2019; ESA, 2020

* Williamson Act Lands displayed are only areas within Sutter County and Colusa County in the vicinity of Tisdale Weir.

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 3.2-1
Mapped Farmland and Other Land Uses





SOURCE: USDA, 2016; LandIQ, 2014; USDA, 2018; ESA, 2020

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 3.2-2
Crop Types

The Sutter Bypass serves primarily as an overflow flood conveyance channel, but it also functions as a sink for drainage of floodwaters and agricultural return flows, and as a conduit for conveyance and distribution of irrigation water. The largest hydrology inputs for the Sutter Bypass are overflows from the Sacramento River at Tisdale Weir, Butte Basin inputs via Butte Creek/Slough, and overflows from the Feather River. However, backwater conditions from the Sacramento River and Feather River at the downstream end of the Sutter Bypass also have a large influence over the extent of upstream flooding in the bypass. In general, the extent of flooding and inundation in the Sutter Bypass depends on the interaction of the variable flow inputs and timing and the water surface elevation of the Sacramento River near Fremont Weir (the downstream terminus of the Sutter Bypass) (Appendix C).

Flows during Flood Season

The Sutter Bypass serves primarily as an overflow channel for conveying Butte Basin and Sacramento River floodwaters in the winter. Flood season is November 1 through April 15 (California Code of Regulations Title 23, Section 112), although based on historic observations, the Sutter Bypass can flood at any time from October through June.

The Sutter Bypass receives direct floodwater input primarily from three sources: Butte Slough, the Tisdale Bypass, and the Feather River, which is also fed by the Yuba and Bear Rivers. Butte Slough always maintains flow into the Sutter Bypass, the Tisdale Bypass flows approximately 12 percent of the time in a given year (on average), and the Feather River spills directly into the Sutter Bypass only during extreme, larger floods (e.g., 1986, 1997). Flood flows in Butte Slough are generated by inputs to the Butte Basin, primarily from Butte Creek and other inputs like the Cherokee Canal (Dry Creek); however, sometimes large inputs to the Butte Basin come from the Sacramento River. This occurs when Sacramento River flood flows spill over Moulton Weir, Colusa Weir, the M&T Flood Relief Structure, the Goose Lake Flood Relief Structure, or the Three B's Natural Overflow Area. Sacramento River flood flows may also enter the Sutter Bypass downstream via the Tisdale Weir and Bypass (Appendix C).

Variability of Inundated Extent

In a typical flood season, backwater conditions exist throughout most of the lower Sutter Bypass, at the north, from near the Feather River confluence downstream to the terminus of the bypass. The upstream portion of the Sutter Bypass functions as a conveyance channel governed by open channel flow dynamics (i.e., gradient and roughness). The point at which the bypass transitions from conveying flows to impounding flows (resulting in backwater conditions) can shift to some degree throughout the flood season. This transition point often ends up somewhere between the Tisdale Bypass and the Feather River. The degree of backwatering is a function of flow through the bypass and the magnitude of flows in the Sacramento and Feather Rivers at the terminus of the bypass. In general, much of the lower Sutter Bypass is inundated for extended periods of time during a typical winter (Appendix C).

Flows during Irrigation Season and Related Operations

Operationally, aside from flood conveyance, the Sutter Bypass serves as a key source of irrigation water for Sutter County farmers during the late spring, summer, and early fall; as a point of drainage for runoff and irrigation return flow from primarily agricultural lands adjacent to the bypass; and as a source of habitat water for the Sutter National Wildlife Refuge and waterfowl wetlands in fall (see Section 3.8, *Recreation*). During the dry season, all flows moving downstream through the Sutter Bypass are typically contained in the East and West Borrow Canals. Dry-season input is from Butte Slough, the Wadsworth Canal, and irrigation return flows from lands adjacent to the bypass (Appendix C).

Seasonal and Annual Flow Variability

Rainfall and flooding in California exhibit substantial variability from year to year, a characteristic aspect of California's hydrology. However, even in moderately wet years, the Sacramento River would historically overtop its banks and flood the surrounding territory. Season-to-season hydrologic variability has a strong influence on conveyance, impoundment, and drainage timing of floodwaters in the Tisdale and Sutter Bypasses (Appendix C).

3.2.3 Regulatory Setting

Federal

The U.S. Natural Resources Conservation Service (NRCS) administers the Farmland Protection Program, a voluntary program aimed at keeping productive farmland in agricultural uses. Through this program, the NRCS provides matching funds to state, local, or tribal government entities and non-profit organizations with existing farmland protection programs to purchase conservation easements. Participating landowners agree not to convert the land to non-agricultural use and retain all rights to use the property for agriculture. Conservation easements must last a minimum of 30 years and applications with perpetual easements receive priority.

The Land Evaluation and Site Assessment system ranks lands for suitability and inclusion in the Farmland Protection Program. This system evaluates the soil's potential for agricultural use, location, market access, and adjacent land use. These factors are used to rank the suitability of parcels based on local resource evaluation and site considerations.

State

California Farmland Conservancy Program

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

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

Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The Important Farmland Inventory System, established in 1975 by the U.S. Soil Conservation Service (now known as NRCS), classifies land based on 10 soil and climatic characteristics. In 1980, DOC started a similar system of mapping and monitoring for California, the Farmland Mapping and Monitoring Program. CEQA lead agencies are required to evaluate agricultural resources in environmental assessments based at least in part on the Farmland Mapping and Monitoring Program. The State's system was designed to document the amount of agricultural land in California that was being converted to non-agricultural land or transferred into Williamson Act contracts.

Williamson Act

Under the Williamson Act, also known as the California Land Conservation Act of 1965, local governments may enter into contracts with private landowners to promote the continued use of relevant land for agricultural or related open space use. The Williamson Act empowers local governments to establish "agricultural preserves" consisting of lands devoted to agricultural and other compatible uses. After establishing such a preserve, the local government may offer the owners of the affected agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural or open space use for a minimum of 10 years.

California Environmental Quality Act Definition of Agricultural Lands

Public Resources Code Section 21060.1 defines "agricultural land" as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland, as defined by the U.S. Department of Agriculture land inventory and monitoring criteria, as modified for California.

Local

The Sutter County General Plan (2030) includes goals and policies that are intended to preserve and protect high-quality agricultural lands in Sutter County for long-term agricultural production and minimize conflicts between agricultural and non-agricultural lands. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.2.4 Impacts and Mitigation Measures

Methods of Analysis

Environmental Science Associates (ESA) prepared a TUFLOW Model Results and CEQA Impacts Analysis (Flow Impacts Analysis) (ESA, 2020), included as Appendix C, to analyze hydrology and hydraulics under existing and project conditions and quantify any changes in inundation downstream in the Sutter Bypass that could result from the Proposed Project. For this analysis, ESA developed a coupled one-dimensional/two-dimensional hydrodynamic model of the Tisdale and Sutter Bypasses using the TUFLOW HPC commercial software package (TUFLOW), and an approach and methodology for assessing the modeling results in the context of CEQA impact criteria.

The modeling domain extends along the Tisdale Bypass and the Sutter Bypass upstream of the Fremont Weir Complex. The model's upstream extent represents the distribution of flows between the East and West Borrow Canals of the Sutter Bypass, which is critical for mapping floodplain areas during low-flow periods, particularly toward the end of the flood season; it does not include areas north of State Route 20. The modeling domain was defined sufficiently downstream to ensure that the model would be bounded by well-defined hydraulic controls (Fremont Weir and stage records from the Sacramento River at Verona stream gage) to capture tailwater effects governing inundation in the lower Sutter Bypass. The model domain captures all lands within the Sutter Bypass that have the potential to be affected by operation of the Proposed Project (see Figure 3 in Appendix C).

DWR has developed a water year typology based on the Sacramento Valley Water Year Index (State Water Board, 1995). Water year types are classified Wet, Above Normal, Below Normal, Dry, and Critical. Figure 2 in Appendix C shows the frequency and duration of Tisdale and Fremont Weir overtopping events and illustrates both the seasonal and year-to-year variation in flows.

The hydraulic analysis adopted a simulation period of water years 1997 to 2018, which optimizes the period of observed data and reflects a wide range of water year types. A water year spans October 1 of the prior calendar year through September 30 of the given water year. However, to account for all seasons of interest and eliminate unnecessary computational time, the model simulations used a truncated water year period from September 28 through June 30. See Appendix C for additional detail on the hydraulic model and assumptions.

The Flow Impacts Analysis evaluated the permanent conversion of agricultural land to non-agricultural uses. The analysis assessed whether additional annual fallowing would result from project implementation, and if so, whether that condition could lead to the conversion of land. The driving variable was the incremental difference in the location, duration, and frequency of additional wetted area in the Sutter Bypass between existing and project conditions from March 1

through June 30, the assumed agricultural preparation and planting period. The analysis assumed the following:

- If a field were wet for too long, it would not be planted in time and would instead be fallowed for that year.
- The Proposed Project would cause a change if it would result in sufficient additional inundation during the standard preparation and planting period to make fallow a field that otherwise would have been planted.

Further, the Flow Impacts Analysis presented a basis for determining whether any predicted increase in fallowing could reasonably be expected to result in permanent conversion to a non-agricultural use (Appendix C).

Farmland Mapping

The Flow Impacts Analysis obtained farmland boundary data as mapped by DOC (2018). Ownership information and parcel boundaries were acquired from Sutter County (2018, 2019) and Yolo County (2018).

Field Mapping

Lands within the Sutter Bypass were further delineated into active agricultural fields based on the following information:

- Fields that appear to be in active production as shown on aerial imagery from 2018
- Fields that appear to be discrete areas in terms of water management, based on field berms explicitly represented in the Central Valley Floodplain Evaluation and Delineation Program's Light Detection and Ranging (LiDAR) data (Fugro Earth Data, Inc., 2010)

There were no active agricultural fields within the Tisdale Bypass. The agricultural field delineations are shown in Figures 5a and 5b in Appendix C.

Last Day Wet and Fallowing Thresholds

The timing of inundation on agricultural lands within the Sutter Bypass can significantly influence the ability of growers to manage their operations. With regard to actual or predicted fallowing, there is some practical threshold date or range of dates beyond which, if a given field is still inundated or saturated, planting is unlikely to occur. During the growing season (spring to fall), much of the land within the Sutter Bypass is used primarily to cultivate rice, although some row crops (e.g., beans, tomatoes, safflower, sunflowers) may also be grown, particularly in the downstream end of the bypass. Compared to the planting of rice, the planting of these row crops is generally less dependent on inundation timing (e.g., beans are generally planted in June).

Based on the understanding of current agricultural practices within the Sutter Bypass, the Flow Impacts Analysis calculated the following variables and adopted the following assumptions for the modeling:

- *Last Day Wet*—the date the ground is considered dry enough for tractors to chisel fields. This is assumed to occur when 70 percent or more of the field is dry (Reclamation and DWR, 2019), as computed by the TUFLOW model at the end of a given day.
- *Drying and Preparation Period*—the sum of additional days to reflect (1) the necessary assumed drying time before field preparation begins and (2) an assumed field preparation period.
- *Planting Date*—the Last Day Wet plus the Drying and Preparation Period. The later the planting date, the greater potential for decreases in agricultural yield.
- *Agricultural Field Preparation and Sowing Period*—March 1 through June 30 (based on Reclamation and DWR, 2019).

Field drying and preparation times and subsequent target planting dates vary to some degree both spatially within the Sutter Bypass and from year to year; therefore, the Flow Impacts Analysis considered a range of reasonable assumptions. For the initial processing of modeling results and assessment of sensitivity, the Flow Impacts Analysis assumed field drying and preparation times of, collectively, 34 and 75 days, and a last viable planting date range of June 1 to June 10 of a given year.

The results derived from the assumed June 1 planting date and 34-day field drying and preparation time were most consistent with the observed CropScape–Cropland Data Layer (CropScape Data) on fallowing, described below. Therefore, the analysis used these assumptions for target planting date and field drying and preparation time.

For the field preparation and sowing season, the analysis used the Last Day Wet computed by the model to identify the date when the ground is considered dry enough for tractors to begin disking the fields. A planting date was then calculated by adding the assumed number of days for field drying and preparation to the Last Day Wet; if the calculated planting date exceeded the target planting date (or “plant by” date), the field was assumed to be fallowed for that year (Appendix C).

Fallowing and Conversion

Some agricultural fields in the Sutter Bypass are fallowed to some degree almost every year. It is important to note that annual fallowing reflects temporary cropland idling, not permanent land conversion. The U.S. Department of Agriculture’s National Agricultural Statistics Service has mapped crop types and land use in the project area dating back to 2007, including fallow/idle cropland, and has published these data as part of the national CropScape Data (Attachment B of Appendix C) (USDA NASS, 2020). The percent of mapped croplands in the Sutter Bypass that are fallowed generally ranges from 5 percent (in water year 2007) to 70 percent (in water year 2017). Relatively large sections of the Sutter Bypass may be fallowed in a given year, and the spatial distribution of the fallowing may shift depending on the driver.

To assess whether any annual fallowing potentially caused by the Proposed Project may lead to permanent conversion of land, the Flow Impacts Analysis assumed that leaving a field fallow for some number of total and/or consecutive years may cause permanent land conversion from agricultural use. The best way to assess whether any fallowing caused by the Proposed Project could incrementally lead to permanent land conversion would be to use a documented threshold for the number of consecutive or total years of fallowing that would result in permanent land conversion; however, no documentation is available.

The CropScape Data generally represent the best estimate of the contemporary extent and frequency of fallowing within the entire Sutter Bypass; based on these data, almost every active agricultural field in the Sutter Bypass has been temporarily fallowed at one time or another. Yet, all of the agricultural fields delineated are currently in active use and production (as of 2018), and thus represent agricultural lands that have not been subjected to permanent land conversion. Thus, as a proxy for a conversion threshold, the Flow Impacts Analysis used the CropScape Data to estimate both the total years and the maximum number of consecutive years of fallowing that did *not* result in permanent land conversion for a given agricultural field.

Generally, according to the CropScape Data, most of the agricultural fields in the Sutter Bypass have experienced 1–4 years of fallowing over approximately the last decade, with the observed range between 0 and 7 years. Further, with regard to maximum consecutive fallowed years, most agricultural fields in the Sutter Bypass have experienced up to 1–2 years, with a range of 0–5 (see Figures 7 and 8 in Appendix C).

Using this proxy, the Flow Impacts Analysis examines the total and maximum consecutive years of fallowing for existing conditions and for the Proposed Project. If the Proposed Project is predicted to cause an increase in the frequency of fallowing beyond the range of fallowing currently observed, then it is assumed that the given field(s) may potentially be a candidate for conversion (Appendix C).

Grazing Lands

The Flow Impacts Analysis assumes that the mechanism for a potential flow-related impact on grazing lands would be a change in the extent, depth, and/or duration of inundation on parcels used for grazing. These changes could affect the extent of available grazing area. However, unlike the assessment of active agricultural fields and fallowing, there are no specific metrics for grazing (e.g., a planting date or “season”); thus, the degree of change in inundation that would preclude this type of land use is uncertain.

It is important to note that these grazing areas are inside the Sutter Bypass, a floodway that conveys floodwater and frequently inundates these locations to considerable depths under existing conditions. Thus, the practice of grazing is likely somewhat opportunistic and cyclical, though without any defined season, and a considerable change in inundation frequency would have to occur for this type of land use to be prohibited or converted.

To assess any potential flow-related impacts of the Proposed Project, a comparative assessment of any additional “wet days” resulting from increased flows from the Proposed Project was used as a proxy for days when grazing may be precluded. A wet day was determined to be a day during the water year simulation period (September 28 through June 1) when the TUFLOW modeling results indicate that water on 30 percent of a parcel or more is at least 0.1 feet deep (Appendix C).

Williamson Act Lands

Based on aerial imagery from 2018, two private hunting clubs are located downstream of the Tisdale Bypass inside the Sutter Bypass, both on Williamson Act lands (Figure 4 in Appendix C). These two areas (comprising a total of three parcels) have been converted from agricultural use and are configured and planted to enable waterfowl use and hunting; they are not designated as Farmland but are enrolled in Williamson Act contracts. As discussed further in Section 3.8, *Recreation*, hunting season for waterfowl (ducks and geese) within the Sutter Bypass is open between September 28 and February 12 (CDFW, 2020), and operation of the Proposed Project may result in increased flows during these periods.

The Flow Impacts Analysis assumes that potential flow-related impacts would be changes to the extent, depth, and/or duration of inundation on parcels used for hunting waterfowl. These changes could affect the extent of recreational area (e.g., change in available waterfowl habitat) or preclude access along roads that may be newly inundated relative to existing conditions.

It is important to note that these hunting areas are inside the Sutter Bypass, a floodway that conveys floodwater and frequently inundates these hunting sites at depths considerably greater than a few feet and closes access roads. Further, when the sites are not inundated by floodwaters, some areas are actively managed (via diversion and pumping) to generate the desired, shallow-flooded habitat (less than 18 inches in depth). The exact timing of when these sites are actively managed is unknown; therefore, the interaction of natural floodwaters and any supplemental flow or water movement is complex and not readily assessed.

To assess any potential flow-related impacts of the Proposed Project, a comparative assessment of the additional wet days resulting from increased flows from the Proposed Project was used as a proxy for lack of access/too wet to hunt. A *wet day* was determined to be a day during the waterfowl hunting season (September 28 through February 12 [CDFW, 2020]) when the TUFLOW modeling results indicate that water on 30 percent of the parcel or more is at least 0.1 feet deep.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if the Proposed Project would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract; 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.

Impacts Not Evaluated Further

The following issue was evaluated and the Proposed Project was determined to result in no impact; therefore, this topic is not evaluated further in this EIR. The analysis is summarized below. For a complete discussion, see the Initial Study Environmental Checklist in **Appendix B** of this EIR.

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]); or result in the loss of forest land or conversion of forest land to non-forest use. The project site and vicinity is not zoned as forest land, timberland, or Timberland Production. Therefore, implementation of the Proposed Project would not conflict with existing zoning or result in the conversion of forest land to non-forest use.

Project-Specific Impacts and Mitigation Measures

Table 3.2-1 summarizes the impact conclusions presented in this section.

**TABLE 3.2-1
 SUMMARY OF IMPACT CONCLUSIONS—AGRICULTURAL RESOURCES**

Impact Statement	Impact Conclusion
3.2-1: Implementation of the Proposed Project could convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract.	LS
3.2-2: Operation and maintenance of the Proposed Project could contribute to cumulative impacts on agricultural resources through the conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract.	LS

NOTE: LS = Less than Significant

SOURCE: Data compiled by Environmental Science Associates in 2020

Impact 3.2-1: Implementation of the Proposed Project could convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract. (Less than Significant)

Construction

There is no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance in the project area, and no parcels in the project area are in Williamson Act contracts. Downstream of the Tisdale Bypass in the Sutter Bypass, there is farmland and some parcels are under Williamson Act contracts. However, construction activities would be limited to the project area and would be temporary and short-term, potentially occurring over two consecutive construction seasons each approximately 6½ months long, outside the flood period (i.e., April 16 through October).

Therefore, construction of the Proposed Project would not affect flows to farmland or parcels under Williamson Act contracts downstream of the project area. Construction activities would not convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, nor would they conflict with a Williamson Act contract. Adjacent landowners and the County would be notified before the start of construction activities.

Operation and Maintenance

Operation and maintenance of the Proposed Project would not affect parcels immediately adjacent to the Tisdale Bypass (north and south) that are farmed and designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or that are in Williamson Act contracts (Figure 3.2-1). Water from the Tisdale Bypass does not flow over these parcels, and no potential exists for seasonal increases in flows through the bypass to affect farming there.

Land within the Sutter Bypass downstream of the confluence with the Tisdale Bypass is designated as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, and there are parcels within the Sutter Bypass that are under Williamson Act contracts. There are also parcels within the Sutter Bypass that are designated as Grazing Land, although this is not considered a protected land use. Long-term operation of the Proposed Project could affect land use and agricultural resources in the Sutter Bypass by adding water (flowing through the notch) and subsequently potentially causing the extent and/or duration of inundation to increase in some areas. Increased inundation may prevent or conflict with existing land uses and agricultural practices, potentially leading to the conversion of land to some other use.

The results of the Flow Impacts Analysis indicate that over the 22-year simulation period, the Proposed Project is predicted to result in 1 additional year of fallowing for 15 fields (out of 115 total fields) and 2 additional years of fallowing for three fields (see Figures 9 and 10 in Appendix C). If the additional fallow years predicted by the model (i.e., the project condition minus the existing condition) for the 18 affected fields are added to the CropScape values shown in Figure 7 of Appendix C for these same fields, the increase would result in, at most, 6 total years of fallowing in the context of the CropScape Data. Thus, the predicted range of fallowing under the Proposed Project remains within the range of fallowing observed under existing conditions over approximately the last decade, which is 0–7 total years of fallowing.

Similar to total fallowed years, the analysis of maximum consecutive fallowed years shows a relatively small change resulting from implementation of the Proposed Project. For two fields in the Sutter Bypass, the Proposed Project would add 1 additional year to the maximum number of consecutively fallowed years over the 22-year simulation period. For the affected fields, the predicted range in the maximum number of consecutively fallowed years is 1–2 years under the existing condition and 2–3 years under the project condition. Thus, as in the case above, the predicted range of fallowing under the Proposed Project remains within the observed range of fallowing under existing conditions (see Figure 8 in Appendix C).

As described above, the predicted impact of operation of the Proposed Project on the fallowing of agricultural fields within the Sutter Bypass is relatively small, at the scales of both individual fields and the entire bypass. For a small set of fields within the Sutter Bypass, the Proposed Project is predicted to slightly increase the frequency with which these fields may be fallowed (i.e., adding 1 or 2 additional fallow years over approximately two decades of modeled conditions). However, based on available information, the predicted frequency of annual fallowing under the Proposed Project—in terms of both total years and consecutive years—would remain within the range of fallowing currently observed and practiced within the Sutter Bypass under existing conditions.

Thus, implementing the Proposed Project could temporarily affect up to approximately 10 percent of Sutter Bypass farmland fields (shown in Figures 5a and 5b of Appendix C) by increasing periods of inundation; however, there is no evidence to suggest that this relatively small predicted change would cause these fields to be permanently taken out of production or otherwise converted to other non-agricultural uses (Appendix C) as compared to existing conditions.

Figure 3.2-1 shows the Williamson Act lands in the vicinity of the project area. For these lands, the range of additional wet days (based on annual average) is 0 to 3.9 days for the water year and 0 to 1.9 days for just the waterfowl season (i.e., September 28 through February 12). These values comprise, at most, less than approximately 1.4 percent of the water year (simulation period) and waterfowl hunting season, respectively. The Williamson Act contract(s) for these lands state that the subject property shall not be used other than for commercial agricultural uses and agricultural compatible uses specified in the contract. Agricultural compatible uses in the contract include waterfowl hunting clubs. Specifically, for the Williamson Act lands, which are currently used as private waterfowl hunting clubs, the predicted increase in the number of wet days, on average, is at most 1 day.

The Flow Impacts Analysis also evaluated effects on designated Grazing Land in the Sutter Bypass for informational purposes. For Grazing Land, the predicted change over the water year ranges from 0 to 3.1 days, which, again, is relatively small (see Figures 11 and 12 and Table 1 in Appendix C).

Based on the modeling results, implementation of the Proposed Project would result in very little to no increase in the average annual number of wet days on Williamson Act land as compared to existing conditions. Given the seasonal and year-to-year variation in inundation within the Sutter Bypass under existing conditions, there is nothing to suggest that this small, predicted change would result in a conflict with a Williamson Act contract.

Impact Summary

The Proposed Project would not result in permanent conversion of agricultural lands, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, to non-agricultural use, and would not cause conflicts with a Williamson Act contract. This impact would be less than significant.

Mitigation Measures: None required.

Cumulative Impacts and Mitigation Measures

The cumulative setting for agricultural resources includes other projects near the project site. These include DWR's Sutter Bypass Pumping Plant Rehabilitation Project, which proposes to increase accessibility at three existing pumping plants along the East Levee of the Sutter Bypass, provide safer conditions for inspections and maintenance activities, and restore a degraded levee prism to design standards; and the U.S. Bureau of Reclamation and California Department of Fish and Wildlife's Sutter National Wildlife Refuge Lift Station Project, which includes construction of a lift station that would allow the Sutter National Wildlife Refuge to divert water from the East Borrow Ditch.

Past projects in the project vicinity include the Tisdale Bypass Sediment Removal 2020 Project (2020), the Sutter Bypass East Borrow Canal Water Control Structures Project (2009), the Tisdale Bypass Channel Rehabilitation Project (2007), the Garmire Road Bridge Replacement Project (2004), and the Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009).

Impact 3.2-2: Operation and maintenance of the Proposed Project could contribute to cumulative impacts on agricultural resources through the conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract. (Less than Significant)

There is no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance in the project area, nor are any project area parcels in Williamson Act contracts. As indicated in Impact 3.2-1, the Proposed Project would not result in the permanent conversion of agricultural lands, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, to non-agricultural use; and would not cause conflicts with a Williamson Act contract. Therefore, the Proposed Project would not contribute to a cumulative impact on agricultural resources. This impact would be less than significant.

Mitigation Measures: None required.

3.3 Air Quality

3.3.1 Introduction

This section describes existing air quality in the project area and surrounding region, details the associated regulatory setting, and presents an analysis of potential impacts of project construction and operations and maintenance (O&M) activities on air quality.

No comments pertaining to air quality were received in response to the Notice of Preparation (NOP). The NOP comment letters are presented in **Appendix A**.

3.3.2 Environmental Setting

Ambient concentrations of air pollutants are determined by the amount of those pollutants emitted by pollutant sources and the atmosphere's ability to transport, transform, and dilute such emissions. Natural factors that affect the transport and fate of pollutants include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the project area are influenced by topography, meteorology, and climate, in addition to the types and quantities of emissions released by air pollutant sources.

The project area is located in Sutter County, within the boundaries of the Sacramento Valley Air Basin (SVAB). The SVAB includes Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and portions of Placer, Solano, and Yuba Counties. The SVAB is bounded on the north by the Cascade Range, on the south by the San Joaquin Valley Air Basin, on the east by the Sierra Nevada, and on the west by the Coast Ranges. Summer conditions are typically characterized by high temperatures and low humidity, with prevailing winds from the south. These mountain ranges channel winds through the air basin and act as barriers that inhibit the dispersion of pollutant emissions.

Summer temperatures in the SVAB average approximately 90 degrees Fahrenheit during the day and 50 degrees Fahrenheit at night. Winter conditions are characterized by occasional rainstorms interspersed with stagnant, sometimes foggy weather. In the winter, temperatures average in the low 50s during the day and the upper 30s at night. During winter, north winds become more frequent, but winds from the south predominate. Rainfall occurs mainly from late October to early May, averaging approximately 20 inches per year, but varies substantially each year (FRAQMD, 2010).

In addition to the prevailing wind patterns that influence the rate at which local pollutant emissions disperse, Yuba and Sutter Counties experience two types of inversions that affect air quality. The first type of inversion layer contributes to photochemical smog conditions by confining pollution to a shallow layer near the ground. This condition occurs in the summer when sinking air forms a "lid" over the region. The second type of inversion occurs when the air near the ground cools while the air aloft remains warm. These inversions occur during winter nights

and can cause localized air pollution “hot spots” near emission sources because of poor dispersion (FRAQMD, 2010).

Air Pollutants of Concern

As required by the federal Clean Air Act of 1970, the U.S. Environmental Protection Agency (EPA) has identified six criteria air pollutants that are pervasive in urban environments and for which national and state health-based ambient air quality standards have been established. EPA 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 identified by EPA. In addition to these federally recognized criteria pollutants, California adds four State criteria pollutants: visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

Criteria Air Pollutants

Ozone

Ground-level ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving volatile organic compounds and oxides of nitrogen (NO_x). The main sources of reactive organic gases (ROG) and NO_x, which are often referred to as “ozone precursors,” are combustion processes (including combustion in motor vehicle engines) and evaporation of solvents, paints, and fuels.

Ozone is considered a regional air pollutant because the wind transports and diffuses ozone precursors at the same time ozone is produced through the photochemical reaction process. Ozone causes eye irritation, constriction of airways, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide

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

Nitrogen Dioxide

NO₂ is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO₂. Aside from its contribution to ozone formation, NO₂ can increase the risk of acute and chronic respiratory disease and reduce visibility. NO₂ may be visible on high-pollution days, especially when ozone levels are also high.

Sulfur Dioxide

SO₂ is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO₂ is also a precursor to the formation of particulate matter, sulfate, and sulfuric acid that could precipitate downwind as acid rain.

Particulate Matter

PM₁₀ and PM_{2.5} consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM₁₀ and PM_{2.5} represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local; others, such as vehicular traffic, have a regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by the human breathing passages. This large dust is of more concern as a soiling nuisance than as a health hazard. The remaining fractions, PM₁₀ and PM_{2.5}, are a health concern, particularly when present at levels exceeding federal and state ambient air quality standards. PM_{2.5} (including diesel exhaust particles) is thought to have greater health effects because these particles are so small and can penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems, including asthma, bronchitis, and acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity (a diseased state or symptoms), mortality (premature death), and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM₁₀ and PM_{2.5} because their immune and respiratory systems are still developing.

Mortality studies conducted since the 1990s have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. A comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution adversely affects cardiopulmonary health.

Lead

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

Toxic Air Contaminants

Toxic air contaminants (TACs) are airborne substances that can cause short-term (acute) or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects, either injury or illness. TACs include both organic and inorganic chemical substances. They may be emitted by a variety of common sources: gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated differently than criteria air pollutants at both the federal and State levels. At the federal level, these pollutants are called “hazardous air pollutants.” California’s list of TACs identifies 243 substances and the federal list of hazardous air pollutants identifies 189 substances.

The California Air Resources Board (CARB) identified diesel particulate matter (DPM) as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic and carcinogenic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and DPM concentrations are higher near heavily traveled highways and rail lines with diesel locomotive operations. The risk from DPM, as determined by CARB, declined from 750 in one million in 1990 to 540 in one million in 2000, but still remains the highest risk to California’s ambient air quality.

Another notable TAC is asbestos, a fibrous mineral that is both naturally occurring in ultramafic rock (a rock type commonly found in California) and used as a processed component of building materials. Because asbestos has been proven to cause serious adverse health effects, including asbestosis and lung cancer, it is strictly regulated based on its natural widespread occurrence and its use as a building material.

Odorous Emissions

Odors are generally regarded as an annoyance rather than a health hazard. Detection of odors is subjective; some individuals can smell minute quantities of specific substances, while others may be sensitive to odors of other substances. Reactions to odors vary substantially as well. Manifestations of a person’s reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The 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. Odor impacts should be considered for any new odor sources proposed to be located near existing receptors, and for any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the odor source will mitigate odor impacts.

Air Quality in the Project Area

CARB operates two monitoring sites within the jurisdictional area of the Feather River Air Quality Management District (FRAQMD). One site, located on Almond Street in Yuba City, can be considered indicative of air quality levels in the Yuba City–Marysville area. The second monitoring site is located on top of the South Butte in the Sutter Buttes mountain range, approximately

2,000 feet above the valley floor. This site is a special-purpose monitoring site, designed to record the transport of ozone from populated areas into the northern Sacramento Valley.

The Yuba City monitoring station is approximately 13 miles northeast of the project site and monitors ozone, NO₂, PM₁₀, and PM_{2.5}. **Table 3.3-1** shows a five-year summary of monitoring data (2014 through 2018) for these pollutants from the Yuba City monitoring station.

**TABLE 3.3-1
AIR QUALITY DATA SUMMARY (2014–2018) FOR THE YUBA CITY MONITORING STATION**

Pollutant		Standard ¹	2014 Monitoring Data	2015 Monitoring Data	2016 Monitoring Data	2017 Monitoring Data	2018 Monitoring Data
Ozone	Highest 1-Hour Average (ppm)	0.090 ppm	0.103	0.080	0.075	0.085	0.086
	State Standard Exceedance Days		1	0	0	0	0
	Highest 8-Hour Average (ppm)	0.070 ppm	0.088	0.074	0.065	0.074	0.072
	State Standard Exceedance Days		3	1	0	2	1
	National Standard Exceedance Days		3	1	0	2	1
NO ₂	Highest Hourly Average (ppm)	0.18 ppm	0.049	0.043	0.040	0.049	0.051
	Measured Days over State Standard		0	0	0	0	0
PM ₁₀	Highest 24-Hour Average (µg/m ³)		77.6	68.2	51.7	145.5	339.6
	Measured Days over National Standard	150 µg/m ³	0	0	0	0	8
	Measured Days over State Standard	50 µg/m ³	8	6	1	19	40
	State Annual Average (µg/m ³)	20 µg/m ³	not available	23.1	20.4	21.8	not available
PM _{2.5}	Highest 24-Hour Average (µg/m ³)	35 µg/m ³	45.3	36.1	40.1	47.2	285.0
	Measured Days over National Standard		2	1	1	2	8
	State Annual Average (µg/m ³)	12 µg/m ³	not available	10.3	11.4	11.9	18.1
	National Annual Average (µg/m ³)	12 µg/m ³	not available	9.6	8.1	9.2	10.2

NOTES:

µg/m³ = micrograms per cubic meter; NO₂ = nitrogen dioxide; PM_{2.5} = particulate matter that is 2.5 microns or less in diameter; PM₁₀ = particulate matter that is 10 microns or less in diameter; ppm = parts per million

1 Generally, State standards and national standards are not to be exceeded more than once per year.

SOURCE: CARB, 2019.

Sensitive Receptors

Degraded air quality does not affect every individual or group in the population in the same way. Some groups are more sensitive than others to adverse health effects caused by exposure to air pollutants:

- Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, people with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and people with other environmental or occupational health exposures (e.g., poor indoor air quality) that affect cardiovascular or respiratory diseases.
- Land uses such as schools, day care centers, hospitals, and nursing and convalescent homes are more sensitive than the general public to poor air quality because the population groups associated with these uses are more susceptible to respiratory distress.
- Parks and playgrounds are moderately sensitive to poor air quality because persons engaged in strenuous work or exercise have increased sensitivity. 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 more sensitive to air quality conditions than commercial and industrial areas because people generally spend longer periods of time at home than elsewhere, with associated greater exposure to ambient air quality conditions.
- Workers are not considered sensitive receptors because all employers must follow U.S. Occupational Safety and Health Administration regulations to ensure the health and well-being of their employees.

Land uses adjacent to the project area include agriculture, open space, and associated support infrastructure. The Sutter County Tisdale Boat Launch Facility (which includes a launch ramp and parking area) is also located in the project area. There are no residences or other sensitive receptors in the project vicinity. The nearest residential communities are in Marysville and Yuba City, approximately 15 miles to the northeast.

3.3.3 Regulatory Setting

Federal

The Clean Air Act (1970, last amended in 1990) required regional planning and air pollution control agencies to prepare a state implementation plan (SIP) and associated regional plans. The SIP and regional plans must outline the agencies' measures to control stationary and mobile pollutant sources to achieve the national ambient air quality standards (NAAQS) by specified deadlines.

The ambient air quality standards are intended to protect public health and welfare. The standards specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. The NAAQS are designed to protect the segments of the public most susceptible to respiratory distress: 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 exceed the ambient air quality standards before adverse health effects are observed.

SIPs are living documents that are modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins, as reported by the agencies with jurisdiction over them. EPA reviews SIPs to determine whether they conform to the mandates of the federal Clean Air Act Amendments and will achieve air quality goals when implemented. If EPA determines that a SIP is inadequate, it may prepare a federal implementation plan for the nonattainment area and may impose additional control measures. If the regional planning or air pollution control agency fails to submit an approvable SIP or to implement the plan within mandated time frames, sanctions can be applied to transportation funding and stationary air pollution sources in the air basin.

Table 3.3-2 presents the current NAAQS and California ambient air quality standards (CAAQS) and briefly describes the principal sources for each pollutant. Under the 1990 federal Clean Air Act Amendments, EPA classifies air basins (or portions thereof) as “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the NAAQS have been achieved. The Clean Air Act Amendments define “unclassified” as any area that cannot be classified, based on available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Table 3.3-3 shows the current attainment status of the project area for criteria air pollutants.

State

California Clean Air Act and Ambient Standards

Although the federal Clean Air Act Amendments 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 the federal standards were established. As shown in Table 3.3-1, because of California’s unique meteorology, there are considerable differences between the State standards and the NAAQS. California’s ambient standards tend to be at least as protective as NAAQS and are often more stringent.

In 1988, California enacted the California Clean Air Act (California Health and Safety Code Section 39600 et seq.). Like its federal counterpart, the California Clean Air Act called for the designation of areas as attainment or nonattainment, but State designations would be based on the CAAQS rather than the NAAQS.

Table 3.3-2 shows the attainment status of the project area with respect to the State standards. The California Clean Air Act requires air districts with exceedances of State air quality standards to prepare a plan documenting reasonable progress toward attainment.

**TABLE 3.3-2
 NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS AND MAJOR SOURCES**

Pollutant	Averaging Time	National Standard	State Standard	Major Pollutant Sources
Ozone	1 hour	–	0.09 ppm	On-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
	8 hours	0.070 ppm	0.070 ppm	
CO	1 hour	35 ppm	20 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours ^[1]	9 ppm	9.0 ppm	
NO ₂	1 hour	100 ppb	0.18 ppm	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual average	0.053 ppm	0.030 ppm	
SO ₂	1 hour	75 ppb	0.25 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	0.5 ppm ^[2]	–	
	24 hours	0.14 ppm	0.04 ppm	
	Annual average	0.030 ppm	–	
PM ₁₀	24 hours	150 µg/m ³	50 µg/m ³	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual average	–	20 µg/m ³	
PM _{2.5}	24 hours	35 µg/m ³	–	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; also formed from photochemical reactions of other pollutants, including NO _x , SO _x , and organics.
	Annual average	12.0 µg/m ³	12 µg/m ³	
Lead	Monthly average	–	1.5 µg/m ³	<i>Present sources:</i> Lead smelters, battery manufacturing and recycling facilities. <i>Past source:</i> Combustion of leaded gasoline.
	Quarterly	1.5 µg/m ³	–	
Hydrogen Sulfide	1 hour	None	0.03 ppm	Geothermal power plants, petroleum production and refining.
Sulfates	24 hours	None	25 µg/m ³	The reaction of SO ₂ in the air.
Visibility-Reducing Particles	8 hours	None	Extinction of 0.23/km; visibility of 10 miles or more	See PM _{2.5} .
Vinyl Chloride	24 hours	None	0.01 ppm	Polyvinyl chloride and vinyl manufacturing.

NOTES:

µg/m³ = micrograms per cubic meter; CO = carbon monoxide; km = kilometer; NO_x = oxides of nitrogen; PM_{2.5} = particulate matter that is 2.5 microns or less in diameter; PM₁₀ = particulate matter that is 10 microns or less in diameter; ppb = parts per billion; ppm = parts per million; ROG = reactive organic gases; SO₂ = sulfur dioxide; SO_x = oxides of sulfur.

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

SOURCES: CARB, 2009, 2016

**TABLE 3.3-3
CRITERIA POLLUTANT ATTAINMENT STATUS FOR THE PROJECT AREA**

Pollutant and Averaging Time	Designation/Classification Federal Standards	Designation/Classification State Standards
Ozone (1-hour)	None	Attainment
Ozone (8-hour)	Nonattainment/Moderate	Attainment
CO	Attainment/Maintenance	Attainment
NO ₂	Attainment	Attainment
SO ₂	Attainment	Attainment
PM ₁₀	Attainment	Nonattainment
PM _{2.5}	Attainment/Maintenance	Attainment
Lead	Unclassified	Attainment
Visibility-Reducing Particles	None	Unclassified
Sulfates	None	Attainment
Hydrogen Sulfide	None	Unclassified

NOTES: CO = carbon monoxide; NO₂ = nitrogen dioxide; PM_{2.5} = particulate matter that is 2.5 microns or less in diameter; PM₁₀ = particulate matter that is 10 microns or less in diameter; SO₂ = sulfur dioxide

SOURCE: FRAQMD, 2019.

California Air Resources Board Measures to Reduce Diesel Emissions

In 2000, CARB approved a comprehensive diesel risk reduction plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The regulation was anticipated to result in an 80 percent decrease in the statewide diesel health risk in 2020, compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel. CARB regulations for diesel emissions also include the following:

- On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation
- On-Road Heavy Duty (New) Vehicle Program
- In-Use Off-Road Diesel Vehicle Regulation
- Portable Engines Air Toxics Control Measure
- Statewide Portable Engine Registration Program
- New Off-Road Compression Ignition Diesel Engines and Equipment Program

All of these regulations and programs have deadlines by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment.

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

Regulation of Toxic Air Contaminants

TACs are regulated under both federal and State laws. Federal law uses the term “hazardous air pollutants” to refer to the same types of compounds that are referred to as TACs under State law. The 1977 federal Clean Air Act Amendments required EPA to identify national emissions standards for hazardous air pollutants to protect public health and welfare. These substances include certain volatile organic compounds, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, 189 substances are regulated as hazardous air pollutants.

Local

Feather River Air Quality Management District Guidelines

FRAQMD is the regional agency tasked with regulating the air quality of Sutter and Yuba Counties through federal, State, and local air quality management programs. Specifically, FRAQMD conducts monitoring, evaluation, and education programs; implements control measures to reduce emissions from stationary sources; issues permits to and inspects pollution sources; enforces air quality regulations; and supports and implements measures to reduce emissions from motor vehicles.

Sutter County General Plan

The Sutter County General Plan (2030) includes goals and policies that are intended to encourage energy conservation, protect air quality, and control greenhouse gas emissions. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

The following air quality goal and policies in the Environmental Resources Element of the Sutter County General Plan are relevant to the Proposed Project.

Goal ER-9: Protect, maintain, and improve the air quality in Sutter County.

Policy ER 9.5: FRAQMD Review. Submit development proposals to FRAQMD for review and comment in accordance with CEQA prior to consideration by the County’s decision-making body.

Policy ER 9.6: New Development. Review and ensure new development projects incorporate feasible measures that reduce construction and operational emissions.

Policy ER 9.10: Contractor Preference. Give preference to contractors that use low-emission equipment and other practices with air quality benefits for County-sponsored construction projects, and to businesses that practice sustainable operations.

3.3.4 Impacts and Mitigation Measures

Methods of Analysis

The Proposed Project would emit pollutants primarily during construction. Construction-related emissions of criteria air pollutants were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Project-specific inputs included the construction schedule, the construction equipment fleet and activity level, and vehicle trips by construction workers and for material transport trips. Where project-specific information was not available, CalEEMod defaults were used. Total emissions estimated over the entire construction period were averaged by the number of construction workdays to derive estimates of average daily emissions, which were then compared to the FRAQMD significance thresholds.

Construction of the Proposed Project is expected to take place over two seasons, each lasting approximately 6½ months; however, the following air quality analysis conservatively assumes that construction would take place in one season, from April 2022 to October 2022. All assumptions, inputs, and calculations are presented in **Appendix D**. The impact of exposure to TACs is discussed qualitatively because the immediate project vicinity lacks sensitive receptors that would necessitate a health risk assessment.

Once operational, the Proposed Project would not introduce new sources of air pollutant emissions. Emissions generated by vehicles used for O&M activities and during operation of maintenance equipment would be similar to existing emissions. Therefore, operational emissions are not analyzed further below.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if implementing the Proposed Project would:

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

FRAQMD has published the *Indirect Source Review Guidelines—A Technical Guide to Assess the Air Quality Impact of Land Use Projects under the California Environmental Quality Act* (FRAQMD, 2010). As part of the guide, FRAQMD has adopted thresholds of significance to assist lead agencies in determining whether a project may have a significant impact on air quality. FRAQMD classifies projects without an operational phase, such as the Proposed Project that would not generate new emissions during operations, as Type 2 projects. Examples of Type 2 projects include roadway construction projects and other projects to update or maintain

infrastructure. FRAQMD considers Type 2 projects to have a significant impact if they would generate more than 25 pounds per day (lb/day) of ROG or NO_x, or more than 80 lb/day of PM₁₀.

Impacts Not Evaluated Further

The following issue was evaluated and the Proposed Project was determined to result in no impact; therefore, this topic is not evaluated further in this EIR. The analysis is summarized below. For a complete discussion, see the Initial Study Environmental Checklist in **Appendix B** of this EIR.

Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. During construction and operation of the Proposed Project, combustion exhaust and engine dust from diesel-fueled equipment could generate localized, short-term, non-persistent odors near the project site. However, because of the rural location of the project area, these odors would not be perceptible beyond the project site boundaries. Further, because of the absence of sensitive receptors in the project vicinity, no exposure would occur. Similar impacts, but on an even smaller scale, would occur from the operation of heavy-duty equipment for maintenance activities. Given the temporary nature of construction and maintenance activities at the project site and the distance to the nearest sensitive receptors, the Proposed Project would have no impact with respect to the creation of odors affecting a substantial number of people.

Project-Specific Impacts and Mitigation Measures

Table 3.3-4 summarizes the impact conclusions presented in this section.

**TABLE 3.3-4
 SUMMARY OF IMPACT CONCLUSIONS—AIR QUALITY**

Impact Statement	Impact Conclusion
3.3-1: Implementation of the Proposed Project could conflict with or obstruct implementation of the applicable air quality plan.	LS
3.3-2: Construction of the Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard.	LSM
3.3-3: Construction of the Proposed Project could expose sensitive receptors to substantial pollutant concentrations.	LS
3.3-4: Construction of the Proposed Project could temporarily add to localized and regional cumulative air quality impacts.	LSM

NOTES: LS = Less than Significant; LSM = Less than Significant with Mitigation Measures

SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.3-1: Implementation of the Proposed Project could conflict with or obstruct implementation of the applicable air quality plan. (Less than Significant)

The federal Clean Air Act and California Clean Air Act require any air district that has been designated as a nonattainment area relative to the NAAQS and CAAQS for ozone, CO, SO₂, or NO₂ to prepare and submit a plan for attaining and maintaining the standards. The district also must review its progress made toward attaining the standards and update the plan regularly.

Together, the air pollution control districts and air quality management districts for the counties in the northern Sacramento Valley form the Northern Sacramento Valley Planning Area (NSVPA). The NSVPA districts are designated as nonattainment for the State ozone standard and have jointly prepared an air quality attainment plan, updated every three years. The 2018 update to the NSVPA Air Quality Attainment Plan assesses the progress made in implementing the previous triennial update, and proposes modifications to the strategies necessary to attain the CAAQS as soon as possible (SVAQEPP, 2018).

FRAQMD has not published guidance for assessing a project or plan relative to the applicable clean air plan (currently, the 2018 NSVPA Air Quality Attainment Plan). The Proposed Project would involve rehabilitating and reconstructing the existing Tisdale Weir to address structural deficiencies; installing fish passage facilities; and completing associated improvements, including a control building for monitoring equipment and an access road. As discussed in the Initial Study Environmental Checklist (**Appendix B**), the Proposed Project would not increase population or induce or increase the potential for growth in the project area. Increases in criteria pollutant emissions would be associated primarily with construction activities, and therefore, would be temporary. Construction and operation of the project would result in a minimal increase in traffic levels along local roadways compared to existing conditions.

The Proposed Project would not result in growth-inducing effects or in long-term increases in population or vehicle miles traveled that would lead to increased emissions levels. Therefore, the Proposed Project would not conflict with or obstruct implementation of the 2018 NSVPA Air Quality Attainment Plan. This impact would be less than significant.

Mitigation Measures: None required.

Impact 3.3-2: Construction of the Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard. (Less than Significant with Mitigation)

Construction activities for the Proposed Project would emit criteria air pollutants. Construction emissions for the Proposed Project were modeled for this analysis using CalEEMod, Version 2016.3.2. Project-specific information was used for the modeling when possible. Where project-specific data were unavailable, CalEEMod defaults were used as inputs, capturing assumed values consistent with standard practice. **Appendix D** presents CalEEMod assumptions and detailed outputs.

The Proposed Project would involve rehabilitating and reconstructing the existing Tisdale Weir to address structural deficiencies; installing fish passage facilities; and completing associated improvements, including a control building for monitoring equipment and an access road. Construction is expected to take place over two seasons, each lasting approximately 6½ months;

however, the air quality analysis assumed a worst-case scenario in which all construction activities would be compressed and completed in one season, from April 2022 to October 2022.

Project construction activities are expected to require the use of construction equipment such as excavators, loaders, bulldozers, a crane, forklifts, dump trucks, generators, and concrete mixing and pumping trucks. The option to use a concrete batch plant to mix concrete on-site instead of hauling pre-mixed concrete to the site is also being considered. If necessary, the concrete batch plant would be located in the southernmost staging area or the spoils site.¹

Vehicle trips for transporting workers and construction equipment and materials to the project area would also emit air pollutants. Depending on the construction phase, this analysis conservatively assumes that up to 50 construction workers traveling to the project area would generate 100 one-way trips. In addition, trucks transporting equipment and materials (including hauling in pre-mixed concrete) would account for a maximum of 18 trips per day under either the concrete haul-in option or the on-site batch plant option.

FRAQMD classifies the Proposed Project as a Type 2 project because the project's operational phase would not generate new emissions. FRAQMD guidance states that if a Type 2 project would exceed "the thresholds of 25 lbs/day [pounds per day] of NO_x or ROG, or daily emissions of 80 lbs/day of PM₁₀, the project must apply Best Available Mitigation Measures for Construction Phase...and include other mitigation to reduce the impact to below the significant thresholds" (FRAQMD, 2010).

Table 3.3-5 presents unmitigated emissions of ROG, NO_x, and PM₁₀ for the Proposed Project, for both the concrete haul-in and on-site batch plant options, as estimated using CalEEMod. PM₁₀ emissions from operation of the on-site batch plant were calculated separately and added to the CalEEMod estimates for that option. Estimates for the batch plant include fugitive emissions from processes such as aggregate and sand transfer, cement and cement supplement unloading, weigh hopper loading, and mixer loading, and emissions from active and inactive storage piles. Emissions factors and concrete composition data from AP-42 (the compilation of EPA's air pollutant emissions factor information) were used in conjunction with a conservative estimate of concrete demand of 13,300 cubic yards per year for project construction.

As shown in Table 3.3-5, the Proposed Project's unmitigated NO_x emissions would be 165.5 lb/day for the concrete haul-in option or 107.8 lb/day for the on-site batch plant option, both exceeding FRAQMD's 25 lb/day threshold for NO_x. Unmitigated emissions of ROG and PM₁₀ would be below the respective FRAQMD thresholds under either the concrete haul-in option or the on-site batch plant option.

¹ The modeling for the concrete batch plant option assumes that the batch plant would be located in the southernmost staging area. If the batch plant were located at the spoils site, the overall mileage would be the same as currently modeled because the current mileage assumes that trucks would pass by the spoils site. In addition, the trips to transport the material from the spoils site to the project site with the concrete batch plant located at the spoils site would be the same as the deliveries of material to the concrete batch plant in the southernmost staging area.

**TABLE 3.3-5
PROJECT CONSTRUCTION EMISSIONS**

Construction Scenario	ROG (lb/day)	NO_x (lb/day)	PM₁₀ (lb/day)
Project with Concrete Haul-In Option	15.4	127.5	6.0
FRAQMD Thresholds	25	25	80
Exceeds Threshold?	No	Yes	No
Project with Concrete Haul-In Option—Mitigated with Tier 4 Final Equipment	4.1	19.3	1.2
FRAQMD Thresholds	25	25	80
Exceeds Threshold?	No	No	No
Project with On-Site Concrete Batch Plant Option	9.7	77.9	5.9
FRAQMD Thresholds	25	25	80
Exceeds Threshold?	No	Yes	No
Project with On-Site Concrete Batch Plant Option—Mitigated with Tier 4 Final Equipment	2.9	13.4	3.1
FRAQMD Thresholds	25	25	80
Exceeds Threshold?	No	No	No

NOTES:

FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_x = oxides of nitrogen; PM₁₀ = particulate matter that is 10 microns or less in diameter; ROG = reactive organic gases

Air quality modeling data are included as **Appendix D**.

SOURCE: Data compiled by Environmental Science Associates in 2020.

The northern SVAB is currently designated as a nonattainment area relative to both the NAAQS and the CAAQS for ozone. The northern SVAB’s nonattainment status is attributable to the region’s development history. Past, present, and future development projects contribute to the region’s adverse air quality impacts on a cumulative basis. By its very nature, air pollution from ozone precursors is largely a cumulative impact. No single project is large enough to result in nonattainment of an ambient air quality standard by itself. Instead, a project’s individual emissions contribute to existing cumulatively significant adverse impacts on air quality. If a project’s contribution to the cumulative impact is considerable, then the project’s impact on air quality would be significant.

In developing thresholds of significance for air pollutants, air districts consider the emissions levels at which a project’s individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse impacts on the region’s existing air quality. Because the Proposed Project would exceed FRAQMD’s significance threshold for NO_x during construction, the Proposed Project’s contribution to the cumulative air quality impact on the area would be significant before mitigation.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact related to criteria pollutant emissions to a less-than-significant level.

Mitigation Measure 3.3-1a: To the greatest extent practicable, off-road diesel construction equipment shall be equipped with the most effective verified diesel emissions control strategies available for the engine type. In this case, the best available control strategy is implementation of Tier 4 Final engines as certified by CARB and EPA. The contractor shall ensure that all construction equipment is properly maintained and tuned in accordance with the manufacturer's specifications. DWR will verify compliance by submitting an equipment inventory and certification statement prepared by the contractor to FRAQMD.

Mitigation Measure 3.3-1b: Once the environmental analysis has been completed and the project is approved, DWR and the construction contractor shall implement the following measures, with oversight by FRAQMD:

1. *Implement Mitigation Measure 3.3-1a;* use low-emissions construction equipment (verified diesel emissions control strategies) to the maximum extent feasible and estimate the NO_x emissions reductions associated with such equipment.

If DWR is unable to secure Tier 4 Final engines for the emissions reductions required to reduce NO_x emissions to below the significance threshold, FRAQMD's off-site mitigation program (described below) shall be engaged to meet these additional emission reduction requirements. The precise amount of off-site mitigation will be determined through the submittal of an equipment inventory and certification statement to FRAQMD as discussed above.

2. *Pay Voluntary Off-Site Mitigation Program fees to FRAQMD,* currently estimated at \$30,000 per weighted ton of NO_x emissions in excess of the significance threshold, plus an administrative fee of no more than 10 percent of the total fee. These fees shall fund one or more emissions reduction projects in the northern SVAB (Yuba and Sutter Counties) to offset NO_x emissions exceeding the threshold. The exact fee shall be determined by FRAQMD and shall be based on the types of projects available at the time of payment.
3. *Once the project is approved, submit a memorandum of understanding to FRAQMD* containing the following information:
 - Source of emissions
 - Estimate of emissions
 - Amount of off-site mitigation requested to be purchased
 - Date the off-site mitigation fee will be provided to FRAQMD (either as a one-time payment before the start of project work or as a down payment, with the remainder due at the end of the construction season)

Once the MOU is submitted, a mitigation agreement between DWR and FRAQMD will be finalized. The agreement will specify the fees and timing of payment and will be executed by DWR and FRAQMD. FRAQMD shall calculate the total Voluntary Off-Site Mitigation Program fee by summing the maximum daily construction

emissions of NO_x (lb/day) in excess of the significance threshold (i.e., 25 lb/day) after implementation of all other available on-site mitigation, and multiplying by the final estimate of construction workdays per year in addition to the 10 percent administrative fee. The fee represents the offset of any remaining NO_x emissions above the threshold by funding emissions reduction programs in the SVAB (e.g., replacing old diesel-powered school buses with low-emissions models).

Mitigation Measure 3.3-1c: As part of the project, DWR will implement the following FRAQMD best management practices (BMPs), which are required by FRAQMD for projects that exceed one or more of its significance thresholds:

BMP 1: All grading operations on the project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.

BMP 2: Construction sites shall be watered as necessary to prevent fugitive dust violations.

BMP 3: An operational water truck should be available at all times. Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts.

BMP 4: On-site dirt piles or other stockpiled particulate matter should be covered, windbreaks installed, and water and/or soil stabilizers employed to reduce wind-blown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

BMP 5: All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free-fall distance and fugitive dust emissions.

BMP 6: Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

BMP 7: To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

BMP 8: Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project area.

BMP 10: Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage.

BMP 11: Reestablish ground cover on the construction site as soon as possible, through seeding and watering.

BMP 12: Disposal by Burning: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited in the project area. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et al.) may be conducted in the project area unless the project proponent successfully applies and obtains a burn permit from the FRAQMD, the Levee District, the Water District or Duck Preserve with local jurisdiction and follows all requirements of the FRAQMD Regulation II. DWR must implement all FRAQMD requirements before burning.

Impact Significance after Mitigation: Less than Significant.

Implementing Mitigation Measure 3.3-1a would reduce NO_x emissions through the use of construction equipment with EPA-certified Tier 4 Final engines. Tier 4 Final engines are now widely available for diesel-fueled heavy-duty construction equipment, and are designed to provide much-improved fuel efficiency and substantially reduce both NO_x and PM emissions. If equipment availability or other aspects of the construction schedule limit the use of Tier 4 Final engines, Mitigation Measure 3.3-1b provides an option for the Proposed Project to participate in FRAQMD's Voluntary Off-Site Mitigation Program to address remaining NO_x emissions exceeding the significance threshold.

With implementation of Mitigation Measures 3.3-1a and 3.3-1b, NO_x emissions levels would be reduced to below FRAQMD thresholds. In addition, with Mitigation Measure 3.3-1c, the Proposed Project would implement FRAQMD Best Available Mitigation Measures, which must be implemented for all Type 2 projects. As shown in Table 3.3-5, with implementation of Mitigation Measures 3.3-1a, 3.3-1b, and 3.3-1c, the Proposed Project's estimated emissions of all criteria air pollutants of concern would be below FRAQMD's respective daily significance thresholds. Therefore, with mitigation, the Proposed Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard.

Impact 3.3-3: Construction of the Proposed Project could expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

Project construction activities would result in short-term emissions of diesel exhaust (DPM emissions) from on-site heavy-duty equipment and truck trips. During construction, DPM would be emitted by off-road diesel equipment used for site grading, excavation, and other activities, and by truck trips to haul materials to and from the worksite. The dose to which receptors are exposed—a function of concentration and the duration of exposure—is the primary factor used to determine the health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the California Environmental Protection Agency's Office of Environmental

Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA, 2015).

The Proposed Project's short-term construction activities would not expose sensitive receptors to substantial pollutant concentrations for the following reasons:

- The generation of DPM emissions from project construction would be temporary. Construction would last for 6½ months per year for a maximum of 2 years, for a total exposure of 13 months (less than 1.6 percent of the 70-year exposure period).
- More importantly, no sensitive receptors are located in the immediate vicinity of the project site. The Office of Environmental Health Hazard Assessment requires that health risk impacts be considered if construction activities would take place within 1,000 feet of sensitive receptors. There are no sensitive receptors within 1,000 feet of the construction locations.

As a result, construction of the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations. O&M activities would generate a fraction of the equipment and truck trips generated by construction activities; therefore, O&M activities would not expose sensitive receptors to substantial pollutant concentrations. This impact would be less than significant.

Mitigation Measures: None required.

Cumulative Impacts and Mitigation Measures

This evaluation of cumulative impacts considers the potential of the Proposed Project in combination with other past, present, and future projects to result in significant impacts on air quality. As discussed in Impact 3.3-2 above, air pollution from ozone precursors is largely a cumulative impact by its very nature. No single project is large enough to result in nonattainment of an ambient air quality standard by itself. Instead, a project's individual emissions contribute to existing cumulatively significant adverse impacts on air quality.

Impact 3.3-4: Construction of the Proposed Project could temporarily add to localized and regional cumulative air quality impacts. (Less than Significant with Mitigation)

In developing thresholds of significance for air pollutants, air districts consider the emissions levels at which a project's individual emissions would be cumulatively considerable. If a project would exceed the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse impacts on the region's existing air quality.

As shown in Table 3.3-5, the Proposed Project would exceed FRAQMD's significance threshold for NO_x during construction. For this reason, the Proposed Project's contribution to localized or regional cumulative air quality impacts would be cumulatively significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measures: Implement Mitigation Measures 3.3-1a through 3.3-1c.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measures 3.3-1a through 3.3-1c would reduce the contribution of the Proposed Project to this cumulative impact to less than considerable because the measures would be implemented to reduce the Proposed Project's construction emissions to below the FRAQMD significance thresholds for all pollutants and reduce the Proposed Project's construction-related fugitive dust emissions.

3.4 Biological Resources

3.4.1 Introduction

This section describes the terrestrial and aquatic biological resources that are known or have the potential to occur in the project area. Biological resources are common vegetation, wildlife, and fisheries resources; sensitive habitats; plant communities; and special-status plant, wildlife, and fish species.

Comments received in response to the Notice of Preparation (see **Appendix A**) were considered during development of the impact analysis:

- The California Department of Fish and Wildlife (CDFW) recommended that the EIR evaluate project impacts on fish and wildlife and develop mitigation and minimization measures to reduce potential impacts of project construction and operation. CDFW noted that the Proposed Project could result in incidental take of listed species protected under the California Endangered Species Act (CESA) and requested that the EIR disclose whether an incidental take permit may be obtained before construction. CDFW also identified that the project may be subject to its regulatory authority under the Lake and Streambed Alteration Agreement.
- The Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) noted the regulatory requirements for protecting wetlands and the jurisdictional requirements of the United States and State, such as Clean Water Act (CWA) Sections 404 and 401 and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act).
- The State Lands Commission requested that the EIR disclose the impacts on fish and wildlife of noise and vibration from project construction, and consider the potential of the Proposed Project to encourage the establishment or proliferation of invasive species.
- Somach Simmons & Dunn, on behalf of the Sutter Bypass–Butte Slough Water Users’ Association, stated that changes in the inundation pattern of the Sutter Bypass could reduce habitat for terrestrial species and disturb fish species and their habitat. Somach Simmons & Dunn also requested an analysis of the effects of the Proposed Project on waterfowl habitat within the Sutter Bypass.

3.4.2 Environmental Setting

The following sections describe the habitat types, primary functions of terrestrial and aquatic habitats, and sensitive biological resources (including special-status species and designated critical habitat) known to occur or have potential to occur in the project area. Background information was gathered from the variety of sources identified in the *Data Sources* section below. Information was collected regarding the distribution of natural communities/land cover types and observations of flora and fauna present in the project area were made during a biological resources survey conducted by Environmental Science Associates (ESA) biologists on October 19, 2018. Subsequent focused surveys for botanical resources were conducted in the project area on May 7 and June 21, 2019, and general biological resources surveys were

conducted on May 21 and July 31, 2019. DWR biologists surveyed the southern and eastern staging areas on March 25 and September 10, 2020.

Data Sources

Before performing the biological resources surveys, ESA reviewed publicly available and subscription-based biological resources data. The following sources assisted in this analysis:

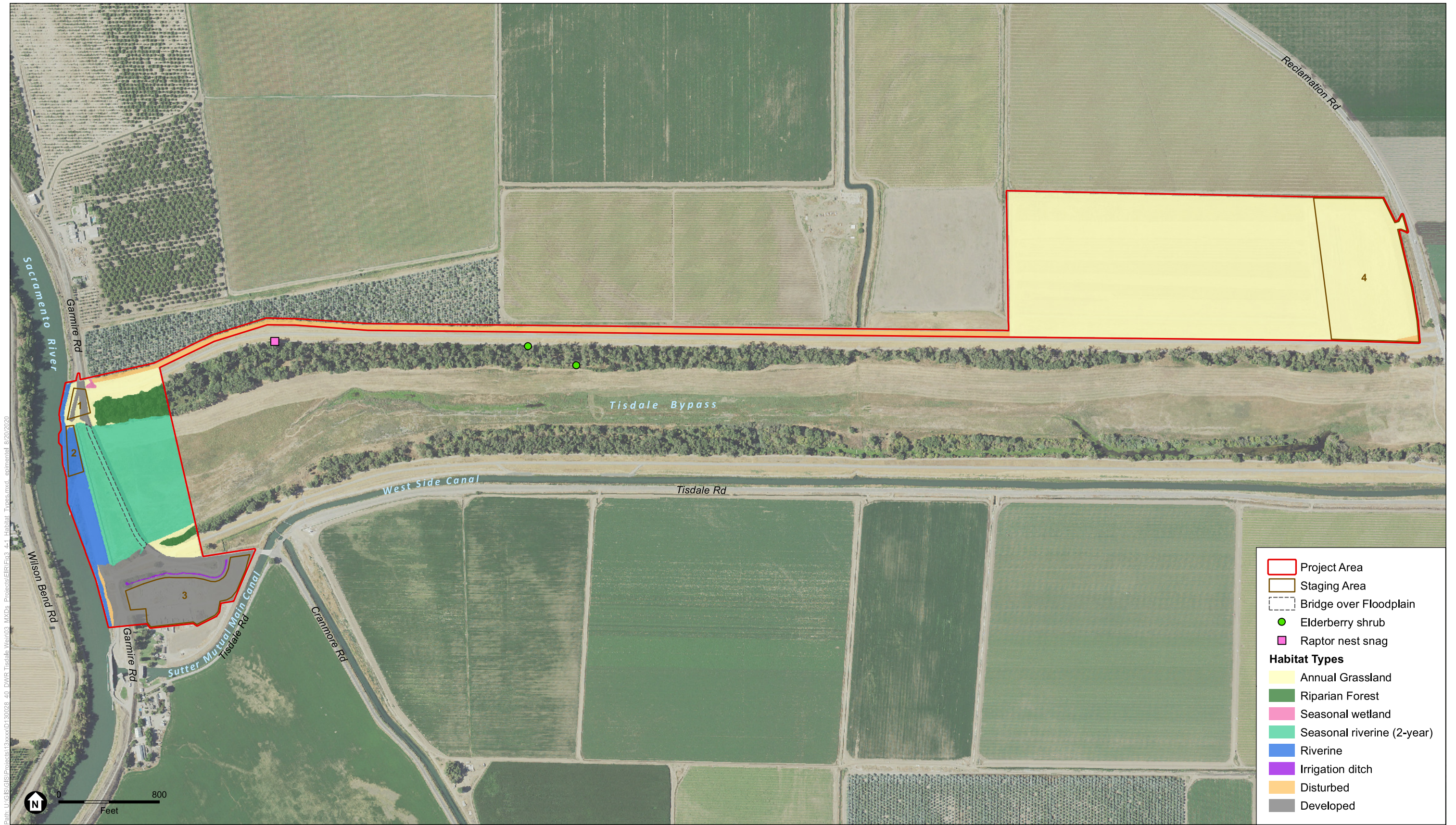
- Topographic maps (Tisdale Weir and surrounding eight quadrangles)
- Online soil maps from the U.S. Natural Resources Conservation Service
- California Wildlife Habitat Relationships database
- The CDFW California Natural Diversity Database (CNDDDB) list of plant and wildlife species documented on the Tisdale Weir quadrangle and eight surrounding quadrangles (CDFW, 2018)
- The California Native Plant Society (CNPS) online database of plant species documented on the Tisdale Weir quadrangle and eight surrounding quadrangles (CNPS, 2018)
- A U.S. Fish and Wildlife Service (USFWS) list of species that may be present in the vicinity of the study area (USFWS, 2018)

The CNDDDB and CNPS lists include special-status species documented on the following nine quadrangles: Meridian, Grimes, Dunnigan, Sutter Buttes, Tisdale Weir, Kirkville, Sutter, Gilsizer Slough, and Sutter Causeway.

Natural Communities/Land Cover Types

ESA biologists conducted a biological resources survey of the project area on October 19, 2018 (ESA, 2019a; see **Appendix E**). Subsequent focused surveys for botanical resources were conducted in the project area on May 7 and June 21, 2019, and general biological resources surveys were conducted on May 21 and July 31, 2019. DWR biologists surveyed the southern and eastern staging areas on March 25, 2020. Eight natural community types/land cover types were observed: annual grassland, riparian forest, seasonal riverine, seasonal wetland, riverine, irrigation ditch, developed, and disturbed (**Table 3.4-1**). **Figure 3.4-1** shows the distribution of all natural community/land cover types present in the project area.

Each of these natural community/land cover types is described below, along with the plant species directly observed in the respective natural communities and their commonly associated wildlife species.



SOURCE: USDA, 2014; DWR, 2019; ESA, 2020

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 3.4-1
Habitat Types

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**TABLE 3.4-1
 NATURAL COMMUNITY/LAND COVER TYPES IN THE PROJECT AREA**

Habitat Type	Acreage ¹
Annual grassland	85.99
Riparian forest	3.18
Seasonal wetland ²	0.08
Seasonal riverine ²	16.86
Riverine ²	4.74
Irrigation ditch ²	0.24
Disturbed	6.20
Developed	13.10
Total	130.62

NOTES:

- 1 Geographic information system calculations may not reflect the exact acreage of the project area due to rounding.
- 2 Potentially jurisdictional wetlands or other waters of the United States include seasonal wetland, seasonal riverine, riverine, and the irrigation ditch.

SOURCE: Data compiled by Environmental Science Associates in 2020

Annual Grassland

Annual grassland, the most common natural community type in the project area, is present primarily on the proposed spoils site in the northeastern portion of the project area. Based on past aerial imagery, the proposed spoils site was formerly farmed agricultural land, but it now appears to be fallowed and has reverted to annual grassland habitat. Because the site had been mowed before the October 19, 2018, biological resources survey, most grass species could not be identified. Dominant identifiable vegetation in this habitat includes wall barley (*Hordeum murinum*), common wild oat (*Avena fatua*), Johnson grass (*Sorghum halepense*), and milk thistle (*Silybum marianum*).

Commonly occurring wildlife species typically associated with annual grassland habitat include mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), California ground squirrel (*Otospermophilus beecheyi*), and black-tailed jackrabbit (*Lepus californicus*).

Seasonal Riverine

Seasonal riverine is the second most common natural community in the project area. Because the Tisdale Bypass is inundated only periodically,¹ the bypass is typically dry. As a result, although it would be considered seasonal riverine, the vegetation encountered in the bypass during the biological resources survey was more typical of that found in moderately disturbed upland habitat. The dominant vegetation is salt grass (*Distichlis spicata*). Johnson grass, cocklebur

¹ Based on historical records, Tisdale Weir overflows about 43 days each year on average, or about 12 percent of the time, mostly between January and March.

(*Xanthium strumarium*), white sweetclover (*Melilotus albus*), and tall flatsedge (*Cyperus eragrostis*) were also observed.

Commonly occurring wildlife species typically associated with this type of vegetation are similar to those found in annual grassland habitat. Cliff swallow nests were observed beneath the deck of the Garmire Road Bridge, which crosses the Tisdale Bypass in the project area.

Riparian Forest

Riparian forest is present along the northern and southern margins of the Tisdale Bypass. CDFW has classified this area as great valley cottonwood riparian forest, which is considered a sensitive natural community. Common overstory vegetation includes valley oak (*Quercus lobata*), narrow-leaved willow (*Salix exigua*), and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). Common understory vegetation includes box elder (*Acer negundo*), Himalayan blackberry (*Rubus armeniacus*), western poison oak (*Toxicodendron diversilobum*), and wild oat.

Commonly occurring wildlife species typically associated with riparian forest habitat include California vole (*Microtus californicus*), black-headed grosbeak (*Pheucticus melanocephalus*), lesser goldfinch (*Spinus psaltria*), and American goldfinch (*S. tristis*). A raptor nest was observed in a portion of riparian forest located northeast of Tisdale Weir (Figure 3.4-1), outside of the project area.

Seasonal Wetland

A seasonal wetland is present in the northwestern portion of the project area, just east of Staging Area 1 and just northeast of Tisdale Weir. The dominant vegetation is salt grass. Other plant species observed during the biological resources survey include vervain (*Verbena litoralis*), Himalayan blackberry, and Johnson grass.

Commonly occurring wildlife species typically associated with seasonal wetlands include common yellowthroat (*Geothlypis trichas*), California toad (*Anaxyrus boreas halophylus*), Sierran tree frog (*Pseudacris sierra*), and common garter snake (*Thamnophis sirtalis*).

Disturbed

Disturbed lands in the project area include the graded levee along the Sacramento River and the haul route on top of the levee that runs along the northern edge of the Tisdale Bypass. The levee along the east bank of the Sacramento River is mostly vegetated, but is sparse in pockets where the soil is extremely rocky (from cobbles and large gravels, presumably placed intentionally to provide levee bank protection). The haul route lacks vegetation and consists of gravel and dirt. Dominant vegetation along the Sacramento River includes salt grass and rough horsetail (*Equisetum hyemale*).

Developed

Developed lands in the project area include paved areas for the Sutter County Tisdale Boat Launch Facility along the Sacramento River, and the staging area (Staging Area 3) in the southern

part of the project area, which is located on a gravel/dirt lot owned by Sutter Mutual Water Company. The developed lands are largely devoid of vegetation, except that a lone elderberry plant (*Sambucus nigra* ssp. *caerulea*) was observed in Staging Area 3 (Figure 3.4-1). The elderberry shrub was no longer present during a follow-up visit on July 31, 2019, as discussed under *Special-Status Invertebrates* below.

Riverine

Riverine habitat exists in the mainstem Sacramento River, which is the western boundary of the project area, including the area up to Tisdale Weir. Commonly occurring terrestrial wildlife species typically associated with riverine habitat include black phoebe (*Sayornis nigricans*), belted kingfisher (*Megaceryle alcyon*), and beaver (*Castor canadensis*). Aquatic species commonly associated with this reach of the Sacramento River include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), and Chinook salmon (*Oncorhynchus tshawytscha*).

Irrigation Ditch

An irrigation ditch (Oji Ditch) passes through the southwestern portion of the project area in Staging Area 3. This ditch has an unlined bed and contains no vegetation. Vegetation along the irrigation ditch's banks is similar to the species identified above for the annual grassland and disturbed habitat types. No commonly occurring wildlife species are associated with irrigation ditches.

Special-Status Species

Special-status species are legally protected under the CESA and federal Endangered Species Act (FESA) or other regulations, or are considered sufficiently rare by the scientific community to qualify for such listing. These species fall into several categories:

- (1) Species listed or proposed for listing as threatened or endangered under the FESA (Code of Federal Regulations Title 50, Sections 17.12 and 17.11 [listed plants and listed animals, respectively], and various notices in the *Federal Register* [proposed species]).
- (2) Species that are candidates for possible future listing as threatened or endangered under the FESA (*Federal Register* Title 61, No. 40, February 28, 1996).
- (3) Species listed or proposed for listing by the State of California as threatened or endangered under the CESA (California Code of Regulations Title 14, Section 670.5).
- (4) Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
- (5) Animal species of special concern to CDFW.
- (6) Animals fully protected under the California Fish and Game Code (Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

- (7) Species that meet the definitions of rare and endangered under CEQA. CEQA Section 15380 provides that a plant or animal species may be treated as rare or endangered even if the species is not on one of the official lists (State CEQA Guidelines Section 15380).
- (8) Plants considered by CDFW and CNPS to be “rare, threatened or endangered in California” (California Rare Plant Ranks [CRPRs] 1A, 1B, 2A, and 2B).²

Species recognized under these terms are collectively referred to as *special-status species*.

A list of special-status plant and wildlife species considered to potentially occur within the study area was developed using information queried from USFWS, the CNPS, and the CNDDDB (see *Data Sources* above). This list of species includes those species that can be found or are known to have occurred historically in the project area or vicinity. Using the results of the biological resources survey conducted by ESA in October 2018, these species were ranked by their likelihood of occurrence within the project area. These rankings were assigned based on the following criteria:

- *None*: The species’ required habitat is lacking.
- *Low*: The species’ required habitat either does not occur or is of very low quality such that no observations have occurred in or near the project area.
- *Moderate*: The species’ required habitat occurs in the project area and there are known occurrences nearby, but there are no recorded observations in the project area.
- *High*: The species has been documented in the project area in the past.

Only those special-status species determined to have at least moderate potential to occur in the project area are analyzed in detail in this EIR.

Special-Status Plants

For the analysis of the Proposed Project, a list of special-status plant species was compiled based on a search of the CNDDDB database and the USFWS and CNPS websites, and on a review of reports for previous projects located at or near the Tisdale Bypass. The list, presented in the biological resources survey report (ESA, 2019a) in **Appendix E** of this EIR, includes 12 special-status plant species initially considered as potentially present in the project area. No special-status plant species—federally listed or State-listed species, and non-listed plant species listed as CRPR 1 or 2—were observed during the October 2018 biological resources survey.

Two subsequent focused surveys for botanical resources were conducted in the project area, on May 7 and June 21, 2019. The focused surveys were timed to overlap the blooming period of any

² CDFW works in collaboration with the CNPS to maintain a list of plant species native to California that have low numbers or limited distribution, or that are otherwise threatened with extinction. These species are categorized by their rarity in the CRPR system. For further information about the CRPR system and the specific ranks, see *California Rare Plant Ranking System* in Section 3.4.3, *Regulatory Setting*.

special-status plant species considered potentially present in the project area. No special-status plant species were observed during these follow-up botanical surveys.

Based on these findings, no special-status plant species are present in the project area.

Special-Status Wildlife

Special-Status Fish

A list of special-status fish species was compiled based on a CNDDDB search and on a review of reports for previous projects located at or near the Tisdale Bypass. No special-status fish species were observed during the 2018 biological resources survey. The likelihood of presence of special-status fish species was determined based on the riverine and seasonal riverine habitat documented within the site and known occurrences in the vicinity of the project area.

Table 3.4-2 lists the special-status fish species initially considered to potentially occur in the project area. A brief summary of the special-status fish species that have at least moderate potential to occur, including their life history and habitat requirements, is provided below. Delta smelt (*Hypomesus transpacificus*) is not considered further because its range is limited to the San Francisco estuary, particularly the Sacramento–San Joaquin Delta (Delta) and Suisun Marsh.

California Central Valley Steelhead

The California Central Valley steelhead (*Oncorhynchus mykiss*) is federally listed as threatened. Historically, steelhead spawned and reared in most of the accessible upstream reaches of Central Valley rivers and many of their tributaries. Steelhead generally migrated farther than Chinook salmon into tributaries and headwater streams where cool, well-oxygenated water is available year-round.

The upstream migration of adult steelhead historically started in July, peaked in early fall, and continued through March. Central Valley steelhead spawn mainly from January through March, but spawning has been reported from late December through April (McEwan and Jackson, 1996). During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 60 degrees Fahrenheit (°F) to approximately 80 days at an average temperature of 58°F (McEwan and Jackson, 1996).

Steelhead fry usually emerge from the gravel 2–8 weeks after hatching, between February and May, sometimes extending into June. Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates, rear throughout the year, and may spend 1–3 years in freshwater before emigrating to the ocean. Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs in juveniles as they begin their downstream migration. Smolting steelhead generally emigrate from March to June.

**TABLE 3.4-2
 SPECIAL-STATUS FISH SPECIES OCCURRING OR POTENTIALLY OCCURRING IN THE PROJECT AREA**

Common Name Scientific Name	Status (Federal/ State)	Habitat Requirements	Identification/ Survey Period	Potential to Occur
Delta smelt <i>Hypomesus transpacificus</i>	FT/CE	Found in open surface waters in the Delta. Seasonally in Suisun Bay, the Carquinez Strait, and San Pablo Bay. Found in Delta estuaries with dense aquatic vegetation and low occurrence of predators. May be affected by downstream sedimentation.	Spawns December–July. Present year-round in the Delta.	None. The project area is outside the distribution range of this species.
California Central Valley DPS steelhead <i>Oncorhynchus mykiss</i>	FT/–	Inhabits rivers and streams tributary to the Sacramento and San Joaquin Rivers and Delta ecosystems.	Spawns in winter and spring.	High. This species is seasonally present in the mainstem Sacramento River and could be present in the Tisdale Bypass during and immediately after events in which Tisdale Weir is overtopped.
Central Valley ESU spring-run Chinook salmon <i>Oncorhynchus tshawytscha</i>	FT/CT	Inhabits rivers and streams tributary to the Sacramento and San Joaquin Rivers and Delta ecosystems.	Spawns in late summer and fall.	High. This species is seasonally present in the mainstem Sacramento River and could be present in the Tisdale Bypass during and immediately after events in which Tisdale Weir is overtopped.
Central Valley ESU fall-/late fall-run Chinook salmon <i>Oncorhynchus tshawytscha</i>	EFH/ CSC	Inhabits rivers and streams tributary to the Sacramento and San Joaquin Rivers and Delta ecosystems.	Spawns in fall and winter.	High. This species is seasonally present in the mainstem Sacramento River and could be present in the Tisdale Bypass during and immediately after events in which Tisdale Weir is overtopped.
Sacramento River ESU winter-run Chinook salmon <i>Oncorhynchus tshawytscha</i>	FE/CE	Inhabits rivers and streams tributary to the Sacramento and San Joaquin Rivers and Delta ecosystems.	Spawns in spring and summer.	High. This species is seasonally present in the mainstem Sacramento River and could be present in the Tisdale Bypass during and immediately after events in which Tisdale Weir is overtopped.
North American green sturgeon <i>Acipenser medirostris</i>	FT/CSC	Spawns in large cobble in deep and turbulent mainstem rivers. The southern DPS spawns in the Sacramento River basin and in the Delta and estuary.	Year-round.	High. This species spawns in the mainstem Sacramento River and is expected to be present at least seasonally in the project area.
Pacific lamprey <i>Entosphenus tridentatus</i>	SC/CSC	Spawns in habitat similar to that of salmon; gravel-bottomed streams at the upstream end of riffle habitat.	Spawning occurs between March and July.	Moderate. This species has been recorded in the project location and in the Yolo Bypass.

NOTES:

Delta = Sacramento–San Joaquin Delta; DPS = distinct population segment; ESU = evolutionarily significant unit

STATUS CODES:

Federal:

FE = federal endangered
 FT = federal threatened
 FC = candidate
 PT = proposed threatened
 FPD = proposed for delisting
 FD = delisted
 EFH = essential fish habitat
 SC = species of concern

California:

CE = State endangered
 CT = State threatened
 CR = State rare
 CSC = California species of special concern
 CCT = State threatened candidate
 CFP = California fully protected

SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018

A large portion of the Central Valley steelhead population spawns in Sacramento River tributaries north of the Tisdale Bypass. Juveniles outmigrating from these tributaries pass Tisdale Weir. Adult steelhead may also attempt to migrate upstream via the Sutter Bypass and Tisdale Weir when these bypasses are inundated. Therefore, this species has a high potential to be present in the Sacramento River in the project area and vicinity.

Central Valley Spring-Run Chinook Salmon

The Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) is federally listed and State-listed as threatened. This was historically the second most abundant run of Central Valley Chinook salmon (Fisher, 1994), occupying the headwaters of all major river systems in the Central Valley where there were no natural barriers (CDFG, 1998). Adults returning to spawn ascended the tributaries to the upper Sacramento River, including the Pit, McCloud, and Little Sacramento Rivers. They also occupied Cottonwood, Battle, Antelope, Mill, Deer, Stony, Big Chico, and Butte Creeks and the Feather, Yuba, American, Mokelumne, Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. Spring-run Chinook salmon migrated into headwater streams where cool, well-oxygenated water is available year-round. Spawning occurs in gravel beds from late August through October, and emergence takes place in March and April.

Spring-run Chinook salmon appear to emigrate at two different life stages: fry and yearlings. Fry move between February and June, while yearlings emigrate October to March, peaking in November. Juveniles display considerable variation in stream residence and migratory behavior. Juvenile spring-run Chinook salmon may leave their natal streams as fry soon after emergence or may rear for several months to a year before migrating as smolts or yearlings (Yoshiyama et al., 1998).

A large portion of the spring-run Chinook salmon population migrates via the Sacramento River past Tisdale Weir. Spring-run Chinook salmon adults may also attempt to migrate upstream via the Sutter Bypass and Tisdale Weir when these bypasses are inundated. Therefore, this species has a high potential to be present in the Sacramento River in the project area and vicinity.

Central Valley Fall-/Late Fall-Run Chinook Salmon

The Central Valley fall-/late fall-run Chinook salmon (*Oncorhynchus tshawytscha*) is a California species of special concern. Adults enter the Sacramento River system from September through January and spawn from October through February. During spawning, the female digs a redd in which she deposits her eggs, which are then fertilized by the male. Newly emerged fry remain in shallow, lower velocity edgewater, particularly where debris congregates and provides cover from predators. The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after an incubation period of 3–5 months, and alevins (yolk-sac fry) remain in the gravel until their yolk sacs are absorbed (2–3 weeks).

Juveniles typically rear in freshwater (in their natal streams and the Delta) for 3–6 months (fall-run) or up to 12 months (late fall-run) before entering the ocean. Juveniles migrate downstream from January through June. Juvenile Chinook salmon prefer water depths of 0.5 to 3.3 feet and

velocities of 0.26 to 1.64 feet per second (Raleigh et al., 1986). Important winter habitat for juvenile Chinook salmon includes flooded bars, side channels, and overbank areas with relatively low water velocities. Juvenile Chinook salmon have been found to rear successfully in floodplain habitat, which routinely floods but is dry at other times. Growth rates appear to be enhanced by the conditions found in floodplain habitat.

Covered structures, space, and food are necessary components for Chinook salmon rearing habitat. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks, downed trees, and large overhanging tree branches. The organic materials that form fish cover also help provide sources of food, in the form of both aquatic and terrestrial insects.

The Sacramento River provides suitable habitat for Central Valley fall-/late fall–run Chinook salmon; the Tisdale Bypass, when inundated, also provides habitat. Therefore, this species has high potential to occur in the Sacramento River in the vicinity of the project area.

Sacramento River Winter-Run Chinook Salmon

The Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) is federally listed and State-listed as endangered. Historically, the distribution of winter-run spawning and initial rearing was limited to the upper Sacramento River (upstream of Shasta Dam), McCloud River, Pit River, and Battle Creek; in those areas, springs provided cold water throughout the summer, allowing for spawning, egg incubation, and rearing during the mid-summer (Yoshiyama et al., 1998). The construction of Shasta Dam in 1943 blocked access to all of these waters except Battle Creek, which currently has its own impediments to upstream migration (several small hydroelectric dams upstream of the Coleman National Fish Hatchery weir).

Adult winter-run Chinook salmon begin migrating upstream through the Delta in December and continue through July, with a peak occurring between December and April (NMFS, 2014). Adults return from the ocean before reaching full sexual maturity and hold in the Sacramento River for several months before spawning while they mature. The spawning range of winter-run Chinook salmon is currently confined to the Sacramento River between Red Bluff Diversion Dam and Keswick Dam (River Miles 243–302) (NMFS, 2014). Historically, spawning likely occurred upstream of Shasta Dam in spawning reaches that are no longer accessible to anadromous fish (Yoshiyama et al., 1998), and in an upper tributary to the Sacramento River, Battle Creek (Lindley et al., 2004).

Juvenile winter-run Chinook salmon begin to enter the Delta in October, and outmigration continues until April. The timing of juvenile outmigration is thought to be strongly correlated with winter rain events that result in higher flows in the Sacramento River (del Rosario et al., 2013). Winter-run Chinook salmon use the Delta primarily as a migration corridor as they make their way to Suisun and San Pablo Bays and eventually the Pacific Ocean.

The entire population of winter-run Chinook salmon migrates via the Sacramento River past Tisdale Weir. Winter-run Chinook salmon adults may also attempt to migrate upstream via the

Sutter Bypass and Tisdale Weir when these bypasses are inundated. Therefore, this species has high potential to be present in the Sacramento River in the project area and vicinity.

North American Green Sturgeon

The North American green sturgeon (*Acipenser medirostris*) is federally listed as threatened and is a California species of special concern. The habitat requirements of green sturgeon are poorly known. Indirect evidence indicates that green sturgeon spawn mainly in the Sacramento River; spawning has been reported in the mainstem as far north as Red Bluff. Spawning times in the Sacramento River are presumed to be from March through July, peaking from mid-April to mid-June. Adult sturgeon are in the river, presumably spawning, when temperatures range from 46°F to 57°F. Their preferred spawning substrate is large cobble, but substrates range from clean sand to bedrock. Eggs are broadcast-spawned and externally fertilized in relatively high water velocities and at depths of less than 10 feet.

Female green sturgeon produce 60,000–140,000 eggs, each approximately 0.15 inch in diameter. Eggs hatch approximately 196 hours (just over 8 days) after spawning, and larvae are 0.3 to 0.75 inch long. Juveniles range in size from less than 1 inch to almost 5 feet. Juveniles migrate to sea before 2 years of age, primarily during the summer and fall. They remain near estuaries at first, but may migrate considerable distances as they grow larger (State Water Board, 1999). Both juvenile and adult green sturgeon are benthic feeders and may also eat small fish.

Given the known spawning locations of green sturgeon, this species is expected to be present in the Sacramento River at Tisdale Weir at least seasonally. Green sturgeon have also been known to attempt to migrate upstream through the Tisdale Bypass when it has been inundated. Therefore, this species has high potential to be present in the Sacramento River in the project area and vicinity.

Pacific Lamprey

The Pacific lamprey (*Entosphenus tridentatus*) is a California species of special concern. USFWS has also designated Pacific lamprey as a species of concern. Species of concern or species of special concern receive no legal protection, and the use of these terms does not necessarily mean that the species will eventually be proposed for State or federal listing as a threatened or endangered species.

Pacific lampreys were historically abundant along the West Coast of North America, but their abundance declined and distribution contracted throughout California, Oregon, Washington, and Idaho (Luzier et al., 2009). Recent data indicate that distribution of the Pacific lamprey has been reduced in many river drainages. They are extirpated above dams and other impassable barriers in West Coast streams, including many larger rivers throughout coastal Washington, Oregon, and California. In addition, the abundance of Pacific lamprey has declined throughout Southern California and the Columbia River basin.

The ecological and climatic characteristics of areas in California that support Pacific lamprey populations vary considerably, “from cool mountain slopes to moist coastal drainages to arid

southern chaparral” (Goodman and Reid, 2012). The historical range extended throughout waters supporting anadromous fish into high-elevation streams of the Sierra Nevada and their tributaries, to the Sacramento River and coastal salmon and steelhead streams.

A conservation agreement for Pacific lamprey has been created to promote the implementation of conservation measures for the species in California, Alaska, Washington, Oregon, and Idaho. DWR is not a signatory to this agreement but has provided a letter supporting the agreement’s goal.

In 2019, a lamprey was documented in CDFW’s 2019 rescue efforts to return stranded fish from the project site to a water source. Information about this species and its distribution is limited; however, there have been other records of lamprey in the Yolo Bypass. This species is considered moderately likely to be present in the project area and is expected to benefit from the proposed fish passage facility.

Special-Status Invertebrates

Table 3.4-3 lists the special-status invertebrate species initially considered to potentially occur in the project area. A brief summary of valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*), including its habitat requirements, is provided below because suitable habitat for this species (i.e., elderberry shrub) was present within the project area during the October 2018 biological resources survey. Vernal pools and swales were not present in the project area; thus, suitable habitat for special-status vernal pool crustaceans is absent.

Valley Elderberry Longhorn Beetle

VELB is federally listed as threatened. This species is completely dependent on elderberry shrubs for all stages of its life cycle, is generally associated with riparian habitats, and is restricted to the Central Valley. VELB is threatened by loss and fragmentation of riparian habitat and by predation and displacement by the invasive Argentine ant.

The life history of VELB is not well known. Adult beetles are active from March to June, which is their assumed breeding season. Adults are known to lay eggs in the crevices of bark of elderberry plants. Larvae hatch days later and bore into the stem of the elderberry shrubs, where they feed on the pith. Larvae pupate inside the stem and emerge as adults in the spring. Larvae cut an emergence/exit hole through the wood and bark of the elderberry plant. Adults can fly between elderberry plants. Evidence of use by VELB is more commonly observed on clumps of elderberry bushes than on isolated bushes.

A single isolated elderberry shrub was observed in the middle of Staging Area 3 in the southwestern portion of the project area during the biological resources survey conducted in October 2018. Although the shrub was relatively small (about 4 feet tall), it was prominent because of the relative dearth of woody vegetation in Staging Area 3. However, during a follow-up visit on July 31, 2019, the elderberry shrub was no longer present.

**TABLE 3.4-3
 SPECIAL-STATUS INVERTEBRATE SPECIES CONSIDERED IN THE PROJECT AREA**

Common Name Scientific Name	Status (Federal/ State)	Habitat Requirements	Identification/ Survey Period	Potential to Occur
Crotch's bumble bee <i>Bombus crotchii</i>	–/CSC	Found in open grassland and scrub. Nests underground in abandoned rodent burrows. Colonies are annual and only the newly mated queens overwinter. The queens emerge from hibernation in early spring to search for nest sites. Host plant food includes milkweed (<i>Asclepias</i> sp.), pincushion (<i>Chaenactis</i> sp.), lupine (<i>Lupinus</i> sp.), bur clover (<i>Medicago</i> sp.), phacelia (<i>Phacelia</i> sp.), and sage (<i>Salvia</i> sp.).	June–August.	Low. The annual grassland in the project area contains suitable host plants; however, because the area is disturbed by periodic mowing activities (and in prior years was in active agriculture), the potential for occurrence of this species is low.
Western bumble bee <i>Bombus occidentalis</i>	–/CSC	Found in open grassy areas, urban parks and gardens, chaparral and shrub areas, and mountain meadows. Nests underground in abandoned rodent burrows or other cavities, but may also nest above ground in structures including logs and railroad ties. Host plant food includes ceanothus (<i>Ceanothus</i> sp.), thistle (<i>Centaurea</i> sp.), rabbitbrush (<i>Chrysothamnus</i> sp.), geranium (<i>Geranium</i> sp.), gumplant (<i>Grindelia</i> sp.), lupine (<i>Lupinus</i> sp.), sweetclover (<i>Melilotus</i> sp.), monardella (<i>Monardella</i> sp.), blackberry (<i>Rubus</i> sp.), goldenrod (<i>Solidago</i> sp.), and clover (<i>Trifolium</i> sp.).	June–August.	None. The project area is outside the currently known range of this species, which is largely restricted to high elevations in the Sierra Nevada and along the coast.
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT/–	Occurs only in the Central Valley of California, in association with blue elderberry (<i>Sambucus nigra</i> ssp. <i>caerulea</i>). Prefers to lay eggs in elderberry shrubs 2–8 inches in diameter; some preference shown for "stressed" elderberry shrubs.	Adults emerge in spring until June. Exit holes visible year-round.	High. Elderberry shrubs are located near the project area in the riparian forest.
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FT/–	Endemic to the grasslands of the Central Valley, central coast mountains, and south coast mountains, in astatic rain-filled pools. Inhabits small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	USFWS protocol-level wet-season sampling and/or dry-season cyst identification.	None. The project area does not provide suitable habitat for this species.
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE/–	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass-bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	USFWS protocol-level wet-season sampling and/or dry-season cyst identification.	None. The project area does not provide suitable habitat for this species.

NOTES:

USFWS = U.S. Fish and Wildlife Service

STATUS CODES:

Federal:

FE = federal endangered
 FT = federal threatened
 FC = candidate
 PT = proposed threatened
 FPD = proposed for delisting
 FD = delisted
 EFH = essential fish habitat

California:

CE = State endangered
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SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018

There are two isolated elderberry shrubs 100–150 feet south of the haul route (along the northern levee of the Tisdale Bypass) in the riparian forest. The USFWS VELB framework recommends conducting additional analysis of elderberry shrubs within 162 feet (50 meters) of the project area (USFWS, 2017a). Therefore, VELB has the potential to occur within 165 feet of the project area.

Special-Status Amphibians

Table 3.4-4 lists the amphibian species initially considered to potentially occur in the project area. This list was compiled based on searches of the CNDDDB database and the USFWS website, and on a review of reports for previous projects located at or near the Tisdale Bypass. Because of the lack of suitable habitat on the project area, no special-status amphibian species are expected to occur.

**TABLE 3.4-4
 SPECIAL-STATUS AMPHIBIAN SPECIES CONSIDERED IN THE PROJECT AREA**

Common Name <i>Scientific Name</i>	Status (Federal/ State)	Habitat Requirements	Identification/ Survey Period	Potential to Occur
California red-legged frog <i>Rana draytonii</i>	FT/CSC	Found in permanent and temporary pools of streams, marshes, and ponds with dense grassy and/or shrubby vegetation from 0 to 4,920 feet.	Aquatic surveys of breeding sites between January and September, optimally after April 15.	None. The project area does not provide suitable habitat for this species.
California tiger salamander <i>Ambystoma californiense</i>	FT/CT	Found in vernal pools, ephemeral wetlands, and seasonal ponds, including constructed stock ponds, in grassland and oak savanna plant communities from 10 to 3,450 feet.	Aquatic surveys of breeding sites between March and May.	None. The project area does not provide habitat for this species.
Foothill yellow-legged frog <i>Rana boylei</i>	FC/CSC	Inhabits partially shaded, rocky streams with perennial flow at low to moderate elevations, in areas of chaparral, open woodland, and forest. Elevation range extends from sea level to around 7,000 feet.	Surveys of breeding sites between April and June.	None. The project area lacks suitable habitat for this species.

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Federal:

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- CCT = State threatened candidate
- CFP = California fully protected

SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018

Special-Status Reptiles

Table 3.4-5 lists special-status reptiles considered to potentially occur in the project area. This list was compiled based on searches of the CNDDDB database and the USFWS website, and through a review of reports for previous projects located at or near the Tisdale Bypass. Giant garter snake (GGS) (*Thamnophis gigas*) is considered to be present on-site and western pond turtle (*Emys marmorata*) has moderate potential to occur. The life history requirements of these species are summarized below.

**TABLE 3.4-5
 SPECIAL-STATUS REPTILE SPECIES CONSIDERED IN THE PROJECT AREA**

Common Name Scientific Name	Status (Federal/ State)	Habitat Requirements	Identification/ Survey Period	Potential to Occur
Giant garter snake <i>Thamnophis gigas</i>	FT/CT	Found in agricultural wetlands and other wetlands such as irrigation and drainage canals, low-gradient streams, marshes, ponds, sloughs, small lakes, and their associated uplands. Upland habitat should have burrows or other soil crevices suitable for snakes to reside during their dormancy period (November–mid-March).	Active outside of dormancy period (November–mid-March).	Present. There is a past documented occurrence of this species in the project area. The Oji Ditch in the southwest portion of the project area provides habitat for this species, although its suitability is only moderate, given the lack of cover in the aquatic habitat or in the upland habitat along the banks of the canal. The small seasonal wetland in the northwest portion of the project area also provides aquatic habitat for this species. Suitable aquatic habitat is also present in a canal located west of Reclamation Road, just outside the proposed spoils site in the northeastern portion of the project area.
Western pond turtle <i>Emys marmorata</i>	–/CSC	Agricultural wetlands and other wetlands such as irrigation and drainage canals, low-gradient streams, marshes, ponds, sloughs, small lakes, and their associated uplands.	Active outside of dormancy period (November–February).	Moderate. The Oji Ditch and seasonal wetland in the project area provide potential habitat for this species.

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SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018

Giant Garter Snake

The giant garter snake is both federally listed and State-listed as threatened. GGS reside in marshes, ponds, sloughs, small lakes, low-gradient streams, and other waterways and agricultural wetlands, including irrigation and drainage canals, rice fields, and adjacent uplands. The ideal aquatic habitat for GGS is generally described as follows: Water present from March through November, slow-moving or static water with mud substrate, emergent or bankside vegetation that provides cover from predators, available prey in the form of small amphibians and small fish, basking sites with vegetation immediately adjacent to escape cover, absence of large predatory fish, and absence of flooding that would inundate upland refugia (USFWS, 2017b).

Although GGS is predominantly an aquatic species, the snakes use upland areas near aquatic habitat during their active spring and summer seasons. Upland habitat is used for basking to regulate body temperature, and for cover. They can use small-mammal burrows and crevices in the soil to avoid predation.

This species was not observed during the October 2018 biological resources survey; however, the CNDDDB has documented numerous occurrences of GGS within 5 miles of the project area. There also was a documented occurrence of this species in 2008 in the project area, along the north bank of the Sutter Mutual Main Canal.

The Tisdale Bypass does not provide suitable habitat for GGS, given the ephemeral presence of water after seasonal flooding. The Sutter Mutual Main Canal located south of the project area provides aquatic habitat, and the agricultural land south of the Sutter Mutual Main Canal provides upland habitat for GGS. The Oji Ditch, in Staging Area 3 in the southern portion of the project area, provides aquatic habitat. Only marginally suitable upland habitat is present directly adjacent to the banks of the ditch, given that few small-mammal burrows are present for GGS upland habitat and that few open areas are present for basking because of the weedy dense vegetation that surrounds the banks. Thus, marginally suitable habitat for GGS is present in the project area, in Staging Area 3. The Oji Ditch is surrounded by developed areas, including a raised embankment to the road located approximately 15 feet to the north and the Sutter Mutual Water Company property approximately 13 feet south of the ditch. GGS could be present in the southern portion of the project area, where staging is proposed to occur.

The small seasonal wetland in the northwest portion of the project area provides marginally suitable habitat for GGS. Emergent vegetation within the wetland provides suitable structure for escape cover and foraging habitat. Upland habitat conditions are marginal because only a few small-mammal burrows were observed in the immediate vicinity of the seasonal wetland area. The slopes of the Tisdale Bypass north levee and the Sacramento River levee could be used as basking habitat for GGS. Therefore, GGS could be present in the northwest portion of the project area, adjacent to where construction access would occur.

Suitable aquatic habitat for GGS is also present in a canal located west of Reclamation Road, just outside the proposed spoils site in the northeastern portion of the project area. GGS could utilize burrows in the vicinity of this canal that are located within the spoils site.

Western Pond Turtle

The western pond turtle (*Emys marmorata*) is a California species of special concern. Western pond turtles are found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with suitable basking sites (Californiaherps, 2019). Suitable aquatic habitat typically has a muddy or rocky bottom and has emergent aquatic vegetation for cover. Western pond turtles nest and overwinter in areas of sparse vegetation comprising grassland and forbs with less than 10 percent slopes, less than 492 feet from aquatic habitat (Rosenberg et al., 2009).

The Oji Ditch in Staging Area 3 and the seasonal wetland northeast of Tisdale Weir provide potential aquatic habitat for western pond turtle, but potential upland habitat is very limited because it is either highly disturbed or managed (e.g., an orchard is located adjacent to the seasonal wetland). The Sacramento River is not expected to provide aquatic habitat for this species, because the turtles prefer to occupy slow-moving or still waters. This species was not

observed in the project area during the October 2018 biological resources survey but has moderate potential to be present, given the potential for suitable habitat.

Special-Status Birds

Table 3.4-6 lists the special-status birds initially considered to potentially occur in the project area. This list was compiled based on searches of the CNDDDB database and the USFWS website, and through a review of reports for previous projects located at or near the Tisdale Bypass. A brief summary of the special-status bird species that have at least moderate potential to occur, including their habitat requirements and documented occurrences nearby, is presented below.

Mountain Plover

The mountain plover (*Charadrius montanus*) is a California species of special concern. Mountain plovers breed in the Great Plains and down to southeastern New Mexico and Texas. They migrate to various locations to winter, including California, Arizona, Texas, and north-central Mexico. They typically forage and roost in flocks ranging from 2 to more than 1,000 individuals throughout the winter. Mountain plovers often roost in depressions in the landscape, such as small-mammal burrows, depressions caused by cattle hoof prints, or furrows. They are commonly observed to use grassland habitats and recently tilled fields as their overwintering habitat.

The annual grassland in the spoils site of the project area provides suitable overwintering habitat for this species. The Tisdale Bypass could also provide potential habitat. No mountain plovers were observed during the October 2018 biological resources survey; however, the species has moderate potential to be present in the project area seasonally, given the presence of suitable habitat.

Swainson's Hawk

The Swainson's hawk (*Buteo swainsoni*) is a State-listed threatened species. The Swainson's hawk population that nests in the Central Valley winters primarily in Mexico, while the population that nests in the interior of North America winters in South America.

Swainson's hawks arrive in the Central Valley between March and early April to establish breeding territories. Breeding occurs from late March to late August, peaking in late May through July (CDFW, 2014a). In the Central Valley, Swainson's hawks nest in isolated trees, small groves, or large woodlands next to open grasslands or agricultural fields. This species typically nests near riparian areas; however, it has been known to nest in urban areas as well. Nest locations are usually close to suitable foraging habitats, which include fallow fields, annual grasslands, irrigated pastures, alfalfa and other hay crops, and low-growing row crops. Swainson's hawks leave their breeding grounds to return to their wintering grounds in late August or early September.

**TABLE 3.4-6
 SPECIAL-STATUS AVIAN SPECIES CONSIDERED IN THE PROJECT AREA**

Common Name Scientific Name	Status (Federal/ State)	Habitat Requirements	Identification/ Survey Period	Potential to Occur
Bank swallow <i>Riparia riparia</i>	-/CT	Nests in riverbanks and forages over riparian areas and adjacent uplands.	April–July	None. The project area does not provide suitable habitat for this species.
Burrowing owl <i>Athene cunicularia</i>	-/CSC	Forages in open plains, grasslands, and prairies; typically nests in abandoned small-mammal burrows.	Year-round/ breeding season surveys between March and August	Low. Although potential habitat is present, there are no documented observations of this species in the area.
California black rail <i>Laterallus jamaicensis coturniculus</i>	-/CT	Saltwater, brackish, and freshwater marshes. Nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation.	Year-round	None. The project area does not provide suitable habitat for this species.
Greater sandhill crane <i>Grus canadensis tabida</i>	-/CT	Nests in wetland habitats in northeastern California; winters in the Central Valley.	September– February	None. The project area does not support suitable roosting or foraging habitat for this species.
Mountain plover <i>Charadrius montanus</i>	-/CSC	Inhabits short grasslands, freshly plowed fields, bare ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.	December– February	Moderate. This species has the potential to be present in the project area in the wintertime.
Song sparrow ("Modesto" population) <i>Melospiza melodia</i>	-/CSC	Nests on the ground and in marshes. Inhabits grassland, chaparral, orchard, woodland, wetland, riparian, and scrub-shrub.	February– September	None. The project area is outside the known distribution range of this species.
Swainson's hawk <i>Buteo swainsoni</i>	-/CT	Nests peripherally to valley riparian systems in lone trees or groves of trees in agricultural fields. Valley oak, Fremont cottonwood, walnut, and large willow trees, ranging in height from 41 to 82 feet, are the most commonly used nest trees in the Central Valley.	March–October	High. The mature trees in the project area and vicinity provide suitable nesting habitat and the agricultural land and grassland habitat in the area provides suitable foraging habitat for this species.
Tricolored blackbird <i>Agelaius tricolor</i>	-/CT (nesting colony)	Nests in dense blackberry, cattail, tules, bulrushes, sedges, willow, or wild rose in freshwater marshes. Nests in large colonies of at least 50 pairs (up to thousands of individuals).	Year-round	None. The project area does not provide suitable nesting habitat for this species.
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	FT/CE	Nests in riparian forests, along the broad, lower flood-bottoms of larger river systems, particularly in willows, cottonwoods, and with a lower story of blackberry, nettles, or wild grape.	June–August	Low. The project area provides suitable foraging habitat.

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Federal:

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SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018

The CNDDDB has numerous records for Swainson’s hawk within 5 miles of the project area. There are two recorded observations of this species in the project area and eight more in close proximity, either farther east within the Tisdale Bypass or along the Sacramento River. None of these occurrences were documented within the last 5 years. The trees in the riparian forest along the northern and southern margins of the Tisdale Bypass provide suitable nesting habitat for this species. The annual grassland on the spoils site of the project area, and the Tisdale Bypass itself when dry, provide suitable foraging habitat for this species. This species was not observed during the October 2018 biological resources survey; however, the survey was conducted outside of the nesting season. The generally accepted nesting season for this species extends from March 1 through August 31. This species has high potential to nest and forage in the project area.

Cliff Swallow

The cliff swallow (*Petrochelidon pyrrhonota*) is a common bird species in the western United States that is not listed under the FESA or CESA. This species is federally protected under the Migratory Bird Treaty Act (Code of Federal Regulations Title 50, Section 10.13) and State protected by California Fish and Game Code Sections 3503 and 3513. Cliff swallows were originally birds of the western mountains, and they still nest underneath horizontal rock ledges on the sides of steep canyons in the foothills and lower elevations of the Sierra Nevada, Rocky Mountains, and Cascade Range. In the past 100–150 years, these birds have expanded their range across the Great Plains and into eastern North America, a range expansion coincident with the widespread construction of highway culverts, bridges, and buildings that provide abundant alternative nesting sites (Brown et al., 2017).

Cliff swallows may construct an entirely new nest made of mud and other vegetative materials or they may use old nests, building off traces of mud where an old nest used to be. The time it takes to build a nest varies, principally in response to weather and distance to a mud source. On average, a new nest can take anywhere from 3 to 7 days to build under optimal conditions. Swallows often produce one brood per year, but can have two broods in a season, with three to five eggs in each brood. Egg laying often begins before nests are finished; for this reason, swallow nests are considered “active” before completion of the nest.

Cliff swallows migrate from their wintering grounds in Central and South America to their breeding grounds in North America. Birds arrive in California from early February to, on rare occasions, late June. Fall migration occurs July through September, when nestlings fledge and as colony sites are vacated, so departures from a locale can be staggered and quite variable between years.

This species is known to nest in a colony each year beneath the Garmire Road Bridge within the project boundary. In 2020 the cliff swallow colony was observed arriving at the bridge in early March (personal observation by Stephanie Ponce, DWR Environmental Scientist). In 2019 the Garmire Road Bridge colony was completely vacated by August 11 (personal observation by Stephanie Ponce, DWR Environmental Scientist).

Special-Status Mammals

Table 3.4-7 lists the special-status mammals considered to potentially occur in the project area. This list was compiled based on searches of the CNDDDB database and the USFWS website, and through a review of reports for previous projects located at or near the Tisdale Bypass. A brief summary of the special-status mammals that have at least moderate potential to occur, including their habitat requirements and documented occurrences nearby, is presented below. Marysville California kangaroo rat (*Dipodomys californicus eximius*) was determined to not be present in the project area because its known distribution range is limited to the around the Sutter Buttes.

**TABLE 3.4-7
 SPECIAL-STATUS MAMMALS CONSIDERED IN THE PROJECT AREA**

Common Name Scientific Name	Status (Federal/ State)	Habitat Requirements	Identification/ Survey Period	Potential to Occur
Western red bat <i>Lasiurus blossevillii</i>	-/CSC	Inhabits cismontane woodland, lower montane coniferous forest, riparian forest, and riparian woodland.	Year-round	Moderate. Potential roosting habitat for this species exists in the riparian trees north of the Tisdale Bypass. There are no known occurrences of this species in the vicinity of the project area.
Marysville California kangaroo rat <i>Dipodomys californicus eximius</i>	-/CSC	Inhabits chaparral and valley and foothill grasslands. Known only in the Sutter Buttes area.	Year-round	None. The project area is outside the known distribution range of this species.
Pallid bat <i>Antrozous pallidus</i>	-/CSC	Inhabits deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky roosting areas.	Year-round	Moderate. Potential roosting habitat for this species is present in the riparian area north of the Tisdale Bypass and underneath the bridge that spans the bypass. There are no known occurrences of this species in the vicinity of the project area.

STATUS CODES:

Federal:

- FE = federal endangered
- FT = federal threatened
- FC = candidate
- PT = proposed threatened
- FPD = proposed for delisting
- FD = delisted
- EFH = essential fish habitat

California:

- CE = State endangered
- CT = State threatened
- CR = State rare
- CSC = California species of special concern
- CCT = State threatened candidate
- CFP = California fully protected

SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018

Western Red Bat

The western red bat (*Lasiurus blossevillii*) is a California species of special concern. This species is locally common in certain areas of California. Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests. The species feeds over a wide variety of habitats: grasslands, shrublands, open woodlands and forests, and croplands. Western red bats roost primarily in trees, less often in shrubs. Roost sites are often in edge habitats adjacent to streams, fields, or urban areas. Family groups roost together and nursery colonies are found with many females and their young.

The trees in the riparian forest along the northern and southern margins of the Tisdale Bypass provide potential roosting habitat for western red bat. This species was not observed in the project area during the October 2018 biological resources survey; however, because potential roosting habitat is present, this species has moderate potential to occur in the project area.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is a California species of special concern. This species occurs throughout California except in parts of the high Sierra and the northwestern corner of the state (CDFW, 2014b). The pallid bat inhabits a variety of habitats, such as grasslands, shrublands, woodlands, and forests; however, it is most abundant in open, dry habitats with rocky areas for roosting. Pallid bats roost alone, in small groups, or gregariously (WBWG, 2005). Roosts include caves, crevices in rocky outcrops and cliffs, mines, trees, and various man-made structures (e.g., bridges, barns, porches), and generally have unobstructed entrances/exits and are high above the ground, warm, and inaccessible to terrestrial predators. Year-to-year and night-to-night reuse of roosts is common; however, bats may switch day roosts on a daily and seasonal basis. The trees in the riparian forest along the northern and southern margins of the Tisdale Bypass and the Garmire Road Bridge in the project area provide potential roosting habitat for this species. No pallid bats were observed during the October 2018 biological resources survey; however, because potential roosting habitat is present, this species has moderate potential to occur in the project area.

Wildlife Corridors

Movements of wildlife generally fall into three basic categories:

- (a) Movements along corridors or habitat linkages associated with home range activities such as foraging, territory defense, and breeding.
- (b) Dispersal movements, which are typically one-way (e.g., juvenile animals leaving their natal areas or individuals colonizing new areas).
- (c) Temporal migration movements, essentially dispersal actions that involve returning to the place of origin (e.g., deer moving from winter grounds to summer ranges and fawning areas).

The Tisdale Bypass can function as a fish passage corridor for anadromous fish species, including Chinook salmon, steelhead, green sturgeon, and Pacific lamprey, when the bypass is inundated by Sacramento River flows that overtop Tisdale Weir. However, under most circumstances, the presence of the weir structure itself functions as a barrier to migration for adult fish attempting to migrate upstream via the Tisdale Bypass.

Sensitive Natural Communities

Sensitive natural communities are communities identified by CDFW that are afforded special consideration under CEQA. These communities are native to California and are considered highly imperiled. CDFW's rankings of natural community rarity follow the *NatureServe Conservation Status Assessments: Methodology for Assigning Ranks* (Faber-Langendoen et al., 2012), which lists vegetation alliances with a global (G) and State (S) rank to indicate how imperiled alliances

are on global and statewide scales. Sensitive natural communities are those with State ranks of S1 (critically imperiled), S2 (imperiled), and S3 (vulnerable).

Great valley cottonwood riparian forest is present in the project area and is considered a sensitive natural community of special concern under CEQA.

Wetlands and Other Waters of the United States and Waters of the State

ESA conducted a wetland delineation of the entire project area in October 2018 (ESA, 2019b). Supplemental information such as the National Wetlands Inventory Data and aerial mapping were used to confirm the results of the field survey. The survey was conducted using the Routine Determination Method as described in the 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Manual) (Environmental Laboratory, 1987). The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Arid West Supplement) (USACE, 2008). For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed.

The following potentially jurisdictional wetlands and other waters of the United States are present in the project area: seasonal riverine, seasonal wetland, riverine, and irrigation ditch (Table 3.4-8). These features are considered jurisdictional under CWA Section 404. Similarly, these features are expected to be subject to regulations by the Central Valley Regional Water Board under CWA Section 401. (See *Clean Water Act Section 401* and *Clean Water Act Section 404* in Section 3.4.3, *Regulatory Setting*.)

**TABLE 3.4-8
 POTENTIALLY JURISDICTIONAL WETLANDS AND OTHER WATERS OF THE UNITED STATES AND STATE**

Aquatic Feature		Wetland Type—Cowardin Classification	Latitude/Longitude (WGS84)	Total Acres/Linear Feet
Wetlands	Seasonal Wetland	Palustrine Emergent Wetland (Seasonally Flooded) (PEMC)	39.027249° / -121.821311°	0.08 acre/–
Other Waters	Seasonal Riverine	Riverine Intermittent Vegetated Streambed (Intermittently Flooded) (R4SB7)	39.025384° / -121.820050°	17.17 acres/–
	Ditch	Riverine Intermittent Streambed (Seasonally Flooded) (R4SBC)	39.023129° / -121.818304°	0.20 acre / 795 linear feet
	Riverine	Riverine Lower Perennial Unconsolidated Bottom (Permanently Flooded) (R2UBH)	39.024641° / -121.821991°	4.55 acres / 360 linear feet
Total Area of Jurisdictional Features:				22.00 acres / 1,155 linear feet

NOTE: WGS84 = World Geodetic System 1984

SOURCE: Data compiled by Environmental Science Associates in 2018

For the purpose of the wetland delineation, the extent of the project footprint west of Tisdale Weir (the area between the Sacramento River channel and the weir) was considered riverine. This

classification was made because this area is directly connected to the main river channel during flood flows. However, this space is also considered a largely developed land cover type because it is almost entirely paved for use as part of the Sutter County Tisdale Boat Launch Facility. On October 23, 2019, the U.S. Army Corps of Engineers (USACE) concurred with the aquatic resources delineation report and completed a preliminary jurisdictional determination (USACE, 2019).

The riparian forest in the project area is expected to be subject to CDFW jurisdiction under Section 1600 of the California Fish and Game Code, in addition to the seasonal riverine, riverine, and irrigation ditch features. The seasonal wetland feature in the northwest corner of the project area is not expected to be under CDFW jurisdiction: It is a discrete feature and does not appear to be directly connected via surface hydrology to the Tisdale Bypass (separated by the north levee of the Tisdale Bypass) or the Sacramento River (separated by the levee on the east bank of the Sacramento River). Ultimately, though, each regulatory agency determines the actual jurisdictional limits.

3.4.3 Regulatory Setting

Federal Policies and Regulations

U.S. Fish and Wildlife Service

USFWS administers the FESA (U.S. Code Section 1531 et seq. [16 USC 1531 et seq.]), the Migratory Bird Treaty Act (16 USC 703–711), and the Bald and Golden Eagle Protection Act (16 USC 668). These regulations are described below.

Federal Endangered Species Act

Under the FESA, the Secretary of the Interior and Secretary of Commerce have joint authority to list a species as threatened or endangered (16 USC 1533[c]). Two federal agencies oversee the FESA: USFWS has jurisdiction over plants, wildlife, and resident fish, while the National Marine Fisheries Service (NMFS) has jurisdiction over anadromous fish and marine fish and mammals. Section 7 of the FESA requires federal agencies to consult with USFWS and NMFS to ensure that the agencies' actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat for listed species. The FESA prohibits the take³ of any fish or wildlife species listed as threatened or endangered, including the destruction of habitat that could hinder the species' recovery.

FESA Section 10 requires that an incidental take permit be issued before any public or private action that could take an endangered or threatened species. The permit requires the project proponent to prepare and implement a habitat conservation plan (HCP) to offset the take of individuals that may occur, incidental to implementation of the project, by providing for the protection of the affected species.

³ *Take* is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct.

The FESA requires a federal agency reviewing a project proposed within its jurisdiction to determine whether any federally listed threatened or endangered species may be present in the project area, and whether the project would have a potentially significant impact on such species. The agency must also determine whether the proposed action is likely to jeopardize the continued existence of any species proposed for listing under the FESA, or to result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3] and 1536[4]).

Critical Habitat Designations

USFWS designates critical habitat for listed species under the FESA. *Designated critical habitat* is a specific area of the geographic region occupied by a listed species that is critical to the species' survival and recovery. Federal entities issuing permits or acting as lead agencies must show that their actions would not negatively affect critical habitat to the extent that they would impede the recovery of the species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 USC 703 Supp. I, 1989) generally prohibits the killing, possessing, or trading of migratory birds, bird parts, eggs, and nests, except as provided by the statute.

U.S. Army Corps of Engineers

The CWA was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the structure for regulating discharges of pollutants to waters of the United States. The CWA is the primary federal law for protecting the quality of the nation's surface waters: lakes, rivers, and coastal wetlands.

Clean Water Act Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may discharge a pollutant into waters of the United States (defined below under *Clean Water Act Section 404*) must obtain certification from the state in which the discharge would originate. If appropriate, the applicant must obtain certification from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect a state's water quality—including projects that require approval by a federal agency, such as issuance of a Section 404 permit, described below—must also comply with CWA Section 401. See also Section 3.7, *Hydrology and Water Quality*.

Clean Water Act Section 402

Under CWA Section 402, the State Water Resources Control Board (State Water Board) has adopted the General Construction Activity Storm Water Permit. This general permit applies to stormwater discharges from any construction activity that would disturb at least 1 acre of total land area, including clearing, grading, excavation, reconstruction, and dredging and filling activities. The general permit requires the site owner to notify the State, prepare and implement a storm water pollution prevention plan, and monitor the plan's effectiveness.

Minor (i.e., *de minimis*) discharge activities regulated by an individual or general permit under the National Pollutant Discharge Elimination System (NPDES), such as discharges resulting in construction dewatering, also require the General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit (CWA Section 402). Project applicants/proponents should apply for this permit at the same time they apply for the NPDES permit. (For further information about the NPDES, see Section 3.7, *Hydrology and Water Quality*.)

Clean Water Act Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the United States. The term *waters of the United States* refers to oceans, bays, rivers, streams, lakes, ponds, and wetlands. Before proceeding with proposed activities, applicants must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States, including wetlands. Waters of the United States are under the jurisdiction of USACE and the U.S. Environmental Protection Agency.

To comply with CWA Section 404, a project must first comply with several other environmental laws and regulations. USACE cannot issue an individual permit or verify the use of a general nationwide permit until the project has met the requirements of the National Environmental Policy Act (better known as NEPA), the FESA, and the National Historic Preservation Act. In addition, USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued under CWA Section 401.

State Policies and Regulations

California Department of Fish and Wildlife

CDFW, formerly known as the California Department of Fish and Game, administers several laws and programs designed to protect fish and wildlife resources under the California Fish and Game Code. These regulations are described below.

California Endangered Species Act

In 1984, the State of California enacted the CESA in Section 2050 et seq. of the California Fish and Game Code. The CESA prohibits the take of State-listed endangered and threatened species, but the State's definition of take does not include habitat destruction. Section 2090 requires State agencies to comply with endangered species protection and recovery measures and to promote conservation of these species. CDFW authorizes take through California Fish and Game Code Section 2081 agreements (except for designated fully protected species; see below). Unlike the provisions of the FESA, CESA protections apply to candidate species that have been petitioned for listing.

Regarding listed rare and endangered plant species, CESA defers to the California Native Plant Protection Act (see below).

California Fish and Game Code Sections 3503 and 3513

Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit the take, possession, or destruction of birds as designated in the federal Migratory Bird Treaty Act

(16 USC 703 et seq.) and in the orders Falconiformes or Strigiformes (birds-of-prey), or of the nest or eggs of such birds, except as otherwise provided in the code or regulations. CDFW considers construction activities that would result in the incidental loss of fertile eggs or nestlings, or that would otherwise lead to nest abandonment and/or reproductive failure, to be take. Any loss of eggs, nests, or young or any activities resulting in nest abandonment would constitute a significant project impact.

Fully Protected Species

Certain species are considered *fully protected*, meaning that the California Fish and Game Code explicitly prohibits all take of individuals of these species except for scientific research.

Section 5050 lists fully protected amphibians and reptiles, Section 5515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals.

A species can be protected under the California Fish and Game Code but not be fully protected. For instance, mountain lion (*Puma concolor*) is protected under Section 4800 et seq. but is not a fully protected species.

Native Plant Protection Act

The Native Plant Protection Act (California Fish and Game Code Sections 1900–1913) is intended to preserve, protect, and enhance endangered or rare native plants in California. The act directs CDFW to establish criteria for determining which native plants are rare or endangered. Under Section 1901, a species is *endangered* when its prospects for survival and reproduction are in immediate jeopardy from one or more cause. A species is *rare* when, though not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered. The act also directs the California Fish and Game Commission to adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

California Rare Plant Ranking System

CDFW works in collaboration with CNPS to maintain a list of plant species native to California that have low numbers or limited distribution, or are otherwise threatened with extinction. These species are categorized by rarity in the California Rare Plant Rank. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Potential impacts on populations of CRPR species may receive consideration under CEQA review. The system ranks rare plants using the following definitions:

- *Rank 1A*: Plants presumed extirpated in California and either rare or extinct elsewhere
- *Rank 1B*: Plants rare, threatened, or endangered in California and elsewhere
- *Rank 2A*: Plants presumed extirpated in California, but more common elsewhere
- *Rank 2B*: Plants rare, threatened, or endangered in California, but more common elsewhere
- *Rank 3*: Plants about which more information is needed—a review list
- *Rank 4*: Plants of limited distribution—a watch list

In general, plants with CRPR 1A, 1B, or 2 are considered to meet the criteria of State CEQA Guidelines Section 15380 (discussed below). In addition, plants with CRPR Rank 1A, 1B, or 2 meet the definitions of California Fish and Game Code Section 1901, Chapter 10 (Native Plant Protection Act) and Sections 2062 and 2067 (CESA).

Lake or Streambed Alteration Agreement Program

Under this program (California Fish and Game Code Sections 1600–1616), CDFW regulates activities that would interfere with the natural flow of, or substantially alter, the channel, bed, or bank of a lake, river, or stream. Section 1602 requires that CDFW be notified of lake or stream alteration activities. If, after notification is complete, CDFW determines that the activity may substantially adversely affect an existing fish and wildlife resource, CDFW has authority to issue a streambed alteration agreement under Section 1603 of the California Fish and Game Code.

Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. These requirements may include avoiding or minimizing the use of heavy equipment in stream zones; limiting work periods to avoid impacts on wildlife and fisheries resources; and implementing measures to restore degraded sites or compensate for permanent habitat losses.

Species of Special Concern

CDFW maintains lists of candidate-endangered species and candidate-threatened species. California candidate species are afforded the same level of protection as listed species. California also designates *species of special concern*, which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species or fully protected species, but may be added to official lists in the future. CDFW intends the species of special concern list to be a management tool for consideration in future land use decisions. The Special Plants and Special Animals lists are available at <https://www.dfg.ca.gov/wildlife/nongame/list.html>.

State Water Resources Control Board

The State Water Board and the regional water quality control boards (regional water boards) are the State agencies with primary responsibility for the coordination and control of water quality. In the Porter-Cologne Act, the Legislature declared that the “state must be prepared to exercise its full power and jurisdiction to protect the quality of the waters in the state from degradation...” (California Water Code Section 13000).

The Porter-Cologne Act grants the regional water boards the authority to implement and enforce the water quality laws, regulations, policies, and plans to protect the groundwater and surface waters of the State. Waters of the State determined to be jurisdictional would require, if affected, waste discharge permitting and/or a certification under CWA Section 401 (in the case of the required USACE permit).

Enforcement of the State's water quality requirements is not solely the purview of the regional water boards and their staff. Other agencies (e.g., CDFW) can enforce certain water quality provisions in State law.

State CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and State statutes, Section 15380(b) of the State CEQA Guidelines provides that a species not on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specific criteria. These criteria have been modeled after the definition of FESA and the section of the California Fish and Game Code that discusses rare or endangered plants or animals. This section was included in the State CEQA Guidelines primarily for situations in which a public agency is reviewing a project that may have a significant effect on a candidate species that has not yet been listed by CDFW or USFWS. CEQA provides the ability to protect species from potential project impacts until the respective agencies have the opportunity to designate the species' protection.

CEQA also specifies the protection of other locally or regionally significant resources, including natural communities or habitats. Although natural communities do not presently have legal protection, CEQA requires an assessment of such communities and potential project impacts. CDFW considers natural communities identified by the CNDDDB as sensitive to be significant resources, and they fall under the State CEQA Guidelines for addressing impacts. Local planning documents such as general and area plans often identify natural communities.

Local

Yuba-Sutter Natural Community Conservation Plan/Habitat Conservation Plan

The Yuba-Sutter Natural Community Conservation Plan/Habitat Conservation Plan is a cooperative planning effort initiated by Yuba and Sutter Counties in connection with improvements to State Routes 99 and 70 and future development in the area surrounding those highways. The draft plan currently covers four different plant species and 15 wildlife species, and the planning area currently encompasses most of Yuba and Sutter Counties. The project area occurs within the current planning area for the Yuba-Sutter Natural Community Conservation Plan/Habitat Conservation Plan; however, this plan is still in development and has not been approved or adopted. Because the Yuba-Sutter Natural Community Conservation Plan/Habitat Conservation Plan is still in development, there are no requirements for compliance.

Sutter County General Plan

The Sutter County General Plan (2030) includes goals and policies that are intended to identify, protect, and enhance Sutter County's important biological resources. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.4.4 Impacts and Mitigation Measures

Methods of Analysis

This section describes the methods used to assess the potential effects of the Proposed Project on biological resources. Information used for the analysis was derived from readily available databases characterizing the occurrence and distribution of biological resources in the project vicinity, and from the professional judgment of DWR environmental staff and ESA biologists.

To identify potential construction-related impacts on biological resources, DWR identified a study area. This biological resources study area includes the entire project area, including the project footprint, construction equipment staging areas, and the spoils disposal area and its haul route.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if implementing the Proposed Project would:

- 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 CDFW, USFWS, or NMFS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW, USFWS, or NMFS;
- Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- 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; or
- Conflict with the provisions of an adopted HCP, natural community conservation plan, or other approved local, regional, or State HCP.

Impacts Not Evaluated Further

The following issue was evaluated and the Proposed Project was determined to result in no impact; therefore, this topic is not evaluated further in this EIR. The analysis is summarized below. For a complete discussion, see the Initial Study Environmental Checklist in **Appendix B** of this EIR.

Conflict with the provisions of an adopted HCP, natural community conservation plan, or other approved local, regional, or State HCP. The project area is not within the boundaries of any adopted HCP, natural community conservation plan, or other approved HCP. While the project area occurs within the current planning area for the Yuba-Sutter Natural Community Conservation Plan/Habitat Conservation Plan, this plan is still in development and thus has not

been approved or adopted. Therefore, the Proposed Project would not conflict with the provisions of an approved HCP or natural community conservation plan.

Project-Specific Impacts and Mitigation Measures

Table 3.4-9 summarizes the impact conclusions presented in this section.

**TABLE 3.4-9
 SUMMARY OF IMPACT CONCLUSIONS—BIOLOGICAL RESOURCES**

Impact Statement	Impact Conclusion
3.4-1: Implementation of the Proposed Project could cause loss or modification of habitat for special-status plant species.	LS
3.4-2: Implementation of the Proposed Project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).	LSM
3.4-3: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for giant garter snake.	LSM
3.4-4: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for western pond turtle.	LSM
3.4-5: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for bird species.	LSM
3.4-6: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable roosting habitat for special-status bats.	LSM
3.4-7: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by causing changes in water quality.	LSM
3.4-8: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by modifying aquatic habitat.	LSM
3.4-9: Construction of the Proposed Project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.	LSM
3.4-10: Implementation of the Proposed Project could increase the potential for predation on native fish from alterations in aquatic habitat structure.	LS
3.4-11: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by affecting fish passage conditions.	LS
3.4-12: Construction of the Proposed Project could cause the loss or degradation of riparian forest.	LSM
3.4-13: Construction of the Proposed Project could cause the loss or deterioration of wetlands and waters of the United States and State.	LSM
3.4-14: Implementation of the Proposed Project could cause interference with the movement of native resident or migratory terrestrial wildlife species.	LS
3.4-15: Implementation of the Proposed Project could conflict with provisions of local policies or ordinances protecting biological resources.	LS
3.4-16: Implementation of the Proposed Project could contribute to cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.	LSM

NOTES: LS = Less than Significant; LSM = Less than Significant with Mitigation

SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.4-1: Implementation of the Proposed Project could cause loss or modification of habitat for special-status plant species. (Less than Significant)

Potentially suitable habitat for special-status plant species is present within the project area. However, no federally listed or State-listed plant species were found in the project area during multiple biological resources surveys conducted in the area in 2018 and 2019, including focused rare-plant surveys conducted in May and June 2019. Based on these survey results, and on soil characteristics, natural community types, and records of observations in the general vicinity (e.g., elsewhere in Sutter County), it was determined that no special-status plant species have the potential to be present in the project area. Therefore, this impact would be less than significant.

Mitigation Measures: None required.

Impact 3.4-2: Implementation of the Proposed Project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs). (Less than Significant with Mitigation)

Construction

One elderberry shrub was observed in the project area during the October 2018 site visit conducted for preparation of the biological resources survey report for the Proposed Project. The shrub was in an area owned by the Sutter Mutual Water Company that was designated for potential construction equipment staging. However, during a follow-up visit in July 2019, the same elderberry shrub was determined to no longer be present. DWR does not know the cause or timing of the removal of this elderberry shrub.

Two known elderberry shrubs are located within the riparian forest north of the Tisdale Bypass, but just east of the project footprint within the bypass (and south of the haul route to the sediment stockpile area). Additional elderberry shrubs have the potential to be present in the riparian forest; however, none were observed during the biological resources surveys for the project, given the density of vegetation present.

Because DWR and ESA biologists visited the project area multiple times within a year and did not observe elderberry shrubs in the riparian forest within the project footprint, the likelihood that elderberry shrubs could be present is minimal. Nonetheless, to minimize potential harm to VELB and its habitat, DWR is assuming that elderberry shrubs may be present.

To enable heavy construction equipment to access the Tisdale Bypass, riparian vegetation may be removed from within the riparian forest that flanks the bypass's northern and southern margins. Therefore, construction of the Proposed Project could result in adverse impacts on VELB if elderberry shrubs are present and must be removed; however, no specific elderberry shrubs have been documented as remaining present within the project footprint, so the nature of such impacts cannot be quantified at this time. Construction-generated dust, root damage, or soil compaction could also result in indirect effects on VELB.

Operations and Maintenance

Operation of the Proposed Project is not expected to result in substantial adverse effects on VELB or elderberry shrubs. The incremental increase in flows entering the Tisdale Bypass via the new notch in Tisdale Weir would not cause a conversion of habitat or appreciably alter groundwater levels in the riparian areas that would negatively influence the reproduction and growth of elderberry shrubs.

For project maintenance, light-duty trucks, excavators, loaders, dump trucks, graders, backhoes, skid-steers, and bulldozers would need to access the Tisdale Bypass to remove the sediment and debris that would accumulate in the concrete energy dissipation and fish collection basin after flood flows. This work would likely be conducted annually; however, the actual frequency would vary depending on local conditions (e.g., in a wet year, the bypass may be too wet late in the season to allow access by heavy construction equipment) and the rate at which sediment and debris accumulate.

To minimize impacts on the riparian forest, equipment traversing the riparian forest for maintenance activities would follow the same routes established during the Proposed Project's construction phase. The heavy machinery would travel back and forth along the same access routes, likely every year, after construction of project facilities. For this reason, no elderberry shrubs large enough to act as host plants for VELB are expected to establish along these regularly used access routes. Elderberry shrubs could still be indirectly affected by dust, root damage, or soil compaction if the shrubs happen to be located close to the construction access routes through the riparian forest.

Impact Summary

Construction activities have the potential to affect elderberry shrubs directly through vegetation trimming and removal and indirectly through soil compaction, root damage, and dust generation. Operations and maintenance (O&M) activities have the potential to indirectly affect elderberry shrubs through dust, root damage, and soil compaction. Therefore, both the Proposed Project's construction-related effects on VELB and its effects on the species from O&M activities would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact on VELB to a less-than-significant level.

Mitigation Measure 3.4-2a: All project activities will avoid suitable elderberry shrubs, defined as shrubs with stem diameters of at least 1 inch when measured at ground level. Shrubs will be flagged or temporarily fenced, as needed, with guidance from a designated biologist. These areas will be avoided by all project personnel and activities. When feasible, fencing will be placed at least 5 feet from the dripline of each shrub, unless otherwise approved by USFWS.

Mitigation Measure 3.4-2b: DWR will not use insecticides, herbicides, or other chemicals that might harm the beetle or its host plant within established buffers (20 feet) around elderberry shrubs. Mowing will not occur within 5 feet of any suitable elderberry stem (i.e., a stem 1 inch in diameter or greater).

Mitigation Measure 3.4-2c: If it is determined that any project activity has the potential to result in the incidental take of VELB despite implementation of Mitigation Measures 3.4-2a and 3.4-2b, DWR will obtain take authorization under the FESA. DWR will implement all measures developed through consultation with USFWS to mitigate the authorized take. The mitigation approach will conform to requirements stipulated by USFWS in its *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS, 2017a).

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-2a would help ensure that any elderberry shrubs in the project area would be identified and avoided. There would be flexibility in establishment of the precise location for equipment access routes through the riparian forest; therefore, project activities are expected to fully avoid any elderberry shrubs in the riparian forest (see Mitigation Measure 3.4-2a), once the shrubs have been identified by a designated biologist. Mitigation Measure 3.4-2b would help to protect elderberry shrubs from indirect effects, such as accidental exposure to herbicides or effects from mowing. If impacts on elderberry shrubs cannot be entirely avoided, DWR would abide by Mitigation Measure 3.4-2c to ensure that any potential impacts on VELB are documented and fully mitigated.

Impact 3.4-3: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for giant garter snake. (Less than Significant with Mitigation)

Construction

The Tisdale Bypass within the project footprint does not provide suitable habitat for GGS, for two reasons: First, the Tisdale Bypass experiences seasonally high water velocities after Tisdale Weir overtopping events; and second, the bypass is surrounded by dense riparian vegetation, which discourages snakes from entering the bypass from nearby irrigation canals and agricultural drainage ditches.

The Sutter Mutual Main Canal, south of the project site, provides aquatic habitat for GGS and the agricultural land south of the canal provides upland habitat for the species. The Oji Ditch, in the southern portion of the project site, provides aquatic habitat. However, upland habitat present adjacent to the banks of this ditch is only marginally suitable; just a few small-mammal burrows provide GGS upland habitat, and few open areas are available for basking because dense weedy vegetation surrounds the banks. The Oji Ditch is surrounded by developed areas, including a raised embankment to the road approximately 15 feet to the north and the Sutter Mutual Water Company property approximately 13 feet south of the ditch. Suitable aquatic habitat for GGS is also present in a canal located west of Reclamation Road, just outside the proposed spoils site in

the northeastern portion of the project area. GGS could utilize burrows in the vicinity of this canal that are located within the spoils site.

The small seasonal wetland in the northwest portion of the project area also represents potentially marginal habitat for this species. However, suitable upland conditions are limited because of the presence of the Tisdale Bypass north levee immediately south of the wetland, the Sacramento River levee immediately west of the wetland, and the highly managed orchard north and east of the wetland. No construction-related ground disturbance activities are planned for the immediate vicinity of the seasonal wetland; however, the Tisdale Bypass north levee would be used for construction equipment access.

Despite the generally marginal quality of GGS habitat within the project footprint, this species has the potential to be present in areas designated for construction access, and for equipment staging and/or stockpiling. Proposed construction activities could adversely affect GGS individuals primarily through vehicle strikes. Project construction would occur from April 16 through October 31, which would largely overlap the active season for GGS, May 1 to October 1. The potential for direct mortality is lower during the active season than during the dormant period because snakes can move to avoid danger.

Some construction activities may occur in April, before the start of the GGS active season, potentially limiting the ability of GGS individuals to voluntarily move away and avoid construction activities because air temperatures are typically cooler. Additionally, construction activities could occur past October 1 (the end of the active season); continuous construction throughout the active season would likely deter GGS seeking to enter the project area. This ongoing work also would likely reduce the likelihood that the snakes would use the area during the dormant period. No active ground disturbance, such as excavation or grading, is planned for the Sutter Mutual Water Company staging area. This would drastically limit the potential for construction of the Proposed Project to affect mammal burrows, soil cracks, and crevices in the ground that could be occupied by GGS. Also, as mentioned previously, the dense riparian vegetation that surrounds the Tisdale Bypass would discourage the snakes from entering the bypass.

Still, the potential exists for construction of the Proposed Project to affect GGS through direct mortality. For example, equipment could unintentionally crush a snake or accidentally drive over and collapse a mammal burrow in the staging area where GGS may be taking refuge. Project construction could also prevent snakes from accessing upland habitat.

Operations and Maintenance

The Tisdale Bypass is already considered unsuitable for GGS under existing conditions. Thus, the increased flows into the bypass that would result from the notching of Tisdale Weir would not likely alter the extent of suitable aquatic or terrestrial habitat for GGS. Vehicles used for project-related maintenance would cause traffic levels near the Oji Ditch and Sutter Mutual Main Canal to increase slightly, incrementally increasing the potential for a vehicle to unintentionally run over a snake.

Impact Summary

Both construction and O&M activities for the Proposed Project could directly affect GGS outside the Tisdale Bypass through vehicle strikes, and construction work outside the Tisdale Bypass could unintentionally collapse mammal burrows in which GGS could be taking refuge. Therefore, impacts of the Proposed Project on GGS would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact on GGS to a less-than-significant level.

Mitigation Measure 3.4-3a: To the extent feasible, DWR will limit project construction and maintenance activities within the project footprint outside the Tisdale Bypass to the active season for GGS, May 1 to October 1. DWR may also conduct work between October 2 and November 1 or between April 1 and April 30 if ambient air temperatures exceed 75°F during the work and maximum daily air temperatures have exceeded approximately 75°F for at least 3 consecutive days immediately preceding the work.

Mitigation Measure 3.4-3b: A designated biologist will present a worker education and awareness program to all on-site construction personnel before materials staging or ground-disturbing activities begin. The program will describe how best to avoid impacts on GGS and will address the topics of species descriptions and identification, life history, and habitat requirements during various life stages. This education program can include handouts, illustrations, photographs, and project maps showing areas of minimization and avoidance measures. All construction personnel will sign a sign-in sheet documenting that they received the training.

Mitigation Measure 3.4-3c: DWR will ensure that a designated biologist surveys the project footprint for burrows, soil cracks, crevices, and other features potentially suitable for use by GGS within terrestrial habitat located within 200 feet of suitable aquatic habitat in the Oji Ditch and seasonal wetland, excluding any areas within this buffer that may overlap the Tisdale Bypass. Surveys will be completed no more than 3 days before construction or maintenance activities in terrestrial habitat that could support GGS. Any identified burrows, soil cracks, crevices, or other habitat features will be flagged by the designated biologist or otherwise identified as biologically sensitive areas. DWR will avoid these biologically sensitive areas during construction and subsequent maintenance. If activities temporarily stop for more than 7 days, the designated biologist will repeat the surveys for soil cracks and similar features, as described above, before construction work resumes.

If feasible and accepted by CDFW and USFWS, DWR may also use other survey techniques (e.g., scent-detection dogs) as an alternative or supplement to surveys conducted by the designated biologist. Such surveys will identify cracks and burrows to help determine occupancy by GGS, and these burrows will be flagged as biologically sensitive areas to be avoided during subsequent work as described above.

Mitigation Measure 3.4-3d: GGS exclusion fencing will be installed consistent with USFWS and CDFW guidance to divert moving snakes from the active construction zone during periods when GGS are active. This exclusion fencing will be installed south of the Oji Ditch between the ditch and the staging area; north of the Sutter Mutual Main Canal between the staging area and the canal; and between the canal that runs along the west side

of Reclamation Road and the spoils site (**Figure 3.4-2**). DWR will also install and regularly maintain exclusion fencing around the southern and western margins of the seasonal wetland to redirect any GGS using the pond away from Garmire Road and the nearby construction access route on the Tisdale Bypass north levee.

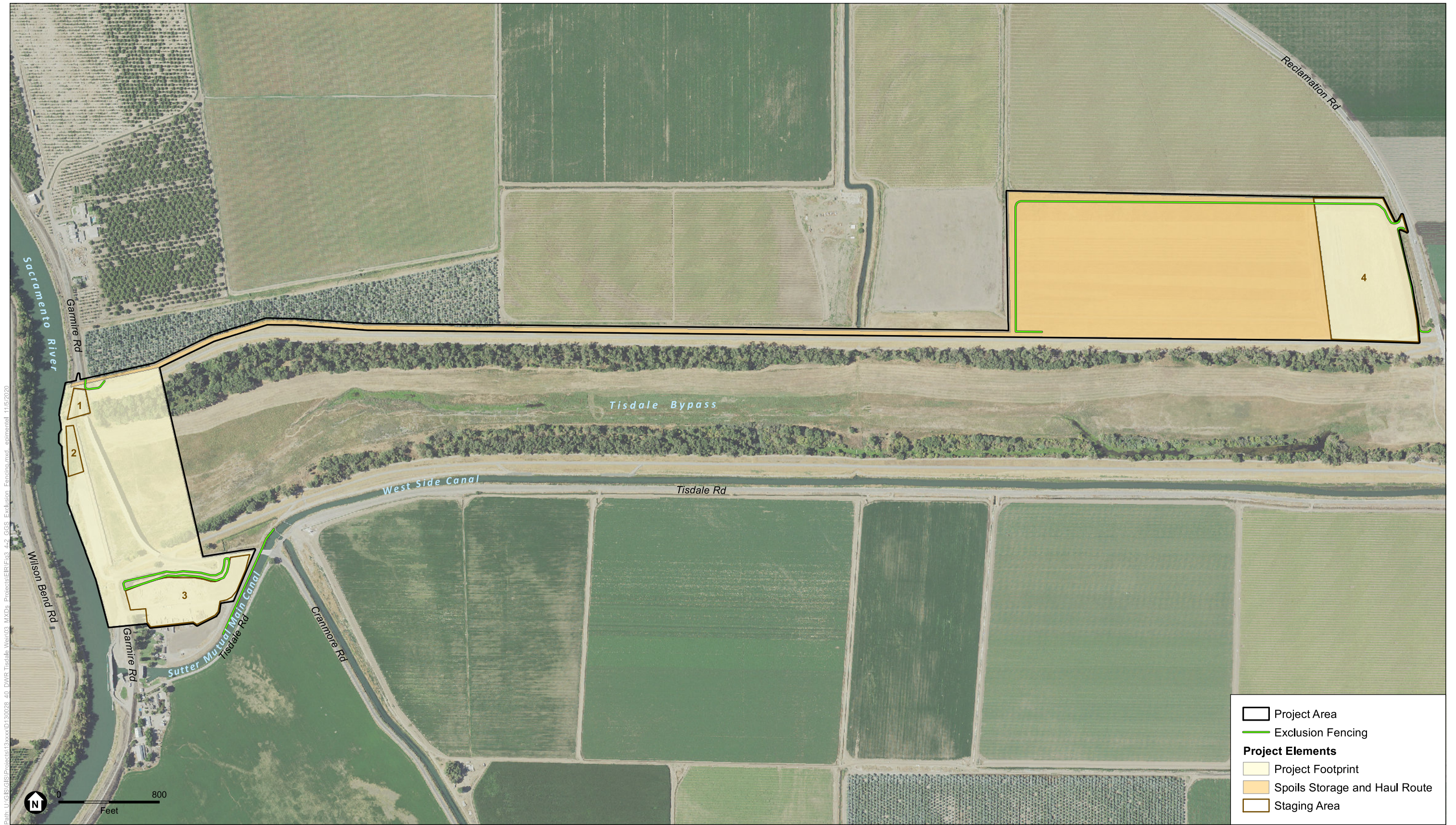
Figure 3.4-2 delineates the maximum anticipated GGS fencing needed to ensure that there is a barrier between any active construction work areas within the action area and any potential GGS aquatic habitat within 200 feet (note that natural features such as dense riparian forest also can function as adequate barriers to ingress of GGS into active work areas). If further engineering analysis determines that a smaller spoils area will be needed to accommodate the Proposed Project, a smaller extent of GGS exclusion fencing may potentially be utilized. Upon agreement with USFWS, DWR will ensure that any reduction in the extent of GGS fencing will still ensure that GGS fencing is installed along the margins of any potential GGS aquatic habitat located within 200 feet of active work areas (unless already obviated by the presence of natural buffers to GGS movement).

The exclusion fencing will be installed before the start of construction. DWR will maintain the exclusion fencing for the duration of the Proposed Project's construction activities. A designated biologist will inspect the exclusion fence daily to verify the condition and function of the fence and to verify that snakes are not becoming trapped in the excluded areas.

Mitigation Measure 3.4-3e: If a GGS individual is observed within the project footprint, DWR will stop work and notify a designated biologist immediately. The snake will be allowed to leave on its own, and the designated biologist will remain in the area for the remainder of the workday to ensure that the snake is not harmed. Alternatively, with prior approval by CDFW and USFWS, the designated biologist may capture the snake and relocate it unharmed to suitable habitat at least 200 feet from the project area. DWR will notify CDFW and USFWS by telephone or email within 24 hours of a GGS observation during project activities. If the snake does not voluntarily leave the project area and cannot be captured and relocated unharmed, project activities will remain halted to prevent harm to the snake, and CDFW and USFWS will be consulted to identify next steps. DWR will implement the measures recommended by CDFW and USFWS before resuming project work in the area.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-3a would limit construction and maintenance activities in areas of aquatic and marginal habitat, to the extent feasible, to periods when the metabolic rates of GGS would likely be high enough that they could actively avoid construction activities. Mitigation Measure 3.4-3b would help familiarize all construction personnel working in the project area with GGS and how to minimize impacts on this species. Mitigation Measure 3.4-3c would ensure that areas of terrestrial habitat where snakes are most likely to be present (e.g., burrows and soil cracks) are identified and flagged for avoidance. Mitigation Measure 3.4-3d would help reduce the likelihood that GGS would be present within the construction footprint in the first place, and Mitigation Measure 3.4-3e outlines the appropriate response to be undertaken if a GGS individual were encountered during construction work.



SOURCE: USDA, 2014; DWR, 2019; ESA, 2020

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 3.4-2
Giant Garter Snake Exclusion Fencing

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Impact 3.4-4: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for western pond turtle. (Less than Significant with Mitigation)

Construction

The Oji Ditch and the seasonal wetland in the project area provide suitable aquatic habitat for western pond turtle. No western pond turtles were observed within the project footprint during biological resources surveys conducted for the Proposed Project. However, no focused surveys have been conducted for this species, and it is presumed that this species could be present in the project area. Proposed construction activities could adversely affect western pond turtle individuals primarily through vehicle strikes, as the seasonal wetland is just north of the haul route between Tisdale Weir and the sediment stockpile area, and the Oji Ditch is adjacent to Staging Area 3. In addition, site preparation and construction activities could obstruct the movement of and reduce the prey base for western pond turtles.

Operations and Maintenance

Operation of the Proposed Project is expected to result in inundation of the Tisdale Bypass for a duration and with a frequency that is within the bounds of conditions observed in the past. (The incremental increase in flows specifically through the weir notch would be most prominent during more frequent but less intense flood events, but that effect would diminish during larger flow events.) The effects of ongoing maintenance activities on western pond turtles would be increased relative to existing conditions, because maintenance of the Proposed Project would require the operation of heavy machinery in and around the Tisdale Bypass potentially on an annual basis, which would increase the likelihood of an unintentional vehicle strike of a turtle.

Impact Summary

Both construction and O&M activities for the Proposed Project could directly affect western pond turtle through vehicle strikes. Therefore, impacts of the Proposed Project on western pond turtle would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact on western pond turtle to a less-than-significant level.

Mitigation Measure 3.4-4a: A designated biologist will present a worker education and awareness program to all on-site personnel before materials staging or ground-disturbing activities begin. The biologist will explain to construction workers how best to avoid impacts on western pond turtle and will address the topics of species descriptions and identification, life history, and habitat requirements during various life stages. This education program can include handouts, illustrations, photographs, and project mapping showing areas of minimization and avoidance measures. The crew members will sign a sign-in sheet documenting that they received the training.

Mitigation Measure 3.4-4b: A designated biologist will conduct a preconstruction survey within 7 days before the establishment of staging areas and the start of construction and maintenance activities.

Mitigation Measure 3.4-4c: Should a western pond turtle be observed during the preconstruction survey, the biologist will identify the location using GPS coordinates. DWR will revisit these locations within 8 hours of ground disturbance. A designated biologist may relocate the turtle found within the construction footprint to suitable habitat away from the construction zone.

Mitigation Measure 3.4-4d: If a western pond turtle is observed on land within the active construction zone, specifically in areas of ground disturbance, access routes, stockpile areas, or staging areas, DWR will immediately stop work within approximately 200 feet of the turtle and notify a designated biologist. If possible, the turtle will be allowed to leave on its own, and the designated biologist will remain in the area for the remainder of the workday to ensure that the turtle is not harmed. Alternatively, with prior CDFW approval, the designated biologist may capture the turtle and relocate it unharmed to suitable habitat at least 200 feet from the project area. If the turtle does not voluntarily leave the project area and cannot be captured and relocated unharmed, construction activities within approximately 200 feet of the turtle will stop to prevent harm to the turtle, and CDFW will be consulted to identify next steps. DWR will implement the measures recommended by CDFW before resuming project activities in the area.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-4a would help familiarize all construction personnel working in the project area with western pond turtle and how to minimize impacts on this species. Mitigation Measures 3.4-4b and 3.4-4c would call for a preconstruction survey to determine whether western pond turtle is present and how any turtles encountered during this survey would be relocated outside the construction footprint. Mitigation Measure 3.4-3d, which would involve installation of snake exclusion fencing in areas where western pond turtle could also be found, would help reduce the likelihood that western pond turtle would be present within the construction footprint in the first place. Mitigation Measure 3.4-4d outlines the appropriate response to be undertaken if a western pond turtle were encountered during construction work.

Impact 3.4-5: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for bird species. (Less than Significant with Mitigation)

Construction

No federally listed or State-listed bird species were observed in the project area during the October 2018 site visit conducted for preparation of the biological resources survey report for the Proposed Project. Based on the habitat present, the biological resources survey report identified mountain plover, Swainson's hawk, and western yellow-billed cuckoo as having the potential to occur in the project area. The project area represents potential overwintering habitat for mountain

plover; however, because construction work would be limited to the summer and early fall, this species is not expected to be present.

Project construction activities could adversely affect special-status bird species by resulting in mortality. Also, general disturbance, including exposure to noise, vibration, and dust, could adversely affect nesting birds by altering their nesting behaviors (e.g., prompting adults to abandon eggs or chicks in nests). Construction activities would occur from April 16 through October 31, overlapping the nesting season for numerous special-status bird species that are present in the project area. Construction work, including removal of riparian trees, during the nesting season could result in the destruction of nests and eggs and the mortality of nestlings.

Other species protected by the Migratory Bird Treaty Act could be present, particularly in the riparian forest. Cliff swallows are common throughout the western United States and are known to nest each year in a colony under the Garmire Road Bridge within the boundaries of the Proposed Project. Activities around this bridge may generate vibration or noise or obstruct the birds' access, potentially causing nest loss or abandonment. Optimal efforts to reduce conflicts include rescheduling work around the bridge to nonbreeding times of the year or implementing a 100-foot biological buffer. However, avoiding the nesting period is not possible, given the goal of the Proposed Project to rehabilitate and build water facilities, because the work must be completed during the dry season (April 16 to October 31). In addition, because of the close proximity of the bridge and breeding colony to active construction work, a preferred 100-foot biological buffer is not possible. Construction activity would occur both under the northern portion of the Garmire Road Bridge and near the bridge, at distances varying from approximately 0 to 100 feet.

Deterrent and barrier measures used by other projects to avoid impacts on nesting swallows include methods such as plastic netting, broadcast alarm calls, and Teflon sheets installed in nest-attachment areas to prevent settlement during construction. Most measures have had only mixed success at discouraging nesting. Removing nests before the breeding season and knocking down incomplete nests during regular maintenance is a commonly used method of avoiding cliff swallow breeding in unwanted areas. Although this method may succeed at preventing nesting and avoiding incidental take of nesting cliff swallows, it causes the birds to relocate, which may result in larger impacts on the colony if nest destruction or disturbance of breeding is eminent. If birds lose their nests, eggs, or young to predators, they may abandon the site for good. Relocation of nesting sites itself may not harm birds, but it has been found that individual birds that had settled at the same breeding colony site are more likely to survive the summer nesting season than those that had lived elsewhere in the past and were therefore naïve about their new surroundings (Brown, 2010).

Operations and Maintenance

After the completion of construction, operation of the operable gates would coincide with Tisdale Weir overtopping events. These flow operations are not expected to affect nesting birds. Mountain plovers may use the Tisdale Bypass during the winter; however, the change in the

bypass's inundation regime under the Proposed Project would be within the range of existing conditions and would be unlikely to limit foraging opportunities for this species.

Maintenance activities occurring during the winter could disturb mountain plovers, should they be present. Because agriculture and annual grasslands dominate the landscape surrounding the project footprint, ample opportunities for mountain plovers to find suitable overwintering habitat are available nearby.

Other bird species may also be temporarily disturbed by vehicles or humans during project-related maintenance actions. These birds are already acclimated to ongoing noise from regular traffic along Garmire Road or at the Sutter County Boat Launch Facility, and from current maintenance activities in the project area. However, proposed maintenance actions may involve the use of heavy machinery such as excavators, loaders, dump trucks, graders, backhoes, skid-steers, and bulldozers, which would generate louder noises than typical passenger vehicles.

Impact Summary

Both construction and O&M activities for the Proposed Project could directly affect nesting birds because they could be disturbed by noise and activity from heavy machinery, and because construction work would include the removal of large trees where birds may be nesting. Therefore, impacts of the Proposed Project on nesting birds would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.4-5a: If vegetation removal is to begin during the nesting season (February 15 to August 31), a designated biologist will conduct a preconstruction nesting survey before the vegetation is removed. The preconstruction survey will be conducted within 14 days before the start of ground-disturbing activities. If the survey shows no evidence of active nests, no additional measures are recommended. If construction does not begin within 14 days of the preconstruction survey, or if it halts for more than 14 days, an additional preconstruction survey is recommended.

Mitigation Measure 3.4-5b: If any active nests are located in the project area, the construction contractor will establish an appropriate buffer zone around the nests, as determined by a designated biologist. Typical buffer zones are 100 feet for migratory bird nests, 250 feet for raptor nests, and 500 feet for western yellow-billed cuckoo, unless a qualified CDFW biologist determines that smaller buffers would be sufficient to avoid impacts. Factors to be considered for determining buffer size will include the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained until a qualified CDFW biologist has determined that the young have fledged and are no longer reliant upon parental care for survival. The designated biologist will monitor nests daily during construction to evaluate whether construction activities have the potential to disturb nesting. All feasible avoidance measures will be implemented (e.g., vehicle and pedestrian access under the Garmire Road Bridge will be reduced). If any project construction work is to occur within 100 feet of swallow nests located under the Garmire Road Bridge, the

designated biologist will elect to implement a stop-work authority until concerning swallow behavior is alleviated if there is concern that the construction activities may result in incidental take of the migratory species.

Mitigation Measure 3.4-5c: If mountain plovers are observed foraging in the project area or adjacent agricultural fields during project construction or maintenance activities, activities within 100 feet will cease until they disperse. This species will be covered under the working training classes presented to construction crews by a designated biologist.

Mitigation Measure 3.4-5d: If vegetation removal is to begin during the nesting season for Swainson's hawk (between March 1 and September 15), a designated biologist will conduct a minimum of one protocol-level preconstruction survey. The survey(s) will occur during the recommended survey periods for the nesting season that coincides with the start of construction activities, in accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000). Where legally permitted, the designated biologist will conduct surveys for nesting Swainson's hawk within 0.25 mile of the project area.

Mitigation Measure 3.4-5e: If active Swainson's hawk nests are found within 0.25 mile of construction or maintenance activities, the findings will be reported to CDFW following the preconstruction survey. For purposes of this avoidance and minimization requirement, "construction activities" are defined to include the operation of heavy equipment during construction (use of cranes or draglines, new rock-crushing activities) or other project-related activities that could cause nest abandonment or forced fledging within 0.25 mile of a nest site between March 1 and September 15. Should an active nest be present within 0.25 mile of a construction area, DWR will consult with CDFW to establish appropriate avoidance measures; determine whether high-visibility construction fencing will be erected around the buffer zone; and implement a monitoring and reporting program before any construction activities occur within 0.25 mile of the nest. Should the designated biologist determine that the construction activities are disturbing the nest, the biologist will halt construction activities until DWR consults with CDFW. The construction activities will not resume until CDFW determines that they will not result in abandonment of the nest site. Should the designated biologist determine that construction activities within the buffer zone have not disturbed the nest, DWR will report to CDFW summarizing the survey results within 30 days after the final monitoring event, and no further avoidance and minimization measures for nesting habitat are recommended.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measures 3.4-5a and 3.4-5d require a preconstruction survey for general nesting birds, and Swainson's hawk specifically, that would be triggered if vegetation removal were to occur during the nesting season. Mitigation Measures 3.4-5b and 3.4-5e outline the steps that would be undertaken if active nests are found. Mitigation Measure 3.4-5c describes how mountain plovers would be avoided if encountered in the project area.

With specific regard to cliff swallows, DWR has evaluated all best management practices for avoiding impacts on nesting cliff swallows. Because the Garmire Road Bridge is approximately 30 feet off the ground and positioned above the proposed construction activities, such activities would not impede the birds' access to resources or nests. Thus, with feasible avoidance measures

(**Mitigation Measure 3.4-5b**) and a biological monitor on-site daily, potential impacts on nesting swallows would be less than significant.

Impact 3.4-6: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable roosting habitat for special-status bats. (Less than Significant with Mitigation)

Construction

Construction activities could disturb riparian forest, which provides potential roosting habitat for pallid bat and western red bat, and grassland habitat, which provides foraging habitat for these species. Potential roosting habitat for pallid bat is present underneath the Garmire Road Bridge, which spans the Tisdale Bypass. Construction activities for the Proposed Project would occur between April 16 and October 31, overlapping the bat maternity season (generally May 1 to August 31). Tree removal that may occur in riparian habitat could adversely affect breeding and nonbreeding bats by causing the loss of established roosts and potential roosting habitat. Work around the Garmire Road Bridge, including the relocation of power and communication cables through existing utility openings on the bridge, could disturb special-status bats if they are occupying the bridge. General disturbance caused by construction activities, including exposure to noise, vibration, and dust, could adversely affect breeding and nonbreeding bats.

Operations and Maintenance

Postconstruction operations under the Proposed Project, such as opening up the operable notch gate, are not expected to affect roosting habitat for special-status bat species. Maintenance activities could disturb special-status bats if the work were to involve activities around the Garmire Road Bridge or generate loud noises. The potential for maintenance activities to disturb special-status bats would be elevated compared to existing conditions because O&M activities for the Proposed Project would require the operation of heavy machinery within the Tisdale Bypass, potentially on an annual basis.

Impact Summary

Both construction and O&M activities for the Proposed Project could directly affect special-status bat species because they could be disturbed by noise and activity from heavy machinery, and because construction work could include the removal of large trees where bats may be roosting. Therefore, impacts of the Proposed Project on bats would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.4-6a: Within 14 days before the beginning of removal of suitable bat roosting trees (larger than 24 inches in diameter at breast height), a designated biologist will conduct a preconstruction survey for special-status bats. If no special-status bats are

observed roosting, no additional measures are required for the tree removal. If tree removal does not begin within 14 days of the preconstruction survey, or if removal halts for more than 14 days, a new survey will be conducted.

Mitigation Measure 3.4-6b: If bats are found in the area where construction-related activities will occur, a minimum 100-foot avoidance buffer will be established around the roost/maternity area until it is no longer occupied. High-visibility fencing will be installed around the buffer and will remain in place until bats no longer occupy the tree or structure. The tree or structure will not be removed or modified until a designated biologist has determined that the bats are no longer occupying the roost. If construction activities must occur within the avoidance buffer, a designated biologist will monitor the activities either continuously or periodically during work, as determined by the biologist. The designated biologist will be empowered to stop activities that, in the biologist's opinion, threaten to cause unanticipated and/or unpermitted adverse effects on special-status bats. If construction activities are stopped, the designated biologist will consult with CDFW to determine appropriate measures that DWR will implement to avoid adverse effects.

Within 14 days before the start of work within 100 feet of the Garmire Road Bridge, a designated biologist will conduct a preconstruction emergence survey for special-status bats. If avoidance of maternity roosts is not feasible, additional mitigation will be developed in consultation with CDFW.

Mitigation Measure 3.4-6c: If construction activities must occur within the avoidance buffer, a designated biologist will monitor the work either continuously or periodically, as determined by the biologist. The designated biologist will be empowered to stop activities that, in the biologist's opinion, threaten to cause unanticipated and/or unpermitted adverse effects on special-status bats. If construction activities are stopped, the designated biologist will consult with CDFW to determine the appropriate measures to implement to avoid adverse effects.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-6a requires a preconstruction survey for special-status bats if large trees are removed. Mitigation Measure 3.4-6b identifies how buffers and one-way exclusion devices would be installed if bats are encountered within the construction footprint, and the steps that would be taken if a maternity roost cannot be avoided. Mitigation Measure 3.4-6c requires that a designated biologist monitor any work within the avoidance buffer for bats.

Impact 3.4-7: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by causing changes in water quality. (Less than Significant with Mitigation)

Construction

Erosion in the Sacramento River and the Tisdale Bypass has the potential to occur during or immediately after construction activities for the Proposed Project. The potential for construction-related erosion in the bypass to affect fish species or their habitat would be greatly minimized because ground-disturbing activities would occur in the dry season, when the Tisdale Bypass is

fully drained. Some of the soil in the bypass that would be disturbed by construction activities could become mobilized in the water column when flood flows inundate the bypass after construction. However, the vast majority of the turbidity in the Tisdale Bypass when inundated would be attributable to the excess sediment load naturally picked up by the Sacramento River when it is in flood stage before its waters reach and overtop Tisdale Weir.

Grading and excavation activities in the connection channel and along the banks of the Sacramento River could directly increase erosion or sedimentation into riverine fish habitat. The use of staging, storage, and disposal areas could indirectly result in erosion and sedimentation into the Sacramento River. The magnitude of potential impacts on fish would depend on the timing and extent of sediment loading, flow conditions in the Sacramento River, and inundation or saturation of the Tisdale Bypass during and immediately after construction. Most fish are highly migratory and can move freely in waterways; however, a sudden localized increase in turbidity has the potential to affect some juvenile fish by temporarily disrupting normal behaviors that are essential to growth and survival, such as feeding, sheltering, and migrating.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments on salmonids. Salmonids have been observed moving laterally and downstream to avoid turbidity plumes. Juvenile salmonids tend to avoid areas that are chronically turbid. In addition, behavior alteration as an effect of turbidity includes disruption of feeding behaviors, which increases the likelihood that individual fish face increased competition for food and space and experience diminished growth rates. Potential turbidity increases may also affect the sheltering abilities of some juvenile salmonids, increasing their susceptibility to predation loss.

Construction activities also could result in the release of hazardous materials or chemicals into aquatic habitats, including the Tisdale Bypass and the Sacramento River. No contamination is expected to be released into aquatic habitats; however, inadvertent contamination may occur during construction work. Contaminants could be released accidentally anytime during construction. Accidental discharge of hazardous materials and chemicals could affect fish that may be present in the immediate vicinity and downstream of the construction area by increasing physiological stress and causing direct mortality. Mitigation Measure 3.4-7b would be implemented to address any chemical spills or seepage if they occur. The measure calls for any hazardous materials (e.g., motor oils) to be stored off-site whenever they are not in use.

Project-related impairment of water quality, from increased erosion and sediment or the accidental release of hazardous materials into aquatic habitats, has the potential to cause physiological stress and mortality and alter normal fish behavior. Water quality is also addressed in Section 3.7, *Hydrology and Water Quality*, Impact 3.7-1.

Operations and Maintenance

Proposed flow operations with the gated notch in Tisdale Weir are not expected to affect habitat quality for fish species. Project-related maintenance activities could result in accidental releases of hazardous materials and chemical spills into aquatic habitats, as described above for

construction-related impacts. The potential for accidental spills during maintenance to affect fish habitat is expected to be minimal. Nonetheless, the potential for this effect would be elevated compared to existing conditions because O&M activities for the Proposed Project would require the operation of heavy machinery within the Tisdale Bypass, potentially on an annual basis.

Impact Summary

Both construction and O&M activities for the Proposed Project could affect fish species by increasing the potential for eroded soils and hazardous materials to end up in waterways. Therefore, impacts of the Proposed Project on fish would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.4-7a: Work will be suspended if Tisdale Weir is forecast to be overtopped during the construction window.

Mitigation Measure 3.4-7b: DWR and its construction contractor will implement the following best management practices to protect water quality:

- The construction contractor will develop and implement a spill prevention, control, and countermeasure plan to minimize the potential for, and effects from, spills of hazardous, toxic, and petroleum substances during construction and maintenance. The plan will be completed before construction activities begin. The spill prevention, control, and countermeasure plan will describe containment facilities and practices, including refueling procedures and spill response actions for each material or waste and procedures for notifying the appropriate agencies.
- Diesel fuel and oil will be used, stored, and disposed of in accordance with standard protocols for handling of hazardous materials.
- All personnel using hazardous materials will be trained in emergency response and spill control.
- All concrete washing and spoils dumping will occur in a designated location outside of jurisdictional waters, including the Tisdale Bypass.
- Construction stockpiles will be covered or protected with soil stabilization measures (e.g., protection of seeding by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) and a temporary sediment barrier to prevent blowoff or runoff during weather events.
- Erosion control materials and devices for severe-weather events will be stored on-site for use as needed.
- All work will occur when the Tisdale Bypass is dry. Areas with permanent open water will be protected from disturbance during excavation by installing silt fencing or other suitable best management practices around the features, or by leaving a buffer of 15 feet from the ponded areas that will be identified by stakes and flagging. Shallow ponded areas will not be affected until they have dried down.

- Any excavated areas will be reseeded with an appropriate seed mix or otherwise treated to reduce erosion and/or siltation.
- Erosion control measures will be placed in areas that are upslope of aquatic habitat, to prevent any soil or other materials from entering aquatic habitat. Silt fencing and/or natural/biodegradable erosion control measures (i.e., straw wattles and hay bales) will be used. Plastic monofilament netting (erosion control matting) will not be allowed because wildlife can become entangled in this type of erosion control material.
- To address potential effects on receiving water quality during the construction period, DWR will prepare and comply with any requirements identified in a storm water pollution prevention plan to maintain water quality.

Mitigation Measure 3.4-7c: DWR will conduct turbidity monitoring in the Sacramento River. *The Basin Plan for the Sacramento River and San Joaquin River Basins (Fifth Edition)* (Basin Plan) (Central Valley Regional Water Board, 2018) contains turbidity objectives. Specifically, the plan states:

- Where natural turbidity is between 5 and 50 nephelometric turbidity units (NTU), turbidity levels may not be elevated by 20 percent above ambient conditions.
- Where ambient conditions are between 50 and 100 NTU, conditions may not be increased by more than 10 NTU.
- Where natural turbidity is greater than 100 NTU, increases will not exceed 10 percent.

A sampling methodology for turbidity monitoring will be developed and implemented based on specific site conditions, project activities, and in consultation with the Central Valley Regional Water Board. If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities will slow to a point that will alleviate the problem.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-7a identifies how work would stop if inundation of the Tisdale Bypass is expected, to avoid conducting work in the bypass when special-status fish may be present. Mitigation Measure 3.4-7b identifies a suite of practices meant to protect water quality, and thus to protect habitat quality for special-status fish. Mitigation Measure 3.4-7c identifies the steps that would be undertaken to ensure the consistency of the Proposed Project with the Central Valley Regional Water Board's Basin Plan standards regarding turbidity for work that would occur within the bank and channel of the Sacramento River.

Impact 3.4-8: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by modifying aquatic habitat. (Less than Significant with Mitigation)

Construction

The project footprint overlaps a section of the Sacramento River designated by NMFS as critical habitat for Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook

salmon, Central Valley steelhead, and green sturgeon. The Tisdale Bypass itself is considered critical habitat for Central Valley spring-run Chinook salmon and Central Valley steelhead.

Vegetation, including large trees, in the riparian forest on the northern and southern margins of the Tisdale Bypass may be disturbed and removed to allow construction equipment to access the bypass. Vegetation would also be disturbed along the Sacramento River near the northern edge of Tisdale Weir, for construction of an access road and equipment pad. Effects on fish species from removing woody riparian vegetation along aquatic habitat could include reduced refugia for juveniles, changes in the production of macroinvertebrates, and altered biodiversity.

However, the potential removal of riparian vegetation from the Tisdale Bypass to facilitate construction access is expected to have limited implications for salmonids, for two reasons. First, the vegetation that may be removed is fairly narrow (on the order of approximately 15 feet wide) and minor, given that the dense riparian vegetation that flanks the entire Tisdale Bypass would remain intact. Second, the majority of the riparian vegetation that may be removed is located in the riparian forest on the northern end of the Tisdale Bypass, and because the bypass's topography naturally slopes down from north to south, fish in the bypass are expected to be found mostly in its southern portion.

Existing bank slope and substrate conditions along the Sacramento River would be temporarily affected during placement and removal of the temporary cofferdam during construction around the site of the new connection channel to isolate it from the Sacramento River. Grading and installation of the concrete connection channel would permanently alter the river bank, as would the placement of approximately 300 cubic yards of riprap to serve as scour protection for the new connection channel. Although construction of the Proposed Project would modify river bank conditions, existing habitat quality has already been degraded by rock slope protection and the limited amount of riparian vegetation along the lower bank of the Sacramento River. Therefore, the value of the shoreline habitat for functions such as juvenile fish rearing and escape cover is not expected to change substantially.

Heavy earth disturbance and access to the Tisdale Bypass by heavy machinery to construct the Proposed Project would affect an area that functions as seasonal aquatic habitat for fish. Given the time frame of construction, the potential to affect fish such as salmon would be minimal; work would occur during the dry season, when the bypass would have drained. Nonetheless, the potential exists for fish to be present (i.e., stranded) in ponded areas and natural depressions within the project footprint. Disturbance of these areas where fish may be holding during the construction process could result in their mortality.

Lighting for nighttime construction could disrupt fish habitat conditions. Artificial lighting during the night can disrupt the normal diel movement patterns of fish and their prey. Lighting also has the potential to increase predation risks for native fish because it would reduce the effectiveness of their cover. (For a discussion of the effects of the Proposed Project on predation risks for native fish specifically from changes in habitat structure, see Impact 3.4-10.)

Operations and Maintenance

O&M activities for the Proposed Project are expected to have minimal effects on aquatic habitat for fish species. The incremental increase in flows entering the Tisdale Bypass via the proposed new notch in Tisdale Weir is not expected to result in a type conversion of habitat by appreciably altering groundwater levels in riparian areas. The additional flow into the Tisdale Bypass via the notch would expand the extent and duration of wetted habitat available for fish during and after episodes of Tisdale Weir overtopping. The incremental increase in availability of floodplain habitat in the Sutter Bypass for fish is expected to be minimal, given the limited, marginal increase in flows that would enter the Tisdale and Sutter Bypass systems as a result of Tisdale Weir notch operations. Maintenance activities, such as the removal of sediment and debris deposited from flood events, would be limited to the time of year when the bypass is dry and native fish would not be expected to be present. (With the Proposed Project, native fish would be less likely to be present within the project footprint during the dry season as a result of stranding.) No maintenance work is expected to occur during the nighttime, minimizing the likelihood that artificial lighting generated within the project footprint would affect aquatic habitat.

In the unlikely event that the Proposed Project does not perform as designed and fish remain stranded below Tisdale Weir, Mitigation Measure 3.4-8c has been identified as a contingency action to protect special-status fish. For an analysis of the implications of Proposed Project operations regarding fish passage conditions, see Impact 3.4-11.

Impact Summary

Construction activities could affect fish if they are present in the Tisdale Bypass or in the cofferdam area, and could disrupt their normal behavior if artificial nighttime construction lighting spills into the Sacramento River. Additionally, although unlikely, the Proposed Project may not perform as designed and fish could remain stranded in the Tisdale Bypass during O&M activities for the Proposed Project. As a result, the potential impact on fish species from construction and O&M activities would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.4-8a: If project activities must occur during non-daylight hours, a designated biologist will establish monitoring measures, including frequency and duration, based on fish species, individual behavior, and type of construction activities. When nighttime work cannot be avoided, nighttime lighting will be used only in the portion of the project area actively being worked on (limited to a minimum distance of 200 feet from habitat for FESA-listed fish species), and will be focused directly on the work area. Lights on work areas will be shielded and focused to minimize lighting of FESA-listed fish species habitat. If the work area is located near surface waters, the lighting will be shielded to avoid shining directly into the water.

Mitigation Measure 3.4-8b: DWR will submit a dewatering and fish rescue plan to NMFS and CDFW before construction. NMFS- and CDFW-approved fish biologists will conduct fish rescues in isolated pools and channels in the project area. These biologists will also rescue any fish trapped in the cofferdam area before dewatering. Fish rescue will also occur in the unlikely event that Sacramento River flows overtop the cofferdam. Methods used for capturing fish could include seining and dip netting. Water will be pumped and discharged back into the Sacramento River from the cofferdam areas as needed to facilitate fish collection activities. Pump intakes will be fitted with appropriately sized, NMFS- and/or CDFW-approved fish screens to prevent fish from becoming entrained.

Mitigation Measure 3.4-8c: The Technical Working Group, consisting of qualified technical experts from DWR, NMFS, and CDFW, will develop triggers for fish rescue events to occur during operation of the Proposed Project. A fish rescue could be needed because of a physical obstruction, adverse water quality within the fish passage facilities, observations that fish in the basin are in poor health, or other reasons. If deemed necessary, a fish rescue plan will be developed and will include the same elements as described in Mitigation Measure 3.4-8b.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-8a identifies the steps that would be undertaken to minimize the extent of lighting that would shine directly into the water. Mitigation Measure 3.4-8b identifies how a fish rescue plan would be in place to relocate any stranded fish within the project footprint before the start of construction activities. Mitigation Measure 3.4-8b also identifies how fish would be rescued from the cofferdam area before dewatering actions. Mitigation Measure 3.4-8c identifies how further fish rescues could be triggered once construction is completed (e.g., if the project were not operating as expected).

Impact 3.4-9: Construction of the Proposed Project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration. (Less than Significant with Mitigation)

Hydrostatic pressure waves and vibrations generated by construction activities can adversely affect all life stages of fish. The extent to which these pressure waves adversely affect fish depends on the physiology of the affected fish. Hydrostatic pressure waves have the potential to rupture the swim bladders and internal organs of fish in the immediate vicinity. Pile driving can cause both sublethal and lethal effects. The sound level produced by pile driving can vary, depending on the pile type, pile size, substrate composition, and type of equipment used.

The California Department of Transportation, in coordination with the Federal Highway Administration and the Departments of Transportation in Oregon and Washington, established the Fisheries Hydroacoustic Working Group to improve and coordinate information regarding the impacts of underwater sound pressure from in-water pile driving on fisheries (Caltrans, 2015). The group also includes representatives from NMFS, USFWS, CDFW, and USACE.

In 2008, the Fisheries Hydroacoustic Working Group developed an agreement establishing interim sound pressure criteria for injury to fish associated with pile driving. The criteria identify sound pressure levels of a peak of 206 decibels (dB) for all fish sizes, an accumulated sound exposure level of 187 dB for fish larger than 2 grams, and an accumulated sound exposure level of 183 dB for fish less than 2 grams (FHWG, 2008). The injury thresholds for impact pile driving are likely to be much lower than the injury thresholds for non-impulsive, continuous sounds produced by vibratory pile drivers (Caltrans, 2015). Vibratory pile driving has been used in place of impact pile driving to minimize adverse effects on fish and other aquatic organisms.

Cofferdams that have been dewatered down to the mud line substantially reduce the sound level from underwater pile driving; and although underwater noise cannot be eliminated because the energy is transmitted through the ground, pile driving in a dewatered cofferdam is the best method for isolating underwater noise (Caltrans, 2015). Therefore, sound pressure waves generated by construction activities within the confines of the cofferdam are expected to be attenuated to levels below which fish would be adversely affected.

To temporarily dewater a stretch of bank along the Sacramento River, the Proposed Project may construct a temporary cofferdam, which would require installing sheet piles. Installation of the piles may involve the use of either an impact driver or a vibratory driver. Using pile drivers to install sheet piles in aquatic environments can cause pressure waves, which result in harmful effects on fish swimming nearby, including the potential to rupture their internal organs. This impact would be significant.

O&M activities for the Proposed Project are not expected to generate any hydrostatic pressure waves and vibrations.

Mitigation Measure:

Implementing the following mitigation measure would reduce this construction-related impact to a less-than-significant level.

Mitigation Measure 3.4-9: To avoid or minimize the potential for injury or mortality of listed fish species caused by pile-driving noise, all pile driving will be restricted to the in-water work period (July 1 to October 1). Non-impact pile driving methods (e.g., vibratory) or other attenuation methods, as needed, will be used to avoid or minimize noise levels that exceed the current thresholds established by NMFS. A vibratory hammer is preferred; however, if an impact hammer is needed to drive piles, noise levels should not exceed the following threshold levels (for fish greater than 2 grams):

- Peak sound pressure level = 206 decibels (dB re 1 micropascal [μPa])
- Accumulated sound exposure level = 187 decibels (dB re 1 $\mu\text{Pa}^2\text{-s}$)

A designated biologist will be present during cofferdam installation and removal to monitor construction work and compliance with the terms and conditions of permits. If required by permit conditions, hydroacoustic monitoring will be performed to monitor underwater sound levels and ensure compliance with established thresholds. If any salmonids,

sturgeon, or lamprey are found dead or injured during pile-driving activities, NMFS will be notified immediately and in-water pile driving will cease. To comply with the thresholds, DWR will employ the following mitigation measures:

- An impact hammer cushion block will be used.
- Impact hammers will be used only during daylight hours, and will initially be used at low energy levels and reduced impact frequency. (Applied energy and frequency will be gradually increased until the necessary full force and frequency are achieved.)
- If noise thresholds are not met using the above measures, DWR will consult with the regulatory agencies on applying other mitigation methods, as feasible (e.g., bubble curtains and/or reducing the daily duration of pile-driving activities).

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-9 identifies the steps that would be undertaken to monitor noise levels to avoid or minimize the potential for injury or mortality of listed fish species if an impact hammer is needed to drive piles.

Impact 3.4-10: Implementation of the Proposed Project could increase the potential for predation on native fish from alterations in aquatic habitat structure. (Less than Significant)

Construction

Construction of the Proposed Project has the potential to increase the risks of predation of native fishes near and downstream of the construction footprint because of the potential for increased turbidity, hazardous materials spills, and vibration and pressure waves. Potential effects of construction activities that are not directly associated with predation risks are described in Impacts 3.4-7 through 3.4-9.

Temporary indirect effects of project construction, such as increased turbidity, potential for hazardous materials spills, and increased underwater vibration and pressure waves, could cause native fishes to move from preferred habitats, leaving them more susceptible to predation. Disorientation caused by noise from pile driving could temporarily disrupt normal fish behaviors, increasing their predation risks. Temporary instream structures, such as a cofferdam, may temporarily provide increased refugia for predatory non-native fish species such as striped bass. This effect has the potential to cause a temporary increase in the predation loss of fish species. The Proposed Project would not cause adverse population-level effects on the survival of native fishes to the extent that species abundance would decline. Although the effects of construction could increase predation risks for native fishes, the effects are expected to be temporary.

Operations and Maintenance

Operation of the Proposed Project is expected to reduce predation risks for fish that can become stranded in the Tisdale Bypass below Tisdale Weir under current conditions. Improving the

ability of upstream-migrating adult fish such as sturgeon and salmon to reach the mainstem Sacramento River is expected to reduce the loss of these fish to piscivorous (fish-eating) predators such as birds, because under existing conditions, the fish commonly become stranded and concentrated in small isolated pools. Periodic maintenance activities within the project footprint are not expected to alter predation risks for native fish species.

Impact Summary

Although the effects of construction could increase predation risks for native fishes, the effects are expected to be temporary, and to not occur at the population level. Operation of the Proposed Project is expected to reduce the predation loss of native fish. The impacts of construction and O&M activities for the Proposed Project related to the risk of predation for native fish would be less than significant.

Mitigation Measures: None required.

Impact 3.4-11: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by affecting fish passage conditions. (Less than Significant)

Construction

Construction activities could impair the migration or passage of fish in the immediate vicinity of the project area by generating the potential for increased turbidity, hazardous materials spills, and underwater noise. Installing a cofferdam to facilitate construction work could impede migration by juvenile special-status species, potentially exposing them to increased predation. However, the cofferdam would be installed when water levels in the Sacramento River would be low (potentially installed above the water level), as the construction season would fall within the dry season. For this reason, the potential adverse effects of the cofferdam on fish are expected to be minimal.

Operations and Maintenance

Once the Proposed Project is operational, the newly constructed notch in Tisdale Weir would improve fish passage conditions for adult special-status anadromous fish in the Tisdale Bypass. An increase in flows entering the Tisdale and Sutter Bypasses relative to existing conditions could result in increased straying. However, under existing conditions, the bypass system has highly variable flow rates during the wet season. Thus, the marginal increase in flows from the Proposed Project is not expected to have a substantial effect on the attraction of anadromous fish into the Tisdale Bypass.

Flow conditions in the Sacramento River downstream of Tisdale Weir are expected to be similar to existing conditions (i.e., to change by 5 percent or less). As shown in **Table 3.4-10** and **Table 3.4-11**, the Proposed Project would decrease flows in the Sacramento River relative to existing conditions, but only during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, as occur during the summer and early fall, the

Proposed Project would not affect flow conditions in the Sacramento River because the river stage would remain below the base elevation of the notch.

**TABLE 3.4-10
 AVERAGE ANNUAL CHANGE IN SACRAMENTO RIVER FLOWS DOWNSTREAM OF TISDALE WEIR¹**

Water Year Type	Volume Remaining without Project (million acre-feet)	Volume Remaining with Project (million acre-feet)	Net Change (million acre-feet) ²	Percent Change
Wet	9.84	9.64	-0.20	-2.02%
Above Normal	8.19	8.02	-0.17	-2.16%
Below Normal	6.48	6.41	-0.07	-1.20%
Dry	5.99	5.93	-0.06	-0.93%
Critically Dry	4.84	4.81	0.03	-0.49%

NOTES:

- 1 Based on analysis of historical hydrological record from 1976 to 2017.
- 2 Change in flow volume based on average annual basis.

SOURCE: Data compiled by Environmental Science Associates in 2019

**TABLE 3.4-11
 SACRAMENTO RIVER FLOWS THROUGH TISDALE WEIR NOTCH DURING FLOOD EVENTS**

Flood Event ¹	Sacramento River at Tisdale Bypass (cubic feet per second)	Flow through Notch in Tisdale Weir (cubic feet per second) ^{2,3}	Percent of Sacramento River Flow Diverted through Notch ²
2-Year	43,623	1,590	3.64%
10-Year	47,809	1,133	2.37%
25-Year	49,403	951	1.93%
50-Year	52,237	613	1.17%
100-Year	54,893	379	0.69%

NOTES:

- 1 It is anticipated that to comply with U.S. Army Corps of Engineers requirements, the notch would be closed when Sacramento River flow events reach or exceed a 10-year flow event. This table presents flow conditions assuming that the notch would be open during such flow events, to provide a conservative estimate of the change of flow split conditions under the Proposed Project (e.g., if the gate could not be closed under high-flow conditions).
- 2 Net flows through the notch are predicted to decrease with increased Sacramento River flows because as water levels rise in the Tisdale Bypass during major flood events, the notch becomes "drowned out" by the tailwater in the bypass and cannot convey flow as efficiently, reducing the net flow-through.
- 3 Modeling result based on Hydrologic Engineering Center's River Analysis System (HEC-RAS) outputs.

SOURCE: Data compiled by Environmental Science Associates in 2019

Under existing conditions, adult salmon, sturgeon, and lamprey moving up the Tisdale Bypass have major challenges navigating past Tisdale Weir. Anadromous fish migrating up through the Tisdale Bypass are often stranded in pools below Tisdale Weir, unable to find a way to navigate past the weir. These include the Tisdale Weir splash basin and other isolated residual pools throughout the Tisdale Bypass that remain when floodwaters recede. Fish passage is mainly limited to extremely large flood events, when the weir is backwatered on its downstream side

because of deep inundation in the Sutter and Tisdale Bypasses. Recurring fish stranding issues at Tisdale Weir prompted CDFW to conduct 12 fish rescue efforts between 1986 and 2017.

Once the project facilities are constructed and operational, the Proposed Project would enhance connectivity in the Tisdale Bypass. Based on the Fish Passage Analysis (see **Appendix F**), which modeled hydrologic conditions relevant for fish passage using records from water years 1978–2017, the Proposed Project would provide passage for salmon over the entire range of flows analyzed, and for sturgeon over most flows. For sturgeon, water depths that are too shallow can become a factor impeding passage as the bypass starts to drain after Sacramento River flows recede. Overall, however, as a result of the Proposed Project, more adult anadromous fish would be able to successfully navigate past Tisdale Weir into the Sacramento River under a wide range of flow conditions. This would be a beneficial result.

Impact Summary

The temporary cofferdam that may be installed during the construction phase of the Proposed Project is not expected to alter the migration patterns of fish in the Sacramento River. By design, O&M activities for the Proposed Project are intended to provide benefits to upstream passage of adult anadromous fish migrating up the Sutter and Tisdale Bypasses. Therefore, impacts on fish passage conditions from construction and O&M activities for the Proposed Project would be less than significant.

Mitigation Measures: None required.

Impact 3.4-12: Construction of the Proposed Project could cause the loss or degradation of riparian forest. (Less than Significant with Mitigation)

CDFW identifies certain habitat types as sensitive natural communities because of their decline statewide, high wildlife habitat value, or hydrologic function. The riparian forest in the project area is considered a sensitive natural community.

Construction work for the Proposed Project may affect riparian forest. The project design is still underway. However, based on preliminary drawings, up to 1 acre of vegetation may be removed from within the riparian forest to facilitate access by heavy construction equipment from the levee crowns along the Tisdale Bypass's north and south margins into the interior of the bypass, and for rock placement to provide scour protection. Loss of riparian vegetation, including large trees, would reduce potential nesting and roosting habitats for special-status wildlife species.

Riparian forest could be indirectly affected by sedimentation; dust generation; accidental leaks or spills of fuel or soil; accidental introduction of invasive plant species carried as seeds on construction equipment or personnel; and the spread of invasive plant species through soil disturbance, which tends to benefit non-natives. Invasive plant species can outcompete native plant species, reducing the complexity and quality of habitat for native vegetation. Invasive plant species

are already present in the riparian forest. However, construction work for the Proposed Project, such as vegetation clearing to facilitate construction, could introduce new invasive plant species.

Operational changes under the Proposed Project would not adversely affect riparian forests because the change in the duration and extent of inundation of the Tisdale Bypass would not result in a type conversion of the riparian habitat. Maintenance crews would likely use the same access routes through the riparian forest as during project construction, so no additional loss of riparian forest would occur. Travel by equipment along the access routes through the riparian forest for annual sediment removal work could incrementally increase the potential to unintentionally introduce invasive species seeds and fragments, compared to existing conditions, in which no heavy machinery traverses these routes through the riparian forest.

Impact Summary

Construction activities may directly affect riparian habitat because riparian vegetation would be trimmed and removed, and because construction equipment could unintentionally introduce invasive weeds to the riparian forest. O&M activities are not expected to result in further loss of riparian habitat because the same access routes through the riparian forest would be used as during the construction phase. However, construction equipment used during annual maintenance work could still introduce invasive weeds to the adjacent remaining riparian habitat. Therefore, both construction-related impacts of the Proposed Project and impacts of O&M activities on riparian forest would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.4-12a: Stakes and flagging will be used at the edge of the construction footprint if work is anticipated to occur within 50 feet of riparian areas that are proposed for avoidance. A biological monitor will be present during initial grading or vegetation-clearing activities within 50 feet of riparian areas proposed for avoidance.

Mitigation Measure 3.4-12b: Tree mitigation will be based on the number or area of trees actually affected by project construction, as determined by a certified arborist. DWR will catalog affected trees before project construction, and will prepare a compensatory mitigation plan for the trees that includes monitoring and reporting. Compensatory mitigation may include the purchase of credits from an approved off-site bank or on-site tree plantings.

Mitigation Measure 3.4-12c: Should removing vegetation within the riparian forest be necessary, DWR will prepare an invasive plant management plan for the plants identified by the California Invasive Plant Council as having a moderate or high level of invasiveness and plants considered locally invasive. The contractor will implement the management plan's recommendations for the affected riparian forest in the construction area. In addition, the contractor will implement the following best management practices to prevent the introduction and spread of invasive plant species during construction:

- All construction equipment will be washed and cleaned of debris before entering the project area to prevent new invasive plant species from entering the project site.

- Straw bales and other vegetative materials used for erosion control will be certified weed-free.
- All revegetation materials (e.g., seed mixes and mulches) will consist of plant species native to Sutter County, certified weed-free. All seeds and container plants will be obtained from locally adapted genetic stock that is free from fungal pathogens.
- In areas requiring weed control, effective methods for removal may vary depending on the species being controlled. Typical methods include hand removal, mowing, or application of herbicides. Herbicides will be used consistent with federal, State, and local requirements. These requirements include the restrictions on herbicide use specified by resource agencies to prevent impacts on aquatic habitats, listed plant or wildlife species, or their habitats. All herbicides will be used in accordance with any guidance on the label that takes into consideration water quality and wildlife concerns.
- Any areas to be revegetated will be replanted with a native vegetation plant and/or seed mix.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-12a would require that staking and flagging be placed to ensure the avoidance of riparian habitat (except the limited riparian vegetation that may be removed to facilitate construction access and rock placement). Mitigation Measure 3.4-12b describes the approach to compensatory mitigation that would be used to offset impacts on the trees removed during construction. Mitigation Measure 3.4-12c outlines the steps that DWR would take to prevent the unintentional spread of invasive plant species to the affected riparian forest in the project area.

Impact 3.4-13: Construction of the Proposed Project could cause the loss or deterioration of wetlands and waters of the United States and State. (Less than Significant with Mitigation)

Construction of the Proposed Project would result in direct and indirect impacts on waters of the United States and State, including seasonal riverine habitat (Tisdale Bypass) and riverine habitat (Sacramento River) (**Figure 3.4-3**). The project would involve filling an estimated 1.16 acres in the bed and along the east bank of the Sacramento River. Most of this fill would provide scour protection for the river bank, particularly around the location of the new connection channel; approximately 0.11 acres would be filled to construct the connection channel itself. The Proposed Project would also fill an estimated 3.53 acres of the Tisdale Bypass. Approximately 1.44 acres of this fill would be used for construction of the new concrete energy dissipation basin, including the associated bedding material.



SOURCE: USDA, 2014; DWR, 2019; ESA, 2019

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 3.4-3
Impacts to Potentially Jurisdictional Waters

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The exact acreages of impacts on jurisdictional waters are based on the latest available construction design available during preparation of this analysis; however, these acreages are expected to change slightly as the design progresses. Permanent impacts would also result from the installation of scour protection on the trailing edge of the energy dissipation basin, construction of the new connection channel, placement of revetment rock along the Sacramento River bank, and placement of grout in potential voids beneath the existing Tisdale Weir.

The Proposed Project would excavate approximately 20,000 cubic yards of materials, including native soil that would be disposed of on a parcel northeast of Tisdale Weir and just northwest of the Reclamation Road Bridge. Any excavated concrete would be removed and disposed at an appropriate off-site facility. This work would involve excavating approximately 16,500 cubic yards of material to prepare for the construction of the energy dissipation and fish collection basin; 30 cubic yards of existing concrete and native soil for construction of the weir notch and operable gates; and 3,300 cubic yards of material along the bank of the Sacramento River to prepare for the installation of the connection channel.

DWR would address any impacts on waters of the United States by meeting USACE's requirements under the CWA Section 404 permitting process. In addition, to address impacts on the Tisdale Bypass, DWR would comply with the Central Valley Regional Water Board's requirements for compliance with CWA Section 401. Furthermore, as required by Section 1602 of the California Fish and Game Code, DWR would notify CDFW of any project impacts on the bed, bank, or channel.

Construction of the Proposed Project would permanently reduce the acreage or function of waters of the United States and State. Therefore, this impact would be potentially significant.

O&M activities for the Proposed Project would not result in any permanent fill or conversion of jurisdictional waters. Ongoing sediment removal would result in temporary impacts on jurisdictional waters. These actions would be necessary to ensure that the fish passage facility is operating as designed (e.g., removing sandy deposits from the energy dissipation basin that would be regularly deposited after inundation events).

Mitigation Measures:

Implementing the following mitigation measures would reduce this construction-related impact to a less-than-significant level.

Mitigation Measure: Implement Mitigation Measure 3.4-7b.

Mitigation Measure 3.4-13: Silt fencing will be erected at the edge of the construction/maintenance footprint in advance of work anticipated to occur within 50 feet of the Sacramento River or the seasonal wetland. A biological monitor will be present during fence installation and during initial grading or vegetation clearing activities within 50 feet of the potentially jurisdictional features proposed for avoidance.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measures 3.4-7b and 3.4-13 identify a suite of practices meant to protect water quality, and thus to protect waters of the United States and State.

Impact 3.4-14: Implementation of the Proposed Project could cause interference with the movement of native resident or migratory terrestrial wildlife species. (Less than Significant)

Construction

Construction activities for the Proposed Project could interfere with the local movement of native resident or migratory wildlife species. Grading and other ground-disturbing activities could temporarily disrupt the movement of reptiles and amphibians, such as GGS. However, construction work would not substantially interfere with the movement of these species because they could move through adjacent unaffected habitat. Construction activities, including equipment and personnel movement and vegetation removal, could interfere with the movement of other terrestrial wildlife species, such as small mammals or birds. However, these activities are not expected to cause substantial effects on the movement of these species, which are mobile and can move away from construction areas to unaffected areas. Project construction noise could temporarily alter the foraging patterns of resident wildlife species in the project area, but it is not anticipated to substantially interfere with foraging because these species could move to nearby unaffected habitat.

Although construction work for the Proposed Project could temporarily alter the movement patterns of native resident or migratory wildlife species, it is not anticipated to substantially interfere with the movement of these terrestrial species, which could move to nearby unaffected habitat.

Operations and Maintenance

Sediment and debris removal for the Proposed Project would generally occur annually, between April and November. However, the frequency of these activities may vary based on the type of water year (e.g., very dry or very wet); the rate at which sediment and debris accumulate at the site; and the effects of the magnitude of sediment and debris accumulation on conveyance capacity, energy dissipation, and fish passage conditions. DWR's maintenance staff would seek to conduct this work in dry channels or when water levels are at their lowest. These maintenance actions would be limited in duration and are not expected to permanently alter the migration or movement patterns of terrestrial wildlife.

Impact Summary

Construction work and O&M activities for the Proposed Project could temporarily alter the movement patterns of native resident or migratory wildlife species; however, they are not anticipated to substantially interfere with the movement of these terrestrial species, which could

easily move to nearby unaffected habitat. The impacts of both construction and O&M activities on the movement of native resident and migratory terrestrial wildlife would be less than significant.

Mitigation Measures: None required.

Impact 3.4-15: Implementation of the Proposed Project could conflict with provisions of local policies or ordinances protecting biological resources. (Less than Significant)

State agencies such as DWR are not subject to local ordinances. To the extent feasible, implementation of the Proposed Project would comply with applicable adopted county ordinances protecting biological resources, provided that they are consistent with DWR's internal environmental policies. This impact would be less than significant.

Mitigation Measures: None required.

Cumulative Impacts and Mitigation Measures

This evaluation of cumulative impacts considers the potential of the Proposed Project in combination with other past, present, and future projects to result in significant impacts on biological resources. The area of analysis for these cumulative impacts includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the confluence with the Tisdale Bypass. Projects include:

- DWR's Sutter Bypass Pumping Plant Rehabilitation Project, which proposes to retrofit maintenance structures at three separate pumping plants along the East Levee of the Sutter Bypass; and
- The U.S. Bureau of Reclamation and CDFW's Sutter National Wildlife Refuge Lift Station Project, which includes construction of a lift station that would allow the Sutter National Wildlife Refuge to divert water from the East Borrow Ditch.

Past projects in the vicinity of the project area include DWR's Tisdale Bypass Sediment Removal 2020 Project (2020), the Sutter Bypass East Borrow Canal Water Control Structures Project (2009), the Tisdale Bypass Channel Rehabilitation Project (2007), the Garmire Road Bridge Replacement Project (2004), and the Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009).

Impact 3.4-16: Implementation of the Proposed Project could contribute to cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species. (Less than Significant with Mitigation)

In the cumulative context, there may be a net loss of riparian habitats potentially used by federally listed and State-listed bird species, special-status bats, and migratory birds. The Proposed Project could contribute to a cumulative direct impact on riparian habitat related to the loss of this habitat and the delay in establishment of any habitat mitigation plots, because newly planted trees and shrubs do not have the same functional value as mature vegetation. Other actions

being concurrently planned, such as the Sutter Bypass Pumping Plant Rehabilitation Project, may also affect riparian vegetation. This project would involve consulting with wildlife agencies under the FESA and CESA, and thus would be required to implement their own mitigation measures to offset impacts on riparian habitat.

The Proposed Project would also involve permanently placing fill within seasonal riverine habitat (i.e., the Tisdale Bypass), including installing a concrete basin, to improve adult fish passage for anadromous fish. This additional fill would be placed near where concrete was permanently placed in the Tisdale Bypass as fill under other projects in the past 15 years (e.g., concrete pilings for the Garmire Road Bridge Replacement Project and a boat ramp and parking lot for the Tisdale Weir Boat Ramp Improvement Project).

Overall, however, these facilities do not interfere with the ability of the Tisdale Bypass to function as seasonal riverine habitat. For example, the Tisdale Weir Boat Ramp parking lot did not convert any habitat to uplands or interfere with the process by which Sacramento River flood flows overtop Tisdale Weir and inundate the bypass. Furthermore, all fill in jurisdictional waters of the United States, such as the Tisdale Bypass, is subject to mitigation to meet USACE and Central Valley Regional Water Board requirements under the CWA Section 404 permit process and the CWA Section 401 water quality certification process.

The Proposed Project's altered flow regime with the operable gates may affect waterfowl habitat conditions downstream in the Sutter Bypass. The Sutter Bypass contains several private clubs that are operated specifically to create beneficial habitat for migratory waterfowl. In addition, the Sutter Bypass Wildlife Area manages certain areas for the benefit of migratory waterfowl. Generally, ideal water depth for waterfowl is around 18 inches or less. A TUFLOW Model Results and CEQA Impacts Analysis conducted for the project (**Appendix C**) indicates that the expected number of wet days during the waterfowl season is expected to increase by an average of only 0 to 1.9 days. Therefore, the suitability of habitat conditions for waterfowl in the Sutter Bypass is expected to be largely unaffected. This topic is discussed further in Section 3.8, *Recreation*.

Depending on the extent or frequency of any land fallowing in Sutter Bypass agricultural areas, GGS, Swainson's hawk, and sandhill crane may be directly influenced by changing habitat conditions. GGS have become increasingly reliant on inundated rice fields for foraging habitat due to the conversion of the historical natural wetland habitat in the Central Valley. The snake's access and presence in the bypass is uncertain, but the species is known to be present around large areas of rice, the predominant crop type grown in the Sutter Bypass. A large increase in fallowed fields associated with rice crops would have the potential to affect this species. On the other hand, Swainson's hawk could potentially benefit from additional fallowing of cropland, because fallowed land is considered to be higher quality foraging habitat for this species than land in active production. Large amounts of additional fallowing of rice cropland would have the potential to reduce the overall quality of suitable foraging habitat for overwintering sandhill cranes, which have grown accustomed to feeding on excess grain left in fields after harvest.

Suitable habitat for GGS may be closely associated with rice agriculture and natural wetlands located near a high density of canals and low density of streams (Halstead et al., 2010). During the active season, GGS individuals are typically found within 30 feet of aquatic habitat. GGS are known to occur in areas immediately adjacent to the Sutter Bypass (Sites and Reclamation, 2017), and it cannot be ruled out this species traverses the Sutter Bypass during its active season to access naturally inundated areas, rice fields, and agricultural canals and drainages to forage. When rice cropland is fallowed, these areas may still provide connectivity between patches of suitable habitat if irrigation canals or drainage ditches remain full (USFWS, 2017b); however, the field areas would not be irrigated and thus would not provide wetted habitat during the snake's active season. Therefore, a large increase in the frequency of rice field fallowing and/or extent of permanent fallowing or land conversion could contribute to a net reduction in suitable GGS foraging habitat, resulting in increased competition for remaining resources, reduced reproductive rates, and increased mortality from predation (USFWS, 2016).

Swainson's hawk foraging habitat includes native grasslands, lightly grazed pastures, and certain agricultural croplands. Among agricultural croplands, alfalfa and fallow fields are considered to provide the highest values for Swainson's hawk foraging, while rice fields provide little value. Increases in the frequency with which fields may be fallowed may provide Swainson's hawk with improved foraging conditions within the Sutter Bypass.

In the Central Valley, sandhill cranes winter almost entirely in agricultural fields and edges. Waste grains and other seeds are dominant foods in winter. Numbers of sandhill cranes have increased in the Sacramento Valley in recent decades, hypothesized to be attributable in part to the limits imposed on burning of rice stubble and the greatly increased practice of flooding to decompose rice stubble. Long-term fallowing of rice fields or other grain crops may contribute to a net reduction in foraging habitat.

Based on the Flow Impacts Analysis (Appendix C), the Proposed Project is expected to have minimal effects on the extent of fallowing of rice fields. The modeling indicates that for a small number of fields within the Sutter Bypass, the Project may slightly increase the frequency with which these fields are fallowed (i.e., adding one or two additional fallow years over approximately two decades). However, overall, the modeling suggests that any change in the extent and frequency of fallowing would remain within the range of fallowing currently observed and practiced within the Sutter Bypass. Therefore, the change to fallowing of fields caused by the Proposed Project would have minimal effects on overall habitat conditions within the bypass for GGS, Swainson's hawk, and sandhill crane. Based on the analysis, any additional land fallowing as a result of the Proposed Project would not lead to a subsequent, significant reduction in habitat for GGS, Swainson's hawk, and sandhill crane.

The slight increase in seasonally inundated habitat in the Sutter Bypass is expected to be beneficial for rearing opportunities for juvenile Chinook salmon and steelhead. Seasonal floodplain inundation, which begins during the winter and early spring but drains before late spring and summer, is expected to be beneficial for native fish such as Chinook salmon and

Sacramento splittail (*Pogonichthys macrolepidotus*). These conditions allow these native fish to exploit food web production by floodplain habitat largely free of competition with most non-native fish, which generally spawn later in the year when temperatures are warmer. However, the incremental benefit to special-status fish species from the increase in floodplain habitat availability in the Sutter Bypass is expected to be minimal, given the limited, marginal increase in flows that would enter the Tisdale and Sutter Bypass systems as a result of Tisdale Weir notch operations.

Implementation of the Proposed Project, in conjunction with the separately considered projects in the project vicinity, has the potential to affect sensitive habitats and special-status species, resulting in potentially significant cumulative impacts on those biological resources.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measures: Implement Mitigation Measures 3.4-2a, 3.4-2b, 3.4-2c, 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, 3.4-3e, 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, 3.4-5e, 3.4-6a, 3.4-6b, 3.4-6c, 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, 3.4-9, 3.4-12a, 3.4-12b, 3.4-12c, and 3.4-13.

Impact Significance after Mitigation: Less than Significant.

Implementation of Mitigation Measures 3.4-2a, 3.4-2b, 3.4-2c, 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, 3.4-3e, 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, 3.4-5e, 3.4-6a, 3.4-6b, 3.4-6c, 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, 3.4-9, 3.4-12a, 3.4-12b, 3.4-12c, and 3.4-13 would reduce the contribution of the Proposed Project to this cumulative impact to less than considerable because these measures would be implemented to avoid, minimize, and/or compensate for the loss of sensitive habitats and special-status species.

3.5 Cultural Resources

3.5.1 Introduction

This section examines the potential impacts of the Proposed Project on cultural resources. Tribal cultural resources are discussed separately in Section 3.9. For the purposes of this analysis, the term *cultural resource* is defined as follows:

Indigenous and historic-era sites, structures, districts, and landscapes, or other evidence associated with human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. These resources include the following types of CEQA-defined resources: historical resources, archaeological resources, and human remains.

The term *indigenous*, rather than *prehistoric*, is used as a synonym for “Native American–related” (except when quoting). *Pre-contact* is used as a chronological adjective to refer to the period before the arrival of Euroamericans in the subject area. “Indigenous” and “pre-contact” are often but not always synonymous: The former term refers to a cultural affiliation and the latter is chronological.

This section relies on the information and findings in the *Tisdale Weir Rehabilitation and Fish Passage Project, Sutter County, California: Cultural Resources Inventory and Evaluation Report* (Hoffman and Cleveland, 2019). That report (**Appendix G** [confidential appendix]) details the results of the cultural resources study, which examined the environmental, ethnographic, and historic background of the project area, emphasizing aspects of human occupation.

The California State Lands Commission (SLC) and California Native American Heritage Commission (NAHC) provided comments regarding cultural resources in response to the Notice of Preparation (see **Appendix A**). The SLC recommended that the EIR address impacts on submerged cultural resources and include a mitigation measure requiring that work be stopped in the event of an unanticipated discovery. The SLC also requested that DWR request the results of a records search of the SLC’s Shipwrecks Database for the project area. Any shipwrecks or cultural resources identified on or in submerged lands of California are under SLC jurisdiction. Further information on the SLC’s Shipwrecks Database is presented below. In-water work would occur primarily within the Tisdale Bypass, and generally would not occur in or along major transportation waterways. A temporary coffer dam may be used to isolate the construction site for the connection channel from the Sacramento River. Therefore, impacts on submerged cultural resources or shipwrecks are not anticipated. However, this section provides mitigation for potential impacts related to the accidental discovery of submerged cultural resources.

The NAHC summarized Assembly Bill (AB) 52 requirements, recommended early consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the Proposed Project, and provided recommendations for cultural resources assessments. See Section 3.9, *Tribal Cultural Resources*.

Key Terms

This section includes the key terms defined below.

- **Architectural Resource.** This resource type includes historic-era buildings, structures (e.g., bridges, canals, roads, utility lines, railroads), objects (e.g., monuments, boundary markers), and districts. Residences, cabins, barns, lighthouses, military-related features, industrial buildings, and bridges are some examples of architectural resources.
- **Archaeological Resource.** This resource type consists of indigenous, or pre-contact, and historic-era archaeological resources:
 - *Indigenous archaeological resources* consist of village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Associated artifacts include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs).
 - *Historic-era archaeological resources* consist of town sites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military and industrial land uses. Associated artifacts include stone, concrete, or adobe footings and walls; artifact-filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

If a resource is considered a ruin (e.g., building lacking structural elements, structure lacking a historic configuration), it is classified as an archaeological resource.

- **CEQA Area of Potential Effects.** The CEQA Area of Potential Effects (C-APE) is defined here as both the horizontal and vertical maximum extents of the Proposed Project's potential direct impacts on cultural resources. The C-APE encompasses the footprint of proposed actions, including staging and access areas.

Because of the nature of the Proposed Project and its minimal potential for indirect effects, a single C-APE has been defined to account for potential impacts on archaeological and architectural resources. Comprising approximately 130.62 acres, the C-APE extends vertically to the maximum depth of the Proposed Project's ground-disturbing activities. That maximum depth varies by location and activity:

- 6 feet for site improvements
- 10 feet for rehabilitation and reconstruction of Tisdale Weir
- 16 feet for the fish passage facilities
- 3 feet for operation and maintenance

The same C-APE applies to the analysis of human remains.

3.5.2 Environmental Setting

This section provides a brief summary of the environmental setting in the *Tisdale Weir Rehabilitation and Fish Passage Project, Sutter County, California: Cultural Resources*

Inventory and Evaluation Report (Hoffman and Cleveland, 2019), which is included as Appendix G (confidential appendix).

Cultural Setting

Ethnographic Setting

Before Euroamericans occupied California, the C-APE was traditionally occupied by the Patwin. The Patwin territory covered an extensive area of north-central California, including the lower west side of the Sacramento Valley west of the Sacramento River from about the present-day town of Princeton in the north to Benicia in the south. The Patwin territory was bounded to the north, northeast, and east by the territories of other Penutian-speaking peoples (Nomlaki, Wintu, and Maidu, respectively). The Pomo and other coastal groups were located to the west. In their large territory, the Patwin have traditionally been divided into River, Hill, and Southern groups, although more complex linguistic and cultural differences existed than these three geographic divisions indicate.

A review of ethnographic literature for the Proposed Project revealed that five Native American villages have been documented within 2 miles of the C-APE; however, they are all at least 0.25 mile from the C-APE. The Patwin village *Ko-sim'-po* and the Maidu village *Hól'-lup-pi*, both east of the Sacramento River, are south of the C-APE. Villages documented west of the Sacramento River were all associated with the Patwin, and include *No'-wis-ap'-pe*, *No'-mah-chup'-pin*, and *No'-we-'hla'-ah*, respectively located southwest, northwest, and south of the C-APE.

Pre-contact Setting

Paleo-Indian Period (13,550 to 10,550 Years Before Present [BP])

Humans first entered the Central Valley sometime before 13,000 years ago. At that time, Pleistocene glaciers had receded to the mountain crests, leaving conifer forests at the middle and upper elevations of the Sierra Nevada and a nearly contiguous conifer forest on the Coast Ranges. The Central Valley was covered with extensive grasslands and riparian forests. The Sacramento–San Joaquin Delta system of central California had not yet developed. The Central Valley was home to a diverse community of large mammals, which soon became extinct. People likely focused on large game hunting, although evidence remains scant, as does understanding of lifeways during this period.

Lower Archaic Period (10,550 to 7550 BP)

During the Lower Archaic Period, the ancient lakes that had been the subsistence base during the Paleo-Indian Period began to dry up as a result of climate change. This change led to the rapid expansion of oak woodland and grassland prairies across the Central Valley. During this period, the first evidence of milling stone technology appeared, indicating increased reliance on processing plants for food. The appearance of milling technology may also indicate less emphasis on hunting as individuals became more familiar with local plants. Milling stones include handstones and milling slabs and are frequently associated with cobble-based pounding, chopping, and scraping tools. People used milling tools to process seeds and nuts. Also during the

Lower Archaic Period, well-made bifaces were used as projectile points and cutting tools. These artifacts were manufactured mostly with local materials; they were commonly formed from meta-volcanic greenstone and volcanic basalts. Trade was limited and the primary social unit remained the extended family.

Middle Archaic Period (7550 to 2550 BP)

After about 7550 BP, California experienced a change in the climate, with warmer and drier conditions. Oak woodland expanded upslope in the Coast Ranges and conifer forest moved into the alpine zone in the Sierra Nevada. Rising sea levels led to the formation of the Sacramento–San Joaquin Delta and associated marshlands. Scant evidence of human occupation from this period has been found in the Sacramento Valley or the adjacent Coast Ranges. Most evidence comes from the Sierra foothills in Calaveras and Tuolumne Counties.

Upper Archaic Period (2550 to 900 BP)

Much more evidence of human occupation in the Central Valley exists for the Upper Archaic Period than for earlier periods. Two fundamental adaptations developed side by side during the Upper Archaic Period, as settlement patterns became more diverse. Populations in the valley tended toward large, high-density, permanent settlements. People used these villages as hubs from which they roamed to collect resources, using a wide range of technologies. In contrast, foothill and mountain populations lived in less dense settlements, moving with the seasons to maximize resource returns. Tools tended to be expedient and used for multiple purposes in a wide variety of activities. Village sites show extended occupation; well-developed middens frequently contain hundreds of burials, storage pits, structural remains, hearths, ash dumps, and extensive floral and faunal remains.

Emergent Period (900 to 300 BP)

A major cultural shift occurred around 900 BP, which marks the beginning of the Emergent Period. Particularly notable was the introduction of the bow and arrow. The bow was adopted at slightly different times in various parts of the Sacramento Valley, but it was used in the Delta region by 750 BP. The bow was accompanied by the Stockton Serrated point, a seemingly indigenous invention that was distinctive from point types used elsewhere in the state. In areas where stone was scarce, baked clay balls are found, presumably for cooking in baskets. Other items from this period are bone tubes, stone pipes, and ear spools. Along rivers, villages are frequently associated with fish weirs, as fishing became increasingly important for people's diets.

Historic Period Setting

Settlement of the Sacramento Valley

Euroamerican exploration of the C-APE and vicinity began in the early 19th century. In 1817, Spanish Captain Luis Argüello led an exploratory party up the Feather River. Gabriel Moraga also explored the Sutter County area in 1808, naming the Feather River and noting the presence of the Sutter Buttes. As part of a Mexican land grant, John Sutter owned a large part of what is today known as Sutter County. In 1842, Nicolaus Allgeier established a ferry at the site of what would become the community of Nicolaus, to cross the Feather River on the road between

Sutter's Fort and Sutter's Hock Farm. In 1850, the California Legislature incorporated Sutter County as one of the state's original 27 counties. The town of Nicolaus was established that year and became a major stopping point on the Feather River.

With the rise of agriculture in Sutter County after the Gold Rush, the C-APE and vicinity developed into an agricultural center. Farmers successfully grew wheat, grapes, and peaches, which contributed to the area's development along with cattle and dairy ranching. Because of the abundance of water from nearby rivers, irrigation was introduced into the area early. The C-APE is in a rural area that has historically been used for agricultural purposes, with little development until the modern period.

U.S. Army Corps of Engineers Sacramento River Flood Control Project (1917–1961)

The Sacramento River Flood Control Project (SRFCP) is the core of the flood protection system along the Sacramento River and its tributaries. The SRFCP was authorized under the Flood Control Act in 1917; construction began in 1918 and continued in several phases until 1961. Segments of the SRFCP levees were originally constructed by local interests and were modified to U.S. Army Corps of Engineers (USACE) flood control standards before being incorporated into the SRFCP system. Once the levee system was complete in 1961, the State of California took over operations and maintenance under USACE regulations.

The SRFCP comprises a comprehensive system of levees, weirs, bypass channels, and drainage systems that extend along the Sacramento River from Ord Bend in Glenn County downstream to Collinsville, near Suisun Bay. Units of the SRFCP cross nine counties: Glenn, Colusa, Butte, Sutter, Yuba, Placer, Sacramento, Yolo, and Solano. The facilities were designed to assist in the management of floodwaters from the Sacramento River and its tributaries. A spillway structure or weir is present at each point where water is allowed to escape from the river channel. The system was designed so that 82 percent of flood discharges flow through the Yolo Bypass and only 18 percent in the main river channel.

The C-APE is within the Sutter Bypass system of the SRFCP. The Tisdale Weir and Bypass provide flood relief from the Sacramento River to the Sutter Bypass. Before 1924, when the Sutter Bypass was constructed, the C-APE was a swampy marshland. The levees along the channel were constructed using material excavated from the bypass. The Tisdale Weir and Bypass were completed in 1932; in 1941–42, USACE raised and enlarged the Sutter Bypass levees in this vicinity.

Existing Cultural Environment

Archival Research

In October 2018, Environmental Science Associates (ESA) staff conducted a cultural resources records search for the C-APE and vicinity at the Northwest Information Center (NWIC) at Sonoma State University, Rohnert Park. Also in October 2018, at the request of ESA, staff at the Northeast Information Center (NEIC) at California State University, Chico, conducted a cultural resources records search for the C-APE and vicinity. The NWIC and NEIC are the repositories of the

California Historical Resources Information System (CHRIS) covering the C-APE and vicinity. The study area for the records searches consisted of the C-APE with a 0.5-mile buffer. In addition, ESA staff obtained National Historic Preservation Act (NHPA) Section 106 documentation (not on file at the CHRIS) from the California Department of Transportation (Caltrans) for the Garmire Road Bridge Replacement Project, which included portions of the C-APE.

Previously Recorded Cultural Resources

The CHRIS has records of three previously recorded cultural resources either in or within 0.5 mile of the C-APE. One of these resources (P-51-000117) was recorded in the C-APE. P-51-000117, the Tisdale Pumping Plant, is a historic-era architectural resource; the other two resources are outside but within 0.5 mile of the C-APE and are indigenous archaeological sites.

In addition, the Caltrans NHPA Section 106 documentation from the nearby Garmire Road Bridge Replacement Project (Supernowicz and Calpo, 2003a) indicated that the Garmire Road Bridge and Tisdale Weir and Bypass were previously documented together as an architectural resource. As part of that same project, the Tisdale Pumping Plants and Sutter Mutual Water Company Tisdale Residences (and Workshop) were documented as separate architectural resources, although it is unclear whether they were documented in the C-APE. These resources would later be recorded together as a single resource. Finally, a National Register of Historic Places (National Register) historic district, the Tisdale Weir Historic District, was proposed as part of the Garmire Road Bridge Replacement Project (Supernowicz and Calpo, 2003b). The documentation for the district indicated that its boundary would include a portion of the C-APE.

Table 3.5-1 summarizes the previously recorded cultural resources in and within 0.5 mile of the C-APE, which are discussed in more detail below.

Tisdale Pumping Plant (P-51-000117)

This historic-era architectural resource was originally recorded in 2004 as the Tisdale Pumping Plant, comprising two pumping plants with associated structures, a segment of the levee on the east side of the Sacramento River, a landscaped residential area, and several historic-era houses. Although the site record location map depicts the resource's boundary as including the southern portion of the C-APE, the site record sketch map appears to indicate that the resource does not extend into the C-APE.

Caltrans documentation for the Garmire Road Bridge Replacement Project shows that the following elements of the 2004 recordation (as P-51-000117) were documented in 2002: Sutter Mutual Water Company Tisdale Pumping Plants and East (or Main) Canal, the Sutter Mutual Water Company Tisdale Residences #1, #2, #3, and Workshop. The boundaries for these resources as recorded in 2002 are unclear, including whether they extend into the C-APE, because the associated documentation does not include any maps of the resources or detailed descriptions of their boundaries. As part of that same Caltrans project, these resources were each determined not eligible for the National Register, receiving State Historic Preservation Officer (SHPO) concurrence, as individual resources, but were recommended National Register-eligible as

contributors to a proposed Tisdale Weir Historic District. However, the SHPO did not concur with the recommendation that the resource is eligible as a proposed Tisdale Weir Historic District, stating that not enough information on the district had been provided.

**TABLE 3.5-1
PREVIOUSLY RECORDED CULTURAL RESOURCES IN OR WITHIN 0.5 MILE OF THE
CEQA AREA OF POTENTIAL EFFECTS**

Primary (P-)	Trinomial (CA-)	Type	Age/ Affiliation	Name/Description	Recorder(s)	Within or Outside C-APE	Previous Eligibility
06-000029	COL-5	Site	Indigenous	Leveled mound, projectile points, shell, midden	Heizer and Krieger (1936)	Outside	Unevaluated
51-000004	SUT-4	Site	Indigenous	Mound, shell, midden	Heizer and Krieger (1936)	Outside	Unevaluated
51-000117 ^a	[none]	Structure	Historic	Tisdale Pumping Plant	Brown and Marlow (2004)	Within	Unevaluated
[none] ^b	[none]	Structures	Historic	Garmire Road Bridge and Tisdale Weir and Bypass	Supernowicz et al. (2002a)	Within	National Register-eligible
[none] ^b	[none]	Buildings and structures	Historic	Tisdale Weir Historic District	Supernowicz and Calpo (2003b)	Within	Recommended National Register-eligible, but no SHPO concurrence

NOTES:

SHPO = State Historic Preservation Officer

a Recorded in 2002 as two separate resources. Neither site record is on file at the California Historical Resources Information System: Sutter Mutual Water Company Tisdale Pumping Plants and East or Main Canal (Supernowicz et al., 2002b); and Sutter Mutual Water Company Tisdale Residences #1, #2, #3, and Workshop (Supernowicz et al., 2002c).

b No record at the California Historical Resources Information System; obtained documentation from the California Department of Water Resources from a previous project.

SOURCE: Data compiled by Environmental Science Associates in 2018, based on searches by the California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, and Northeast Information Center at California State University, Chico

Garmire Road Bridge and Tisdale Weir and Bypass

This resource was originally documented during the Garmire Road Bridge Replacement Project (discussed above) as consisting of the Garmire Road Bridge, Tisdale Weir, and Tisdale Bypass, all as one resource:

- The bridge, constructed in 1935, was described as a 1,134-foot-long, 18-foot-wide, 40-span continuous steel girder structure with a reinforced concrete deck set on four-column reinforced concrete bents with reinforced concrete wall abutments and flared wing walls, and sitting on the Tisdale Weir.
- The weir, constructed in 1911, was described as a 1,000-foot-long reinforced concrete trough that was built to allow excess water from the Sacramento River to leave the river through the bypass and avert potential flooding, and as having original construction with concrete columns and bents to support a two-lane bridge.

- The bypass was described in the Garmire Road Bridge Replacement Project documentation as simply the flood control channel.

In 2003, this resource was evaluated as individually eligible for the National Register under Criterion C because it was a unique combination of a vehicular bridge and weir. The resource was also evaluated as National Register-eligible as part of a proposed Tisdale Weir Historic District, under Criteria A and C. As a result, in 2003, Caltrans recommended the resource as National Register-eligible both as an individual resource and as a contributor to a proposed Tisdale Weir Historic District. In 2004, the SHPO concurred with the recommendation that the resource is individually eligible, but did not concur that the resource is eligible as a contributor to a proposed Tisdale Weir Historic District, stating that not enough information on the district had been provided.

The bridge was replaced as part of Caltrans' Garmire Road Bridge Replacement Project and a Historic American Engineering Record was prepared to resolve that project's adverse effects on the resource. The weir and bypass are still present.

Tisdale Weir Historic District

This resource, the Tisdale Weir Historic District, was originally documented during Caltrans' Garmire Road Bridge Replacement Project, discussed above. Caltrans suggested that the Garmire Road Bridge (No. 18C-0004), Tisdale Weir, Sutter Mutual Water Company Residence #1, Tisdale Pumping Plants, and the East, or Main, Canal Segment all contribute to a rural historic district associated with reclamation, agriculture, irrigation, flood control, transportation, and engineering. As stated by Supernowicz and Calpo (2003b):

The proposed Tisdale Weir National Register Historic District (NRHP), which dates from 1910-1940, is named after a ranching/farming family that settled along the Sacramento River in Butte County during the nineteenth century. The proposed district borders the east side of the Sacramento River located south of Grand Island and north of Fraziers Island. The area is used almost exclusively for agriculture, which includes row crops and orchards. During the late nineteenth century, most of the land east of the Sacramento River was inundated by periodic flooding from the Sacramento River. Through private funding and government subsidies, levees were constructed along the river's edge preventing floodwaters from destroying valuable crops and communities.

The proposed contributing properties include the Garmire Road Bridge (No. 18C-0004) and Tisdale Weir (which also appear to be individually eligible for listing in the NRHP); the Sutter Mutual Water Company Residence #1, the Main and Riverside pumping plants, and the East or Main Canal. The other properties within the proposed district that appear to be non-contributors include the Cranmore Road Bridge (No. 18C-0004), the modern Oji Brothers pumping station, and the Sutter Mutual Water Company residences #2 and #3, and workshop. The contextual setting includes the Sacramento River, the East Levee, the Tisdale Bypass and levees, agricultural lands, and other irrigation canals.

The properties identified in the proposed Tisdale Weir Historic District share common themes as described above. The properties are also associated with the much larger Sacramento Valley and River Flood Control System, the State Water Plan, and the much broader plans that later formed the catalyst for the Central Valley Project (CVP), whose importance to California's water needs and flood control has been substantially documented. The Tisdale properties lie within Reclamation District 1500, the largest of

its kind in California, and together they help sustain Sutter County's valuable agricultural lands, in addition to providing flood control for downriver communities and areas surrounding Sacramento. The Tisdale Weir is among a handful of similar weirs along the Sacramento River that are critical to managing flood waters and preventing devastating floods, which occurred periodically prior to the construction of the weir in 1911. The Garmire Road Bridge is built atop the Tisdale Weir, which is rather unique, and remains nearly the same as when it was built in 1935. It provides needed access across the Tisdale Bypass year-round. A levee follows the eastern bank of the Sacramento River through the reclamation district. The levee was constructed during the early 1900s and maintains the Sacramento River in its current channel preventing flooding in nearby farms and communities. Sutter Mutual Water Company is the largest provider of irrigation water in Reclamation District 1500. The company dates to 1919 when the Tisdale Pumping Plant and East Canal were constructed along the Sacramento River. The 1919 pumping plant retains good integrity, including the exterior concrete building, which houses a series of Byron Jackson centrifugal pumps that are fully operable. Across the levee to the west is a second pumping plant built in 1940, which also provides needed irrigation water. A circa 1900–1910 wood frame, hipped roof residence lies to the north of the 1919 pumping plant. As a whole, the proposed district retains good integrity, particularly the location and setting of the various properties.

In 2003, the Tisdale Weir Historic District was recommended as National Register-eligible, under Criteria A and C. However, the SHPO did not concur that the district is National Register-eligible, stating that not enough information on the district had been provided.

Previous Cultural Resources Studies

The NWIC has records of four previous cultural resources studies that have been conducted in or within 0.5 mile of the C-APE, while the NEIC has records of seven studies conducted in or within 0.5 mile of the C-APE. Two of the studies on file at the NEIC were overviews and did not involve any fieldwork. Of the 11 studies conducted in or within 0.5 mile of the C-APE, six have included portions of the C-APE. As mentioned above, ESA also obtained cultural resources documents from Caltrans for the Garmire Road Bridge Replacement Project, which covered portions of the C-APE.

Submerged Cultural Resources

As noted in Section 3.5.1, *Introduction*, the SLC expressed concern about the potential presence of submerged cultural resources, including wreckage and cargo from shipwrecks and boats, and portions of ships and boats. The SLC maintains a Shipwrecks Database that currently identifies approximately 1,550 recorded shipwrecks in California.

On September 27, 2019, ESA requested that the SLC conduct a records search of the Shipwrecks Database for the C-APE. The SLC responded on October 3, 2019, indicating that its Shipwrecks Database has no record of any shipwrecks in the C-APE. In addition, as summarized above, the CHRIS has no record of any previously recorded submerged cultural resources, including any shipwrecks, in or close to the C-APE.

Native American Correspondence

ESA contacted the NAHC on October 5, 2018, requesting a search of the NAHC's Sacred Lands File (SLF) and a list of Native American representatives who may have interest in the Proposed

Project. The NAHC replied on October 9, 2018, stating that the SLF has no record of sacred sites in the C-APE. The reply also listed Native American representatives to contact regarding these resources, indicating that they may be interested in the Proposed Project.

United Auburn Indian Community of the Auburn Rancheria

On October 31, 2018, DWR sent a letter via certified mail to Gene Whitehouse, Chairperson of the United Auburn Indian Community of the Auburn Rancheria (UAIC). The letter provided information about the Proposed Project and asked UAIC to notify DWR if it would like to consult under California Public Resources Code (PRC) Section 21080.3. On November 1, 2018, DWR emailed UAIC Cultural Resources Manager Marcos Guerrero. The email informed Mr. Guerrero that a letter with details of the Proposed Project had been mailed and asked whether UAIC would like to participate in the cultural resources field survey. Mr. Guerrero replied that UAIC was interested in participating, and ESA and UAIC exchanged emails to schedule the survey.

DWR met UAIC Tribal Monitor Rene Guerrero and ESA in the field on November 8, 2018, before a field survey, in which UAIC and ESA participated. On November 28, 2018, DWR received a letter from UAIC Chairperson Whitehouse (dated November 13, 2018). The letter stated that UAIC would like to formally consult on the Proposed Project under PRC Section 21080.3, and to schedule a meeting.

On April 2, 2019, DWR emailed UAIC representatives to ask how UAIC would like to proceed with consultation. UAIC responded via email on April 12, 2019, stating that although a UAIC representative was present during the cultural resources pedestrian survey, UAIC still had some concerns because a Native American village had been documented in the project vicinity. The UAIC email also provided mitigation measures to incorporate into the EIR, regarding inadvertent discovery of cultural resources and tribal cultural resources and a tribal cultural resources awareness training.

Between August and December 2019, DWR and UAIC conducted consultation, via email, regarding the potential of the Proposed Project to affect cultural resources and tribal cultural resources and appropriate mitigation measures to reduce any such impacts. During the consultation, UAIC did not identify any tribal cultural resources that could be affected by the Proposed Project. In December 2019, DWR and UAIC agreed on the impact conclusions for cultural resources and tribal cultural resources and mitigation measures for the current document, with UAIC agreeing to conclude consultation if the language was incorporated into the current document. The impacts discussion and mitigation measures for cultural resources and tribal cultural resources in the current document are those agreed to during the consultation.

Correspondence with Other Native American Representatives

On November 14, 2018, DWR sent letters via certified mail to each contact provided in the NAHC reply, other than the UAIC representative. The letters provided information on the Proposed Project and asked the recipients to provide information on cultural resources that may be affected by the Proposed Project, if they would like to do so. The only response to these letters

came from the Yocha Dehe Wintun Nation (YDWN), which stated that the Proposed Project is not within the YDWN aboriginal territories, and that therefore, the YDWN declined to comment on the Proposed Project. Appendix G presents documentation of the correspondence with Native American representatives regarding the Proposed Project that has occurred to date.

Field Survey

In November 2018, ESA archaeologists and a UAIC tribal monitor conducted a cultural resources pedestrian survey of all portions of the C-APE except for the northeast staging area and western portion of the southern staging area. In May 2019, ESA archaeologists conducted a cultural resources pedestrian survey of the northeast staging area portion of the C-APE. In September 2020, an ESA archaeologist conducted a cultural resources pedestrian survey of the western portion of the southern staging area. The pedestrian surveys used intensive methods that consisted of walking parallel transects spaced no more than 15 meters apart and inspecting the surface for cultural materials (archaeological or architectural) or evidence. When ground visibility was poor, cleared areas and areas disturbed by rodents along and between the transect lines were checked with special attention. Between the pedestrian surveys, all portions of the C-APE were covered except for a narrow stretch of very dense understory paralleling the north side of the Tisdale Bypass.

During the pedestrian surveys, ESA identified one architectural resource in the C-APE, the Tisdale Weir and Bypass portions of the previously recorded Garmire Road Bridge and Tisdale Weir and Bypass. ESA (Hoffman and Cleveland, 2019) evaluated this resource as not eligible for the California Register (and National Register) as an individual resource or as a contributor to any historic district. No archaeological resources were identified in the C-APE during the pedestrian surveys. No evidence of resources associated with previously recorded architectural resource P-51-000117, whose site boundary was previously recorded as including the southern portion of the C-APE, was observed. The new Garmire Road Bridge was observed in the C-APE, but the bridge is of modern construction and was not documented further for the Proposed Project.

Summary of Existing Cultural Environment

Through archival research, records searches, correspondence with Native American representatives, and pedestrian surveys, one cultural resource was identified in the C-APE. The resource, the Tisdale Weir and Bypass, consists of the 1,000-foot-long concrete Tisdale Weir and the 4-mile-long earthen Tisdale Bypass, with associated levees. The resource was previously determined individually eligible for the National Register under Criterion C because it was a unique combination of a vehicular bridge and a weir. After this determination was made, the historic-era bridge was removed and replaced, resulting in the resource's loss of a significant contributing component.

ESA (Hoffman and Cleveland, 2019) evaluated the significance of the resource, in its current condition, and concluded that it no longer retains sufficient integrity to reflect its historic significance as an engineering feature. Therefore, the resource is not eligible for the California Register (and National Register) as an individual resource or as a contributor to any historic district. As a result, the resource does not qualify as a historical resource under CEQA.

3.5.3 Regulatory Setting

State

California Environmental Quality Act

CEQA (PRC Section 21000 et seq.) is the principal statute governing environmental review of projects occurring in California. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including a significant effect on historical or unique archaeological or paleontological resources. Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment.

The State of California implements provisions in CEQA through its statewide comprehensive cultural resources surveys and preservation programs. The California Office of Historic Preservation (OHP), an office of the California Department of Parks and Recreation, oversees adherence to CEQA regulations and maintains the California Historic Resource Inventory. The SHPO is an appointed official who implements historic preservation programs within State jurisdiction. Typically, a resource must be more than 50 years old to be considered as a potential historical resource. The OHP advises recording any resource 45 years or older, because there is commonly a 5-year lag between identification of a resource and the date that planning decisions are made.

Historical Resources

The State CEQA Guidelines recognize that a historical resource includes all of the following:

- A resource in the California Register.
- A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g).
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided that the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and State CEQA Guidelines Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource listed in the State CEQA Guidelines, then the site may be treated in accordance with PRC Section 21083, pertaining to unique archaeological resources.

Unique Archaeological Resources

As defined in PRC Section 21083.2, a *unique archaeological resource* is 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:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

The State CEQA Guidelines note that if an archaeological resource is not a unique archaeological resource or historical resource, the effects of the project on those cultural resources shall not be considered a significant effect on the environment (State CEQA Guidelines Section 15064.5[c][4]).

Assembly Bill 52 and Tribal Cultural Resources

AB 52, enacted in September 2014, recognizes that California Native American Tribes have expertise with regard to their tribal history and practices. The law established a new category of cultural resources, *tribal cultural resources*, in CEQA to consider tribal cultural values when determining the impacts of projects on cultural resources (PRC Sections 21080.3.1, 21084.2, and 21084.3).

PRC 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.
 - Included in a local register of historical resources, as defined in PRC Section 5020.1(k).
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. 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 PRC Section 21074(a) is also a tribal cultural resource if the landscape is geographically defined in terms of the size and scope. A historical resource as described in PRC Section 21084.1, a unique archaeological resource as defined in PRC Section 21083.2, or a non-unique archaeological resource as defined in PRC Section 21083.2 may also be a tribal cultural resource under CEQA if it meets the criteria identified in PRC Section 21074(a).

AB 52 requires CEQA lead agencies to analyze the impacts of projects on tribal cultural resources separately from impacts on archaeological resources (PRC Sections 21074 and

21083.09) because archaeological resources have cultural values beyond their ability to yield data important to prehistory or history. AB 52 also defines tribal cultural resources in a new section of the PRC (Section 21074; see above). Lead agencies must engage in additional consultation with California Native American Tribes (PRC Sections 21080.3.1, 21080.3.2, and 21082.3).

The provisions of AB 52 apply to projects for which a notice of preparation or notice of negative declaration/mitigated negative declaration was filed on or after July 1, 2015. As such, AB 52 applies to the Proposed Project.

California Register of Historical Resources

The California Register 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” (PRC Section 5024.1[a]). Per PRC Section 5024.1, certain resources are automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a cultural resource must be significant at the federal, State, and/or local level under one or more of the following four criteria:

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.

A resource eligible for the California Register must be of sufficient age, and retain enough of its historic character or appearance (integrity), to convey the reason for its significance. The California Register consists of both resources that are listed automatically and resources that must be nominated through an application and public hearing.

The California Register automatically includes the following resources:

- California properties listed in the National Register and those formally determined eligible for the National Register.
- California Registered Historical Landmarks from No. 770 onward.
- California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion in the California Register.

The following other resources may be nominated to the California Register:

- Historical resources with a significance rating of Categories 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register).
- Individual historic resources.
- Historic resources contributing to historic districts.
- Historic resources designated or listed as local landmarks, or designated under any local ordinance, such as a historic preservation overlay zone.

California Public Resources Code Section 5097

PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains that are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any Native American artifacts or human remains is guilty of a felony punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect, or with malice or wantonness, is also guilty of a felony punishable by imprisonment.

California Native American Historic Resources Protection Act

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to \$50,000 per violation, for persons who unlawfully and maliciously excavate upon, remove, destroy, injure, or deface a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

California Health and Safety Code Section 7050.5

Section 7050.5 of the California Health and Safety Code protects human remains by prohibiting the disinterment, disturbance, or removal of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (reiterated in State CEQA Guidelines Section 15064.59[e]) also identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

California Natural Resources Agency Tribal Consultation Policy

The California Natural Resources Agency's *Final Tribal Consultation Policy*, adopted November 12, 2012, was developed in response to Governor Jerry Brown's Executive Order B-10-11 (September 19, 2011), which states, "[t]he purpose of this policy is to ensure effective government-to-government consultation between the Natural Resources Agency, its Departments...and Indian Tribes...to provide meaningful input into the development of regulations, rules, policies, programs, projects, plans, property decisions, and activities that may affect tribal communities."

DWR Tribal Engagement Policy

DWR adopted a *Tribal Engagement Policy*, effective March 8, 2016, to strengthen DWR's commitment to improving communication, collaboration, and consultation with California Native American Tribes. This policy is consistent with Executive Order B-10-11, the California Natural Resources Agency's *Tribal Consultation Policy*, and AB 52, and includes principles that facilitate early and meaningful tribal engagement with California Native American Tribes.

Shipwrecks and Submerged Cultural Resources

The title to all abandoned shipwrecks and other (submerged) cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the SLC (PRC Section 6313[a]). Also, according to PRC Section 6313(c), any submerged cultural resource remaining in State waters for more than 50 years is presumed to be archaeologically or historically significant.

Local

The Sutter County General Plan (2030) includes goals and policies that are intended to identify, protect, and enhance Sutter County's important cultural resources to increase awareness of the county's heritage. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.5.4 Impacts and Mitigation Measures

Methods of Analysis

Historical Resources

Impacts on historical resources are assessed by identifying any activities that would affect resources that have been identified as historical, such as new construction, demolition, or substantial alteration. Individual properties and districts identified as historical resources under CEQA include those that are significant because of their association with important events, people, or architectural styles or master architects, or for their informational value (California Register Criteria 1, 2, 3, and 4) and that retain sufficient historic integrity to convey their significance. Criterion 4 is typically applied to the evaluation of archaeological resources and not to architectural resources. Historical resources may include architectural resources and archaeological resources.

Once a resource has been identified as significant, it must be determined whether the impacts of the project would "cause a substantial adverse change in the significance" of the resource (State CEQA Guidelines Section 15064.5[b]). A 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 [the] historical resource would be materially impaired" (State CEQA Guidelines Section 15064.5[b][1]). A historical resource is materially

impaired through the demolition or alteration of the resource's physical characteristics that convey its historical significance and that justify its inclusion in (or eligibility for inclusion in) the California Register or a qualified local register (State CEQA Guidelines Section 15064.5[b][2]). Therefore, material impairment of historical resources constitutes a significant impact.

Archaeological Resources

The significance of most pre-contact and historic-era archaeological sites is typically assessed relative to California Register Criterion 4. This criterion stresses the importance of the information potential contained within an archaeological site, rather than the significance of the site as a surviving example of a type or its association with an important person or event.

Archaeological resources may qualify as historical resources under the definition provided in State CEQA Guidelines Section 15064.5(a). Alternatively, they may be assessed under CEQA as unique archaeological resources. "Unique archaeological resources" are defined as archaeological artifacts, objects, or sites that contain information needed to answer important scientific research questions (PRC Section 21083.2).

A substantial adverse change in the significance of an archaeological resource is assessed similarly to such changes to other historical resources; that is, a "substantial adverse change" in significance means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of [the] historical resource would be materially impaired" (State CEQA Guidelines Section 15064.5[b][1]). As stated previously, a historical resource is materially impaired when a project demolishes or materially alters the resource's physical characteristics that convey its historical significance and that justify its inclusion (or eligibility for inclusion) in the California Register or a qualified local register (State CEQA Guidelines Section 15064.5[b][2]). Therefore, material impairment of archaeological resources that are considered historical resources or unique archaeological resources would be a significant impact.

Human Remains

Human remains, including those buried outside of formal cemeteries, are protected under several State laws, including PRC Section 5097.98 and Health and Safety Code Section 7050.5. For the purposes of this analysis, intentional disturbance, mutilation, or removal of interred human remains would be a significant impact.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if the Proposed Project would:

- Cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5; or
- Disturb any human remains, including those interred outside of formal cemeteries.

Impacts Not Evaluated Further

The following issue was evaluated and the Proposed Project was determined to result in no impact; therefore, this topic is not evaluated further in this EIR. The analysis is summarized below. For a complete discussion, see the Initial Study Environmental Checklist in **Appendix B** of this EIR.

Cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5.

Based on the results of the background research and field surveys, one architectural resource older than 50 years of age has been identified in the C-APE. The resource, the Tisdale Weir and Bypass, consists of the approximately 1,150-foot-long concrete Tisdale Weir and the approximately 4-mile-long earthen Tisdale Bypass, with associated levees. The resource has been evaluated as not eligible for the California Register as an individual resource or as a contributor to any historic district; it does not qualify as a historical resource, as defined in State CEQA Guidelines Section 15064.5. Therefore, no known historical resources, as defined in State CEQA Guidelines Section 15064.5, are present in the C-APE.

Project-Specific Impacts and Mitigation Measures

Table 3.5-2 summarizes the impact conclusions presented in this section.

**TABLE 3.5-2
 SUMMARY OF IMPACT CONCLUSIONS—CULTURAL RESOURCES**

Impact Statement	Impact Conclusion
3.5-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	LSM
3.5-2: Implementation of the Proposed Project could disturb human remains, including those interred outside of dedicated cemeteries.	LSM
3.5-3: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	LSM
3.5-4: Implementation of the Proposed Project could contribute to significant cumulative damage to unidentified human remains.	LSM

NOTE: LSM = Less than Significant with Mitigation Measures

SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.5-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5. (Less than Significant with Mitigation)

No archaeological resources, including any submerged cultural resources, have been identified in the C-APE. Therefore, no known archaeological resources that may qualify as historical resources (as defined in State CEQA Guidelines Section 15064.5) or unique archaeological resources (as defined in PRC Section 21083.2[g]) are present in the C-APE. Furthermore, extensive work,

including excavation for installing deep foundations for the Garmire Road Bridge, has been previously conducted in the C-APE without encountering any archaeological resources. As a result, there is no substantial evidence of the presence in the C-APE of any archaeological resources, as defined in State CEQA Guidelines Section 15064.5. Therefore, the Proposed Project is not expected to affect any archaeological resource, including any shipwrecks and other submerged cultural resources, pursuant to State CEQA Guidelines Section 15064.5.

Although there is no substantial evidence that archaeological resources are present in the C-APE, the Proposed Project would involve ground-disturbing activities that may extend into undisturbed soil. Such activities could unearth, expose, or disturb subsurface archaeological resources, including shipwrecks or other submerged cultural resources, that have not been identified on the surface. If such resources were found to qualify as archaeological resources pursuant to State CEQA Guidelines Section 15064, impacts of the Proposed Project on archaeological resources would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.5-1a: Before construction, a qualified archaeologist shall prepare a cultural resources awareness and sensitivity training program for all construction and field workers involved in ground-disturbing activities. A “qualified archaeologist” is defined as one who meets the U.S. Secretary of the Interior’s Professional Qualifications Standards for Archeology and has expertise in California archaeology. Before DWR provides this training, an advance copy shall be shared with culturally affiliated California Native American Tribes to confirm that it captures all the elements of awareness and sensitivity training associated with the work. The training program developed shall include a presentation that covers, at minimum, the types of cultural resources common to the area, regulatory protections for cultural resources, and the protocol for unanticipated discovery of archaeological resources (see Mitigation Measure 3.5-1b). Written materials associated with the program shall be provided to project personnel as appropriate. Personnel assigned to work in areas of ground-disturbing activities shall receive the training before starting work in these areas.

Mitigation Measure 3.5-1b: If historic-era archaeological resources are encountered during Project development or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. DWR and a qualified archaeologist shall be immediately informed of the discovery. A “qualified archaeologist” is defined as one who meets the U.S. Secretary of the Interior’s Professional Qualifications Standards for Archeology and has expertise in California archaeology. The qualified archaeologist shall inspect the discovery and shall notify DWR of their initial assessment. Historic-era materials might include building or structure footings and walls, and deposits of metal, glass, and/or ceramic refuse.

If DWR determines, based on recommendations from the qualified archaeologist, that the resource may qualify as a historical resource or unique archaeological resource (as defined in State CEQA Guidelines Section 15064.5), then the resource shall be avoided if feasible.

Avoidance means that no activities associated with the project may affect cultural resources within the boundaries of the resource or any defined buffer zones.

If avoidance is not feasible, DWR shall consult with a qualified archaeologist and other appropriate interested parties to determine treatment measures to minimize or mitigate any potential impacts on the resource pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4.

Once treatment measures have been determined, DWR shall prepare and implement an Archaeological Resources Management Plan that outlines the treatment measures for the resource. Treatment measures typically consist of two steps:

- Determine whether the resource qualifies as a historical resource, unique archaeological resource, or tribal cultural resource through historical or ethnographic research, evaluative testing (excavation), and laboratory analysis.
- If it does qualify as one of these resource types, conduct data recovery (e.g., excavation, documentation, curation) targeting the recovery of the resource's important data.

The Archaeological Resources Management Plan shall include:

- Background context.
- Research themes and research questions for assessing potential resource significance.
- Methods for evaluating the resource for California Register eligibility (e.g., ethnographic or historical research, evaluative test excavations, documentation, laboratory and geoarchaeological analyses, reporting) and, if an archaeological resource, for evaluating its eligibility as a unique archaeological resource under CEQA.
- Data recovery methods (e.g., background methods, field methods, laboratory methods, documentation, consultation, curation, reporting), if the resource is determined to be a historical resource, unique archaeological resource, or tribal cultural resource.

Any treatment measures implemented shall be documented in a professional-level technical report (e.g., Archaeological Testing Results Report, Archaeological Data Recovery Report, Ethnographic Report) to be authored by a qualified archaeologist and filed with CHRIS. Construction work at the location of the find may commence upon completion of the approved treatment and authorization by DWR. Work may proceed in other parts of the project area while the mitigation is being carried out.

Mitigation Measure 3.5-1c: If a shipwreck and associated artifacts or other cultural resources on or in the tide and submerged lands of California are encountered during project development or operation, Mitigation Measure 3.5-1b and the following measures shall be implemented:

- DWR shall initiate consultation with SLC staff within two business days of the discovery.
- Per PRC Section 6313(c), any submerged cultural resource remaining in State waters for more than 50 years is presumed to be archaeologically or historically significant.

- If the find is a maritime archaeological resource, the qualified archaeologist with whom DWR consults shall have expertise in maritime archaeology.
- DWR shall consult with the SLC regarding assessment of the find and development of any treatment measures to minimize or mitigate potential impacts on the resource, pursuant to PRC Section 21083.2 and State CEQA Guidelines Section 15126.4.
- DWR shall submit to the SLC any report prepared for the resource as part of the assessment of the find and implementation of treatment measures to minimize or mitigate potential impacts.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measures 3.5-1a and 3.5-1b were developed in consultation with the UAIC as part of Proposed Project consultation pursuant to PRC Section 21080.3. With implementation of Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c, the potential for ground-disturbing activities to unearth, expose, or disturb previously unidentified subsurface archaeological resources would be reduced to less than significant by requiring cultural resources awareness and sensitivity training for project personnel, and through implementation of a protocol for unanticipated discovery of archaeological resources.

Impact 3.5-2: Implementation of the Proposed Project could disturb human remains, including those interred outside of dedicated cemeteries. (Less than Significant with Mitigation)

No human remains have been identified in the C-APE through archival research, field surveys, or Native American consultation or correspondence. Also, extensive work, including excavations for installing deep foundations for the Garmire Road Bridge, has been previously conducted in the C-APE without encountering any human remains, and the land use designations for the C-APE do not include cemetery uses. Therefore, there is no substantial evidence that the Proposed Project would disturb any human remains.

However, the Proposed Project would involve ground-disturbing activities. It is possible that such activities could unearth, expose, or disturb previously unknown human remains. Should human remains be discovered and be disturbed or damaged during construction activities, impacts of the Proposed Project on the human remains would be significant.

Mitigation Measure:

Implementing the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure 3.5-2: If human remains are uncovered during construction, all work shall immediately halt within 100 feet of the find and the Sutter County Coroner shall be contacted to evaluate the remains and follow the procedures and protocols set forth in State CEQA Guidelines Section 15064.5(e)(1). If the County Coroner determines that the

remains are Native American, the County shall contact the NAHC, in accordance with Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. See Mitigation Measure 3.9-1c, which pertains specifically to Native American remains.

Impact Significance after Mitigation: Less than Significant.

With implementation of Mitigation Measure 3.5-2, which was developed in consultation with the UAIC as part of Proposed Project consultation pursuant to PRC Section 21080.3, the potential for significant impacts on human remains would be reduced to a less-than-significant level through identification, consultation, and avoidance.

Cumulative Impacts and Mitigation Measures

This evaluation of cumulative impacts considers the potential of the Proposed Project in combination with other past, present, and future projects to result in significant impacts on cultural resources. The area of analysis for these cumulative impacts includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the confluence with the Tisdale Bypass.

Other projects considered include DWR's Sutter Bypass Pumping Plant Rehabilitation Project, which proposes to retrofit maintenance structures at three separate pumping plants along the East Levee of the Sutter Bypass; and the U.S. Bureau of Reclamation and CDFW's Sutter National Wildlife Refuge Lift Station Project, which includes construction of a lift station that would allow the Sutter National Wildlife Refuge to divert water from the East Borrow Ditch. Past projects in the vicinity of the C-APE include DWR's Tisdale Bypass Sediment Removal 2020 Project (2020), the Sutter Bypass East Borrow Canal Water Control Structures Project (2009), the Tisdale Bypass Channel Rehabilitation Project (2007), the Garmire Road Bridge Replacement Project (2004), and the Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009).

This area of analysis considers the traditional territory of the local Native American community for impacts on indigenous archaeological resources and human remains, and areas of Euroamerican settlement and development for impacts on historic-era archaeological resources and human remains.

Impact 3.5-3: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5. (Less than Significant with Mitigation)

The cumulative context for impacts on archaeological resources includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the connection to the Tisdale Bypass, considering the traditional territory of the local Native American community for impacts on indigenous archaeological resources, and areas of Euroamerican settlement and development for impacts on historic-era archaeological resources.

The C-APE and vicinity contain a significant archaeological record that, in many cases, has not been well documented or recorded. Therefore, the potential exists for ongoing and future

development projects in the vicinity to disturb landscapes that may contain known or unknown archaeological resources. Implementation of the Proposed Project in conjunction with the separately considered projects has the potential to affect known and currently undocumented indigenous and historic-era archaeological resources, resulting in a potentially cumulative significant impact on archaeological resources.

Continued development in the region runs the inherent risk of damaging or destroying previously unknown significant archaeological resources that could yield information important to our history or prehistory, resulting in a significant cumulative impact. Proposed Project activities, and any potential associated recovery of archaeological data from the unanticipated discovery of significant archaeological resources during Proposed Project implementation, could affect previously unidentified archaeological resources in the C-APE, resulting in a considerable contribution to this cumulative impact.

Likewise, the C-APE and vicinity may contain previously undocumented significant archaeological resources that have value independent of the scientific information that they can provide. Therefore, the potential exists for ongoing and future development projects in the C-APE and vicinity to disturb landscapes and archaeological resources significant for their association with significant events, people, or structure. Implementation of the Proposed Project in conjunction with the separately considered projects has the potential to affect such archaeological resources, resulting in a potentially cumulative significant impact on those resources.

In summary, development and operation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5. Overall, the cumulative effect of the Proposed Project on archaeological resources may be significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measures: Implement Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c.

Impact Significance after Mitigation: Less than Significant.

Implementation of Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c would reduce the Proposed Project's contribution to cumulative impacts on archaeological resources to a less-than-considerable level, and the impact would be less than significant.

Impact 3.5-4: Implementation of the Proposed Project could contribute to significant cumulative damage to unidentified human remains. (Less than Significant with Mitigation)

The cumulative context for impacts on human remains includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the connection to Tisdale Bypass, considering the traditional territory of the local Native American community for impacts on indigenous human remains, and areas of Euroamerican settlement and development for impacts on historic-era human remains.

Continued development in the region runs the inherent risk of damaging or destroying previously unidentified human remains, resulting in a significant cumulative impact. The Proposed Project's ground-disturbing activities could affect previously unidentified human remains in the C-APE, resulting in a considerable contribution to this cumulative impact. All projects in the area of analysis for cumulative impacts are subject to the same State laws applicable to previously unidentified human remains, and assuming that these laws would be enforced on all projects having similar effects, the cumulative impact would be less than significant.

In summary, development and operation of the Proposed Project could contribute to significant cumulative damage to unidentified human remains. Overall, the cumulative effect of the Proposed Project on unidentified human remains may be significant.

Mitigation Measures:

Adherence to State laws regarding human remains and implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure: Implement Mitigation Measure 3.5-2.

Impact Significance after Mitigation: Less than Significant.

Adherence to State laws regarding human remains and implementation of Mitigation Measure 3.5-2 would reduce the Proposed Project's contribution to cumulative impacts on human remains to a less-than-considerable level, and the impact would be less than significant.

3.6 Greenhouse Gas Emissions

3.6.1 Introduction

This section describes and evaluates issues related to greenhouse gas (GHG) emissions in the context of the Proposed Project, presenting the following information:

- An overview of climate change.
- The various GHGs identified as drivers of climate change.
- The environmental and regulatory setting pertinent to GHG emissions, including relevant federal, State, and local regulations.
- The criteria used for determining the significance of environmental impacts.
- Potential impacts of implementing the Proposed Project.

The California State Lands Commission provided comments regarding the GHG analysis in response to the Notice of Preparation (see **Appendix A**). Those comments recommended using DWR's climate action plan (CAP) to address mitigation, adaptation, and consistency in the climate change analysis for the Proposed Project.

3.6.2 Environmental Setting Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are called GHGs. The process by which heat is held in the atmosphere is similar to the effect greenhouses have in raising the internal temperature, hence the name "GHGs."

GHG emissions, if not sufficiently curtailed, are likely to contribute further to increases in global temperatures. According to the U.S. Environmental Protection Agency (EPA), the term "climate change" refers to any significant change in measures of climate, such as temperature, precipitation, or wind, that lasts for an extended period (several decades or longer). There is scientific consensus that climate change is occurring and that human activity contributes in some measure to that change. The potential effects of climate change in California include sea level rise and reductions in snowpack, as well as an increased number of extreme-heat days per year, high-ozone days, large forest fires, and drought years (CARB, 2014). Globally, climate change could affect numerous environmental resources through potential, although uncertain, changes to future air temperatures and precipitation patterns.

According to the International Panel on Climate Change (IPCC, 2007), the projected direct effects of climate change will likely vary regionally but are expected to include:

- Higher maximum temperatures and more hot days over nearly all land areas.
- Higher minimum temperatures and fewer cold days and frost days over nearly all land areas.
- Reduced diurnal temperature range over most land areas.

- An increase in the heat index over most land areas.
- More intense precipitation events.

Climate change is also projected to result in many secondary effects, including a global rise in sea level, ocean acidification, impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity. The possible outcomes and feedback mechanisms involved are not fully understood, and much research remains to be done; however, the potential exists for substantial environmental, social, and economic consequences in the long term.

GHG emissions are a global concern. GHG emissions cumulatively contribute to planet-wide atmospheric accumulations; consequently, there are no regional “hot spots” of elevated concentrations of carbon dioxide (CO₂) or any other GHG. Therefore, GHG emissions, existing or future, are not a localized phenomenon, and there are no localized geographical constraints in the project area relative to GHG emissions.

Greenhouse Gas Emissions

GHG emissions from human activities consist primarily of CO₂ emissions, with much smaller emissions of nitrous oxide, methane (often from uncombusted natural gas), sulfur hexafluoride from high-voltage power equipment, and hydrofluorocarbons and perfluorocarbons from refrigeration/chiller equipment.

These GHGs have different warming potentials, defined as amounts of heat trapped in the atmosphere by a certain mass of the gas. CO₂ is the most common reference gas for climate change; for this reason, GHG emissions are often quantified and reported as CO₂-equivalent (CO₂e) emissions. The global warming potential indicates, on a metric ton-for-ton basis, how much a gas contributes to global warming relative to how much warming would be predicted to be caused by the same mass of CO₂. The global warming potentials of methane and nitrous oxide are 25 times and 298 times that of CO₂, respectively (CARB, 2018).

The principal GHGs that are emitted by human activity and accumulate in the atmosphere are described below.

Carbon Dioxide

CO₂ is a naturally occurring gas that enters the atmosphere through both natural and anthropogenic (human) sources. Key anthropogenic sources include the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, wood and lumber products, and other biomass, and industrial chemical reactions such as those associated with manufacturing cement. CO₂ is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane

Like CO₂, methane is emitted by both natural and anthropogenic sources. Key anthropogenic sources of methane include gaseous emissions from landfills, releases from the mining and materials extraction industries (particularly coal mining), and fugitive releases from the extraction

and transport of natural gas and crude oil. Livestock and agricultural practices also emit methane and some quantities of methane are released during fossil fuel combustion.

Nitrous Oxide

Nitrous oxide is emitted by both natural and anthropogenic sources. Important anthropogenic sources include industrial activities, agricultural activities (primarily the application of nitrogen fertilizer), the use of explosives, combustion of fossil fuels, and decay of solid waste.

Greenhouse Gas Sources

Human activities are responsible for almost all of the increase in GHGs in the atmosphere over the last 150 years. The largest source of GHG emissions from human activities in the United States is the burning of fossil fuels for electricity, heat, and transportation (EPA, 2019).

The primary sources of GHG emissions in the United States are transportation (nearly 28.9 percent of 2017 GHG emissions), electricity production (27.5 percent), industry (22.2 percent), commercial and residential (11.6 percent), and agriculture (9 percent). Agricultural land uses, open space, and forests offset 11 percent of the total emissions by acting as a sink that absorbs CO₂ from the atmosphere. Since 1990, managed forests and other lands in the United States have absorbed more CO₂ from the atmosphere than they have emitted (EPA, 2019).

In 2017, California produced approximately 424 million metric tons (MT) of CO₂e emissions. Transportation was the source of 41 percent of the state’s GHG emissions, followed by industrial operations at 24 percent, electricity generation at 15 percent, and commercial and residential sources at 13 percent. Agricultural and other sources represent the remaining 7 percent of the GHG emissions. **Table 3.6-1** shows California’s GHG emissions from 2011 to 2017.

**TABLE 3.6-1
 CALIFORNIA GREENHOUSE GAS EMISSIONS (MILLION METRIC TONS CO₂e)**

Emission Inventory Category	2011	2012	2013	2014	2015	2016	2017	% of 2017
Electricity Generation (in state)	41.26	51.17	49.62	51.79	49.98	42.35	38.57	9.1%
Electricity Generation (imports)	46.95	44.58	40.08	36.84	33.98	26.35	24.00	5.7%
Transportation	166.78	166.24	165.82	167.39	170.91	173.31	174.31	41.1%
Industrial	100.65	101.68	104.48	105.07	102.79	101.04	101.14	23.8%
Commercial	20.73	21.11	21.64	21.37	22.05	23.18	23.26	5.5%
Residential	32.90	30.91	32.07	27.14	27.91	29.30	30.40	7.2%
Agriculture and Forestry	34.34	35.46	33.99	35.06	33.75	33.51	32.42	7.6%
Not Specified (solvents and chemicals)	0.26	0.27	0.25	0.24	0.18	0.24	0.17	<0.1%
Total Gross Emissions	443.6	451.2	447.7	444.7	441.4	429.0	424.1	100.0%

NOTE: CO₂e = carbon dioxide equivalent

SOURCE: CARB, 2019.

3.6.3 Regulatory Setting

Federal

In response to a lawsuit filed by California, other states, cities, and environmental organizations on April 2, 2007, the U.S. Supreme Court found that GHGs should be considered air pollutants and are covered by the Clean Air Act. On December 7, 2009, the EPA Administrator signed two findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

- **Endangerment Finding:** The current and projected concentrations of six key GHGs in the atmosphere—CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—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 GHG pollution that threatens public health and welfare.

State

The California Air Resources Board (CARB) coordinates and oversees State programs intended to reduce emissions. CARB has delegated oversight for stationary sources to regional air districts while maintaining jurisdiction over mobile sources. The State of California has not established ambient air quality standards for GHGs. However, California has enacted laws, most notably Assembly Bill (AB) 32 discussed below, directing CARB to develop actions to reduce GHG emissions, and several other State legislative actions related to climate change and GHG emissions have come into play in the past decade.

Senate Bill 97

Senate Bill (SB) 97, enacted in August 2007, acknowledges that climate change is a prominent environmental issue requiring analysis under CEQA. SB 97 directed the Governor's Office of Planning and Research to prepare and develop guidelines for the California Natural Resources Agency for the feasible mitigation of GHG emissions, as required by CEQA. In 2009, the Natural Resources Agency adopted the State CEQA Guidelines amendments, as required by SB 97. These amendments provide guidance to public agencies for analyzing and mitigating the effects of GHG emissions in draft CEQA documents. The amendments became effective in 2010.

State CEQA Guidelines

Section 15064.4 of the State CEQA Guidelines addresses the significance of GHG emissions and calls on lead agencies to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents. CEQA further states that the analysis of GHG impacts should consider:

- The extent to which a project may increase or reduce GHG emissions.
- Whether project emissions would exceed a locally applicable threshold of significance.

- The extent to which a 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 State CEQA Guidelines also state that a project’s incremental contribution to a cumulative effect is not cumulatively considerable if the project would comply with a previously approved plan or mitigation program (including plans or regulations for reduction of GHG emissions) that provides specific requirements to avoid or substantially lessen the cumulative problem in the geographic area in which the project is located (State CEQA Guidelines Section 15064[h][3]). The State CEQA Guidelines do not, however, set a numerical threshold of significance for GHG emissions.

The revisions also include the following guidance on measures to mitigate GHG emissions, when such emissions are found to be significant. Measures to mitigate the significant effects of GHG emissions may include, among others:

- (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency’s decision.
- (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures.
- (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project’s emissions.
- (4) Measures that sequester GHGs.
- (5) In the case of the adoption of a plan, such as a general plan, long-range development plan, or plans for the reduction of GHG emissions, the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

Executive Order S-3-05

In 2005, in recognition of California’s vulnerability to the effects of climate change, Governor Arnold Schwarzenegger issued Executive Order S-3-05, which established a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

As discussed below, the 2020 reduction target was codified in 2006 as AB 32. However, the 2050 reduction target has not been codified, and the California Supreme Court has ruled that CEQA lead agencies are not required to use it as a significance threshold (*Cleveland National Forest Foundation v. San Diego Association of Governments* [2017] 3 Cal.5th 497).

Assembly Bill 32 and the California Climate Change Scoping Plan

In 2006, the California Legislature enacted AB 32 (Health and Safety Code Section 38500 et seq.), the Global Warming Solutions Act. AB 32 required CARB to design and implement feasible and cost-effective emissions limits, regulations, and other measures to reduce statewide GHG emissions to 1990 levels by 2020 (a 25 percent reduction). AB 32 anticipated that the emissions reduction goals would be met in part through local government actions. CARB identified a GHG emissions target for local governments—15 percent below current levels—and noted that successful implementation relies on local governments' land use planning and urban growth decisions.

In December 2008, in compliance with AB 32, CARB adopted *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan) (CARB, 2009), which outlined measures for meeting the 2020 GHG emissions reduction target. The Scoping Plan recommended measures for further study and possible State implementation, such as new fuel regulations. It estimated that emissions from the transportation, energy, agriculture, and forestry sectors and other sources could be reduced by 174 million MT CO₂e (about 191 million U.S. tons) should the State implement all measures in the Scoping Plan. The Scoping Plan relies on the requirements of SB 375 (discussed below) to implement the emissions reductions anticipated from land use decisions.

AB 32 requires that the Scoping Plan be updated at least every 5 years. CARB approved the first update to the Scoping Plan on May 22, 2014 (CARB, 2014). The Scoping Plan was updated again in 2017 to address the 2030 target established by SB 32 as discussed below. The 2017 update proposed a framework of action for California to reduce GHG emissions by 40 percent by 2030 compared to 1990 levels. Continuing the efforts made since 2006 under AB 32, the plan focuses on such programs as the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; implementation of cleaner cars, trucks, and freight movement; renewable energy programs; and reduction of methane emissions from agriculture and waste (CARB, 2017).

Executive Order S-1-07

Executive Order S-1-07, signed by Governor Schwarzenegger in 2007, identified the transportation sector as the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. Executive Order S-1-07 established a goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020. The order directed CARB to determine whether this Low Carbon Fuel Standard could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009, CARB approved the regulation to implement the Low Carbon Fuel Standard, to reduce GHG emissions from the transportation sector in California by about 16 million MT in 2020.

Executive Order B-30-15 and Senate Bill 32

Executive Order B-30-15 (April 29, 2015) set an interim target of reducing statewide GHG emissions to 40 percent below 1990 levels by 2030. The order directed State agencies with jurisdiction over GHG emissions to implement measures under their statutory authority to achieve

this 2030 target. Specifically, Executive Order B-30-15 directed CARB to update the Scoping Plan to express this 2030 target in metric tons.

On September 8, 2016, Governor Jerry Brown signed SB 32, which codified the 2030 reduction target called for in Executive Order B-30-15. CARB's 2017 Scoping Plan update addresses the 2030 target, as discussed above (CARB, 2017).

Senate Bill 605

On September 21, 2014, Governor Brown signed SB 605, which required CARB to develop a comprehensive strategy no later than January 1, 2016, for reducing emissions of short-lived climate pollutants. As defined in SB 605, a "short-lived climate pollutant" is "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide." SB 605, however, did not specify the compounds that are short-lived climate pollutants, nor did it add to the list of GHGs regulated under AB 32.

For the strategy required by SB 605, CARB completed an inventory of the sources and emissions of short-lived climate pollutants. The strategy prioritized development of new measures that offer co-benefits, either by improving water quality or by reducing other air pollutants that affect community health and disadvantaged communities.

Greenhouse Gas Emissions Reduction Plan

DWR developed and approved the Greenhouse Gas Emissions Reduction Plan (GGERP) on May 24, 2012, to guide its project development and decision making regarding energy use and GHG emissions (DWR, 2012). The GGERP, which addresses reducing GHG emissions from DWR activities, represents the first phase of DWR's CAP. Phases II and III address technical approaches to characterizing and analyzing the impacts of climate change on DWR activities, and measures for resiliency and adaptation to future conditions expected to result from climate change.

Specifically, the GGERP shows DWR's plan to substantially reduce its GHG emissions in the near term (through 2020) and to continue reducing emissions beyond 2020 to achieve its long-term (2050) goals for reducing GHG emissions. The plan lays out both near-term and long-term goals for GHG emissions reductions to guide decision making through 2050: to reduce emissions by 50 percent below 1990 levels by 2020, and by 80 percent below 1990 levels by 2050 (DWR, 2012).

DWR has identified 11 measures that it will implement to achieve the GHG emissions reduction goals identified in the GGERP, including:

- Termination of DWR's use of and associated delivery of electricity from a coal-fired power plant.
- Efficiency improvements to DWR's existing facilities.
- Purchase and development of renewable and high-efficiency electricity supplies.
- Comprehensive improvements to DWR's construction practices.
- Improvements to DWR's business activities that will reduce GHG emissions.

The GHG emissions reduction measures are broken into three categories:

- (1) **Specific action measures** are measures that DWR will implement as individual projects or as a series of stand-alone projects. These projects will affect ongoing and future DWR activities by changing the way DWR operates.
- (2) **Project-level measures** are actions that must be incorporated into future projects. Those projects will rely on the analysis in the GGERP to help streamline the analyses of cumulative impacts in later project-specific environmental documents under CEQA.
- (3) **Conditional measures** are actions that may or may not be incorporated into future projects, depending on the characteristics of the specific project and its ability to incorporate the measure.

Local

Sutter County General Plan

The Sutter County General Plan (2030) (Sutter County, 2011) includes goals and policies that are intended to encourage energy conservation, protect air quality, and control GHG emissions. DWR, as a State agency, is not subject to local regulations without legislative consent; however, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County (County) regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

Sutter County Climate Action Plan

To achieve the Sutter County General Plan's goals and provide a more livable, equitable, and economically vibrant community, the County prepared and has implemented the Sutter County CAP. The CAP was adopted in July 2010 as part of the County's efforts to reduce GHG emissions in coordination with its land use decisions. The Sutter County CAP lists specific actions to reduce GHG emissions attributable to Sutter County to levels consistent with the AB 32 targets. In addition, the CAP serves as a qualified GHG emissions reduction plan from which the county's future development can tier, thereby streamlining environmental analyses under CEQA. The CAP aims to minimize impacts of development on air quality, promote energy conservation, and ensure that the County's land use decisions and internal operations are consistent with adopted State legislation (Sutter County, 2010).

Feather River Air Quality Management District Guidelines

The Feather River Air Quality Management District (FRAQMD) is a regional agency tasked with regulating the air quality of Sutter and Yuba Counties. FRAQMD accomplishes this goal through monitoring, evaluation, education, control measures to reduce stationary-source emissions, permitting and inspection of pollution sources, enforcement of air quality regulations, and measures to reduce motor vehicle emissions.

FRAQMD has not established guidance or significance thresholds for the evaluation of GHGs or the establishment of a CAP, opting instead to recommend the use of existing methodologies. FRAQMD specifically cites the California Air Pollution Control Officers Association and

California Natural Resources Agency's Climate Change Portal, and the Office of the Attorney General, among others, for assistance in evaluating GHG emissions.

3.6.4 Impacts and Mitigation Measures

Methods of Analysis

Construction Emissions

Similar to the methods and assumptions used in Section 3.3, *Air Quality*, the Proposed Project's construction-related GHG emissions were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2. CalEEMod calculates emissions of CO₂, methane, and nitrous oxide from construction-related GHG sources such as off-road construction equipment, material delivery trucks, soil haul trucks, and construction worker vehicles.

In the absence of FRAQMD thresholds or guidance, the analysis used guidance from the South Coast Air Quality Management District and numeric thresholds from the Sacramento Metropolitan Air Quality Management District to determine the significance of GHG construction emissions. The South Coast Air Quality Management District recommends amortizing total construction emissions over 30 years and adding those emissions to operational emissions, then comparing the total to the operational significance threshold (SCAQMD, 2008). Several other air districts, including the Bay Area Air Quality Management District, encourage using similar amortization methods. The Sacramento Metropolitan Air Quality Management District's operational GHG threshold for projects is 1,100 MT of CO₂e per year (SMAQMD, 2015).

Operational Emissions

Direct sources of operational GHG emissions from the Proposed Project include vehicle trips by employees and maintenance vehicles, and equipment used for maintenance activities. Because these activities and trips would be comparable to existing conditions, they would not result in an increase in operational GHG emissions.

The Proposed Project is expected to cause a minimal increase in electricity requirements at the site to power the operable gates and monitoring equipment. Because these emissions would be negligible, no major source of indirect GHG emissions would result from the Proposed Project. Therefore, operational GHG emissions are not discussed further in the analysis below.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if the Proposed Project would:

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

Project-Specific Impacts and Mitigation Measures

Table 3.6-2 summarizes the impact conclusions presented in this section.

TABLE 3.6-2
SUMMARY OF IMPACT CONCLUSIONS—GREENHOUSE GAS EMISSIONS

Impact Statement	Impact Conclusion
3.6-1: Construction of the Proposed Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	LS
3.6-2: Construction of the Proposed Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LS
3.6-3: Construction of the Proposed Project could generate greenhouse gas emissions that could contribute considerably to a cumulative impact.	LS

NOTE: LS = Less than Significant
 SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.6-1: Construction of the Proposed Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. (Less than Significant)

Construction of the Proposed Project would generate emissions of GHGs such as CO₂, methane, and nitrous oxide from the combustion of fossil fuels to power construction equipment. Construction may take place over two seasons, each lasting 6½ months; however, the air quality and GHG analyses assume a worst-case scenario in which all construction activities would be completed within one season, lasting from April through October 2022. During this time, the Proposed Project would emit GHGs during the transport and delivery of construction equipment and materials to the project area, operation of construction equipment, and worker trips, all of which would use fossil fuels.

Construction emissions associated with the Proposed Project were estimated using CalEEMod, based on information about the project-specific equipment to be used. The analysis used CalEEMod defaults when project-specific information was not available. **Table 3.6-3** presents total construction emissions for the Proposed Project. See **Appendix D** for all emissions factors and assumptions used to estimate the GHG emissions associated with construction of the Proposed Project.

As indicated in Table 3.6-3, the Proposed Project’s total GHG construction emissions, measured as CO₂e, would be approximately 1,434 MT for the on-site concrete batch plant option or 2,166 MT for the concrete haul-in option. When amortized over a 30-year period, these emissions equal approximately 47.8 and 72.2 MT per year, respectively, which is substantially less than the significance threshold of 1,100 MT of CO₂e per year. Therefore, the GHG emissions generated by the Proposed Project would not be cumulatively considerable and would not contribute significantly to global climate change. This impact would be less than significant.

**TABLE 3.6-3
 ESTIMATED CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS**

Emissions Source	On-Site Concrete Batch Plant Option metric tons per year of CO₂e	Concrete Haul-In Option metric tons per year of CO₂e
Construction equipment and vehicle emissions over 6½ months	1,434	2,166
Annual emissions amortized over 30 years	47.8	72.2
SMAQMD significance threshold	1,100	1,100
Significant impact?	No	No

NOTE: CO₂e = carbon dioxide equivalent; SMAQMD = Sacramento Metropolitan Air Quality Management District

SOURCES: Data provided by DWR in 2019; data compiled by Environmental Science Associates in 2019

DWR’s GGERP considers projects that generate 25,000 MT of CO₂e over the entire project construction period, or 12,500 MT of CO₂e in any single construction year, to be “extraordinary construction projects.” Such extraordinary projects are not included in the GGERP and are not eligible to use the plan to streamline the cumulative impacts analysis of later projects under CEQA. Based on this threshold, the Proposed Project is not considered an extraordinary construction project.

Mitigation Measures: None required.

Impact 3.6-2: Construction of the Proposed Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. (Less than Significant)

In May 2012, DWR adopted its CAP Phase I: GGERP, which details DWR’s efforts to reduce its GHG emissions consistent with Executive Order S-3-05 and AB 32. DWR also adopted the Initial Study/Negative Declaration prepared for the GGERP in accordance with the review and public process specified by the State CEQA Guidelines. The GGERP estimates historical (back to 1990), current, and future GHG emissions from operations, construction, maintenance, and business practices (e.g., building-related energy use). The plan specifies aggressive 2020 and 2050 emissions reduction goals and identifies a list of measures to achieve these goals.

DWR specifically prepared its GGERP as a “plan for the reduction of GHG emissions” as discussed in State CEQA Guidelines Section 15183.5(b). Section 15183.5(b) states that such a document, which must meet specified requirements, “may be used in the cumulative impacts analysis of later projects.” Because global climate change, by its very nature, is a global cumulative impact, an individual project’s compliance with a qualifying GHG reduction plan may suffice to mitigate the project’s incremental contribution to that cumulative impact to a level that is not “cumulatively considerable.” (See State CEQA Guidelines Section 15064[h][3].)

More specifically, “[l]ater project-specific environmental documents may tier from and/or incorporate by reference” the “programmatic review” conducted for the GHG emissions reduction plan. “An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project.” (State CEQA Guidelines Section 15183.5[b][2].)

Section 12 of the GGERP outlines the steps that each DWR project will take to demonstrate consistency with the GGERP. Among these steps are the following:

- (1) Analyze GHG emissions from construction of the proposed project.
- (2) Determine that the project’s construction emissions do not exceed the levels of construction emissions analyzed in the GGERP.
- (3) Incorporate DWR’s project-level GHG emissions reduction strategies into the design of the project.
- (4) Determine that the project does not conflict with DWR’s ability to implement any of the “Specific Action” GHG emissions reduction measures identified in the GGERP.
- (5) Determine that the project would not add electricity demands to the State Water Project system that could alter DWR’s emissions reduction trajectory in such a way as to impede its ability to meet its emissions reduction goals.

Consistent with these requirements, a GGERP Consistency Determination Checklist is presented in **Appendix D**, documenting that the Proposed Project has met each of the required elements.

Based on the analysis in the GGERP and the demonstration that the Proposed Project is consistent with the GGERP (as shown in the Consistency Determination Checklist in **Appendix D**), DWR as the lead agency has determined that the project’s incremental contribution to the cumulative impact of increasing atmospheric levels of GHGs would be less than cumulatively considerable, and therefore, less than significant.

Mitigation Measures: None required.

Cumulative Impacts and Mitigation Measures

Climate change is a global problem. While pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Therefore, the effects of GHGs are also experienced globally.

The atmospheric concentration of GHGs determines the intensity of climate change. Current levels are already leading to increases in global temperatures, sea level rise, severe weather, and

other environmental impacts. The continued increase in atmospheric GHG concentrations will only worsen the severity and intensity of climate change, leading to irrevocable environmental changes. Therefore, in the context of CEQA, GHG impacts on global climate change are inherently cumulative. No single project could generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, GHG emissions from present and future projects combine to contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

Impact 3.6-3: Construction of the Proposed Project could generate greenhouse gas emissions that could contribute considerably to a cumulative impact. (Less than Significant)

As discussed under Impacts 3.6-1 and 3.6-2, GHG emissions from construction of the Proposed Project would be less than significant. The Proposed Project would also comply with the goals and actions of applicable State and local GHG reduction plans that aim to achieve the SB 32 target for California to reduce GHG emissions by 40 percent by 2030 compared to 1990 levels. Therefore, the contribution of the Proposed Project to the global cumulative impact would be less than cumulatively considerable, and this impact would be less than significant.

Mitigation Measures: None required.

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3.7 Hydrology

3.7.1 Introduction

This section addresses the hydrologic resources (surface water, water supply, and flood management resources) that could be affected by the Proposed Project.

The following comments received in response to the Notice of Preparation (see **Appendix A**) were considered during development of the impact analysis:

- The Central Valley Regional Water Quality Control Board (Regional Water Board) commented that the Proposed Project should evaluate potential impacts on surface water and groundwater quality and noted the permits that may be required for the Proposed Project.
- Oji Bros Farm Inc. and Reclamation District 1500 submitted letters that requested modeling and an evaluation indicating how the flow regimes in the Sacramento River, through and over Tisdale Weir and the notch, and downstream of the project area would differ from flow regimes under current conditions and operations. These letters also requested an analysis of the potential impacts of operations and maintenance (O&M) activities.
- The California State Lands Commission recommended that the analysis demonstrate how the design of Tisdale Weir would be sufficient to ensure the function, safety, and protection of the environment, factoring in the effects of climate change.
- Somach Simmons & Dunn stated that the EIR should address potential adverse impacts of the Proposed Project related to flood control and other critical infrastructure in the Sutter Bypass.

This section addresses the issues raised in these comment letters, to the extent applicable under CEQA. The following information sources were used to prepare this section:

- *California Water Plan Update 2013* (DWR, 2014)
- *Sediment Budget Analysis Technical Memorandum* (ESA, 2019a; **Appendix H**)
- *Flood Hydrologic and Hydraulic System Analysis Technical Memorandum* (ESA, 2019b; **Appendix I**)

3.7.2 Environmental Setting

The project area is located on the east side of the Sacramento River, approximately 13.7 miles southwest of Yuba City in unincorporated Sutter County. Sutter County is north of Sacramento on the east side of California's Central Valley. The topography of the area is generally flat except for the Sutter Buttes, approximately 8.5 miles to the north. Sutter County has a Mediterranean climate generally characterized by hot, dry summers and relatively moderate, wet winters. Precipitation rates are greatest during the late fall to early spring, followed by the dry season from later spring to early fall.

Because there are no substantial water storage reservoirs in Sutter County, rainfall percolates into the soil, runs off into local streams and rivers, and evaporates. By late summer, most small creeks

and streams are generally dry and rivers are at their lowest levels. Some small creeks have water during the dry season as a result of agricultural irrigation and drainage (Sutter County, 2008).

Surface Hydrology

The project area lies within the Sacramento River Basin, which is bounded by the Sierra Nevada to the east, the Coast Ranges to the west, the Cascade Range and Trinity Mountains to the north, and the Sacramento–San Joaquin Delta (Delta) to the southeast. The basin covers a 27,210-square-mile area that includes all watersheds tributary to the Sacramento River. The Sacramento River Basin is the largest river basin in California, with an average annual outflow of approximately 22 million acre-feet.

The Sacramento River is approximately 327 miles long. The river's major tributaries are the Pit and McCloud Rivers, which join the Sacramento from the north, and the Feather and American Rivers, which are tributaries from the east. The Yuba River is a tributary to the Feather River. Numerous additional tributary streams and creeks flow from the east and west. River flows are regulated by Shasta Dam and several dams on the major tributaries, including Oroville Dam on the Feather River and Folsom Dam on the American River, which provide power generation, flood control, water supply, recreation, fisheries, and wildlife management (Central Valley Regional Water Board, 2018).

The project area is located in the Sacramento Valley subregion of the Sacramento River Basin, which is the terminus for many of the Sacramento River's tributary watershed areas. This subregion begins downstream of Shasta Dam and continues south to Sacramento and the Delta, encompassing approximately 5,500 miles.

Historically, monthly flows in the Sacramento River reflect runoff patterns associated with winter precipitation and spring snowmelt, with peak flows generally occurring in February, March, and April. In 1945, Shasta Dam was completed as part of the Central Valley Project, creating Shasta Lake with a storage capacity of 4.5 million acre-feet. Once Shasta Dam became operational, Sacramento River flows downstream of the dam became regulated; today, these flows are typically higher in the summer (when water is released for downstream irrigation needs) than they were before Shasta Dam was built. As an example, since 1963, mean monthly flows in the river at Redding during July, August, and September are 400 percent higher than summer flows before 1943. The changes in hydrology become less pronounced farther downstream of Shasta Dam, where inflows from tributary streams have more of an influence on total flows. Typical summer-season flows in the Sacramento River are about 8,000 cubic feet per second (cfs) at Red Bluff and 12,000 cfs at Verona, just north of Sacramento (SRWP, 2010a).

The Feather River is approximately 12 miles east of the project area and flows along the east side of Sutter County. It forms the eastern boundary of the city of Yuba City, along with the confluence with the Yuba River, and eventually joins the Sacramento River approximately 20 miles southeast of the project area.

Flood Management

The Sacramento Valley subregion can be broadly characterized as a “flow-through” system: Most of the water not consumed by irrigation or other purposes eventually returns to the Sacramento River via various tributaries or percolates to groundwater that recharges local aquifers. Winter flood flows in the valley still occur and are a major management issue. From Butte City downstream, flooding along the Sacramento River is controlled by an elaborate system of levees, weirs, and bypasses. When river flows reach a certain height, water spills into the Colusa, Sutter, and Yolo Bypass floodways to minimize the risk of flooding to adjacent agricultural lands and major urban centers (including the cities of Yuba City, Marysville, and Sacramento).

In the past, under natural conditions before levee and reservoir construction, the Sacramento River had insufficient capacity to carry the heavy winter and spring flows generated by wet-season precipitation and/or snowmelt. As a result, the river channel overflowed onto the surrounding countryside and, in some cases, flooded almost the entire width of the Sacramento Valley. The sediment being carried in the channel was deposited in the overflow areas, where flow velocity was much slower.

The largest floods in the Sacramento River Basin have been primarily heavy precipitation (including rain-on-snow) events occurring from November through April. Federal, State, local, and private entities have worked independently and interdependently over the years to shape the Sacramento Valley’s current flood management system.

The existing federal/State flood management system influences flooding and flood management on more than 2.2 million acres (3,400 square miles) of land. The Central Valley flood management system includes Sacramento River Flood Control Project (SRFCP) facilities that are operated and maintained in conjunction with flood control facilities operated and maintained by federal, State, local, and private interests. This system includes approximately 1,600 miles of project levees and dams on nearly every major tributary. Historically, the flood management system of levees, channels, and flood control structures in the project area was developed to prevent the flooding of farmland. Today, the levee system, local and regional flood management facilities, and projects reduce flooding of additional valley land in both urban and rural areas.

The SRFCP’s 10 overflow structures (6 weirs, 3 flood relief structures, and an emergency overflow roadway) divert flows from the Sacramento River into bypass channels during peak-flow events to reduce the potential for levee failure downstream of the weir structures. Weirs are lowered sections of levees that allow flood flows that exceed downstream channel capacity to escape into a bypass channel or basin. The weirs pass floodwaters by gravity once the river reaches the overflow water surface elevation.

All six SRFCP weirs (Moulton, Colusa, Tisdale, Fremont, Sacramento, and the Cache Creek Settling Basin) consist of a fixed-level, concrete overflow section, followed by a concrete, energy dissipation basin. At each weir, a rock and/or concrete erosion blanket extends across

the channel beyond the energy dissipation basin and a pair of training levees defines the weir-flow escape channel.

Tisdale Weir, south of Colusa and just downstream of Grimes, was built by the U.S. Army Corps of Engineers (USACE) in 1932 atop an earlier structure built around 1911. This ungated, fixed-crest weir has a crest measuring approximately 1,150 feet long, 11 feet high, and 38 feet wide. The weir was originally designed to spill and convey up to 38,000 cfs of excess Sacramento River flow into the Tisdale Bypass, a 4-mile-long channel that flows eastward to the Sutter Bypass. The weir begins to spill when flows in the Sacramento River exceed approximately 22,000 cfs.

The Sutter Bypass, which began operation in the 1930s, has a design capacity of 380,000 cfs and is a leveed portion of the natural floodway in the Sutter Basin. The bypass is south of the Sutter Buttes, stretching from about Colusa to Verona between the Sacramento and Feather Rivers. Flows enter the Sutter Bypass from the Butte Basin at the upper end of the bypass near Colusa at Butte Slough. Other flows, such as interior drainage from pumping plants or from the Wadsworth Canal, discharge laterally to the Sutter Bypass, as do flows from the Sacramento River via the Tisdale Weir and Bypass. During large events, flood flows from the Sutter Bypass and the Feather River may converge approximately 7 miles upstream from their confluence with the Sacramento River at Fremont Weir. Fremont Weir is located on the south side of the Sacramento River, and flood flows spill into the Yolo Bypass. During high-flow events, a majority of the flow from the Sutter Bypass spills into the Sacramento River from the north and then flows over Fremont Weir into the Yolo Bypass on the south side of the river.

Surface Water Quality

Numerous natural and artificial sources influence water quality in the Sacramento River Basin: soil erosion, discharges from industrial and residential wastewater plants, stormwater runoff, agriculture, recreation activities, mining, timber harvesting in upper portions of the watersheds, and flora and fauna. Water from the Sacramento River and its major tributaries is generally of good quality, as it is largely melted snow that collects in upstream reservoirs and is released according to various rules of operation. However, several streams in the northern portion of the Sacramento River watershed are listed as impaired as a result of abandoned mine drainage and high concentrations of copper, lead, and zinc. Other water quality issues include temperature, mercury, pesticides, nutrients, and salts (DWR, 2014).

Salt and salinity management is considered one of the most serious long-term water quality issues facing the Central Valley, which includes the Sacramento River Basin. Salinity levels (measured as electrical conductivity [EC]) are generally lower in the Sacramento River Basin than in other regions of California. EC levels range from 84 to 140 micromhos per centimeter in the upper reaches of the Sacramento River. Farther downstream, EC levels gradually increase as water comes in contact with natural salts in soil and human activities (e.g., fertilizer application, disposal of treated wastewater) introduce salts either directly to water bodies or into the soil. In general, the Feather River has lower salinity levels than the Sacramento River and dilutes EC below the confluence of the two rivers (DWR, 2014).

Inorganic mercury enters waterways when soils erode, atmospheric dust falls to the ground, and mineral springs discharge. Another source is cinnabar ore (mercury sulfide) that was mined in the Inner Coast Ranges for elemental mercury (quicksilver). (The Inner Coast Ranges are a long mountain range subsystem of the California Coast Ranges running generally north/south in western California, from the Klamath Mountains system south to Santa Barbara County.) This liquid form of mercury was transported from the Coast Ranges to the Sierra Nevada for gold recovery, where several million pounds of mercury were lost to the environment during the Gold Rush.

In various aquatic environments, especially wetlands and other areas where the soil is anoxic (depleted of dissolved oxygen), inorganic mercury can be converted to methylmercury, a potent neurotoxin. Methylmercury is readily absorbed from water and food; consequently, concentrations multiply greatly between water and top predators of aquatic food chains. The cumulative result of this bioaccumulation is a more than million-fold increase in methylmercury concentrations in predatory fish such as bass and fish-eating wildlife such as terns and eagles (SRWP, 2010b).

The State Water Resources Control Board (State Water Board) publishes updates to the *Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins* (Basin Plan) to improve water quality and maintain beneficial uses in the Sacramento and San Joaquin Rivers. The Basin Plan describes water quality concerns for the Sacramento River that include agriculture, forestry, urban land uses, and stormwater runoff. Further, as shown in **Table 3.7-1**, the Sacramento River in the area of the Proposed Project (Red Bluff to Knights Landing) is listed in the State Water Board’s Total Maximum Daily Load (TMDL) program for chlorpyrifos, dichlorodiphenyltrichloroethane (DDT), diazinon, dieldrin, fecal coliform, mercury, polychlorinated biphenyls (PCBs), and unknown toxicity (State Water Board, 2010). The State Water Board’s TMDL programs are implemented under Clean Water Act (CWA) Section 303(d) for impaired water bodies. TMDL programs are plans that describe how an impaired water body will meet federal water quality standards.

**TABLE 3.7-1
CLEAN WATER SECTION 303(D) LIST OF MAIN STEM IMPAIRED SURFACE WATER BODIES
IN THE PROJECT VICINITY**

River	River Reach	Impairments
Sacramento River	Red Bluff to Knights Landing	Chlorpyrifos, DDT, diazinon, dieldrin, fecal coliform, mercury, PCBs, unknown toxicity
Sacramento River	Knights Landing to the Delta	Chlordane, chlorpyrifos, DDT, diazinon, dieldrin, diuron, mercury, PCBs, unknown toxicity
Sutter Bypass	Not applicable	Diazinon, mercury
Lower Feather River	Oroville Dam to the confluence with the Sacramento River	Cadmium, chlorpyrifos, copper, DDT, diazinon, fecal coliform, Group A pesticides, lead, mercury, nickel, dissolved oxygen, PCBs, salinity, unknown toxicity

NOTES:

DDT = dichlorodiphenyltrichloroethane; Delta = Sacramento–San Joaquin Delta; PCBs = polychlorinated biphenyls

SOURCE: State Water Board, 2010

Groundwater

The project area is located in Sutter County, which overlies the Sutter Subbasin of the greater Sacramento Valley Groundwater Basin. The major surface water sources described previously are also major sources of recharge to the groundwater subbasin. Other sources of groundwater recharge in the Sutter Subbasin are percolation of rainfall, agricultural irrigation, and subsurface inflow from adjacent groundwater subbasins. Groundwater pumping and subsurface outflow to rivers and adjoining subbasins result in the lowering of groundwater levels.

In Sutter County, groundwater is used for water supplies, agricultural irrigation, and domestic drinking water. Groundwater level trends in the county are reported to be stable and tend to be within about 10 feet below the ground surface (Sutter County, 2008). Similarly, groundwater is approximately 10 feet below the ground surface in the project vicinity (DWR, 2018).

DWR, the California Department of Public Health, and Sutter County monitor water quality in the Sutter Subbasin underlying Sutter County. The primary groundwater chemistry is calcium, magnesium, sodium, chloride, sulfate, and bicarbonate. Recent groundwater data for portions of the county report the presence of chemical elements and compounds in amounts that exceed standards for safe drinking water quality and aesthetics. In addition, groundwater quality is expected to degrade in the future unless measures are taken to reduce the presence of contaminants in soil and prevent additional contamination. No major areas of groundwater contamination have been reported in Sutter County (Sutter County, 2008).

3.7.3 Regulatory Setting

Federal

Clean Water Act

The CWA established the basic structure for regulating discharges of pollutants into “waters of the United States.” The act specifies regulatory and administrative tools to reduce direct discharges of pollutants into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

Clean Water Act Section 303(d) Impaired Waters List

Section 303(d) of the CWA requires states to develop lists of water bodies that would not attain water quality objectives after point-source dischargers (municipalities and industries) implement the required levels of treatment. Under Section 303(d), each state must develop a TMDL for each listed pollutant. The TMDL is the amount (“loading”) of a pollutant that the water body can receive and still comply with water quality objectives.

The TMDL can also serve as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must allocate allowable loadings to point and nonpoint sources, while considering background loadings and including a margin of safety. The TMDL must also analyze the linkage between loading reductions and the attainment of water quality objectives.

The U.S. Environmental Protection Agency (EPA) either must approve a TMDL prepared by the state or, if it disapproves the state's TMDL, must issue its own. Limits on listed pollutants specified in National Pollutant Discharge Elimination System (NPDES) permits must be consistent with the waste load allocation prescribed in the TMDL. It is anticipated that the problems that caused a given pollutant to be placed on the Section 303(d) list would be remediated once the TMDL has been implemented.

In California, the regional water boards are responsible for preparing and managing the Section 303(d) list. California's 303(d) list is updated periodically to reflect changing conditions in the state's waterways. In November 2010, EPA approved the most recent update to California's Section 303(d) list of impaired waters requiring TMDLs (2008–2010). Table 3.7-1 shows the current (2010) Section 303(d) list of impaired waters in the project area. As shown, only the main downstream waterways of the western, eastern, and central portions of the Sacramento River Hydrologic Region are listed as impaired.

State

California Water Code

Among the many sections of the California Water Code that are related to the State's responsibilities, Sections 8350, 8361, 12648, and 12878 authorize DWR to maintain the federal project levees of the SRFCP:

- Section 8350 approves and adopts the conditions, plans, construction, and mode of maintenance and operation of works within the SRFCP.
- Section 8361 directs DWR to maintain and operate the SRFCP.
- Section 12648 authorized and adopted the project for the control of floods and other purposes on the Sacramento River.
- Section 12878 states that DWR must comply with the O&M standards of the federal government and requirements of the Central Valley Flood Protection Board (formerly known as The Reclamation Board).

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) was enacted, and revised in December 2007, to protect the quality of all waters of the State of California for use and enjoyment by the people of California. The Porter-Cologne Act states that all activities that may affect the quality of waters of the State must be regulated to obtain the highest water quality that is reasonable, considering all present and future demands on those waters. The law also provides for a statewide program to control water quality, recognizing that inter-basin water development projects and other statewide considerations increasingly influence waters of the State, and that factors such as precipitation, topography, population, recreation, agriculture, industry, and economic development vary regionally.

The Porter-Cologne Act authorizes the State Water Board and regional boards to oversee the coordination and control of water quality in California. This work includes meeting the responsibilities established by the CWA that have been delegated to the State.

State Water Resources Control Board

Created by the California Legislature in 1967, the State Water Board holds authority over statewide water resources allocation and water quality protection. The State Water Board allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine regional water boards. The mission of the State Water Board is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.

Central Valley Regional Water Quality Control Board

Under the Porter-Cologne Act, the Central Valley Regional Water Board is charged with protecting the quality of the waters within its jurisdiction for all beneficial uses. The project area is located within the jurisdiction of the Central Valley Regional Water Board. State law defines the beneficial uses of California's waters that may be protected against quality degradation to include, but not be limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

To protect water quality, the Central Valley Regional Water Board develops and adopts water quality control plans (called "basin plans," as discussed below) for specific groundwater and surface water basins, and prescribes and enforces requirements on agricultural, domestic, and industrial waste discharges. The Central Valley Regional Water Board oversees many major programs to support and provide benefit to water quality: Agricultural Regulatory; Above-Ground Tanks; Basin Planning; CALFED; Confined Animal Facilities; Landfills and Mining; Nonpoint Source; Spills, Leaks, Investigations, and Cleanups; Storm Water; TMDL; Underground Storage Tanks; Wastewater Discharges (including NPDES); Wastewater to Land Discharge; Water Quality Certification; and Watershed Management.

The Central Valley Regional Water Board addresses aquatic resource impairments caused by pesticides through its Nonpoint Source Program, Irrigated Lands Regulatory Program, and NPDES permits program. The Regional Water Board also develops water quality criteria and related control programs for the current use of pesticides in waterways in the Central Valley that support aquatic life. Phase I of this effort includes organophosphate pesticides (diazinon and chlorpyrifos). Phase II will address pyrethroid pesticides and possibly other pesticides of concern.

Basin Plans and Water Quality Objectives

The Porter-Cologne Act provides for the development and periodic review of basin plans that are prepared by the regional water boards. Basin plans designate the beneficial uses of California's major rivers and groundwater basins, and establish narrative and numerical water quality objectives for those waters. The term "beneficial uses" represents the services and qualities of a

water body (the reasons the water body is considered valuable), and water quality objectives are the standards necessary to protect and support those beneficial uses. Basin plans are implemented primarily through the NPDES permitting system and by issuing waste discharge regulations to ensure that the water quality objectives are met.

Basin plans provide the technical basis for determining waste discharge requirements and taking regulatory enforcement actions if deemed necessary. A basin plan has been adopted for the Sacramento and San Joaquin River Basins (Central Valley Regional Water Board, 2018), which encompass the project area.

The Basin Plan sets water quality objectives for the surface waters in its region for the following substances and parameters: ammonia, bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, radioactivity, salinity, sediment, settleable material, suspended material, taste and odor, temperature, toxicity, turbidity, and pesticides. For groundwater, water quality objectives applicable to all groundwater have been set for bacteria, chemical constituents, radioactivity, taste, odors, and toxicity (Central Valley Regional Water Board, 2018).

State law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050[f]). Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning. The basin plans designate the beneficial uses and establish an implementation program to achieve the water quality objectives and protect the beneficial uses. The implementation program describes how a regional water board will coordinate its regulatory and nonregulatory programs to address specific water quality concerns (DWR, 2014). Specific objectives for concentrations of chemical constituents are also applied to major water bodies based on their designated beneficial uses. **Table 3.7-2** shows the beneficial uses designated in the vicinity of the project area.

Central Valley Flood Protection Board, Floodway Encroachment Permit

The Central Valley Flood Protection Board's mission is to reduce the risk of catastrophic flooding to people and property with California's Central Valley through several objectives:

- Manage flooding along the Sacramento and San Joaquin Rivers and their tributaries in cooperation with USACE.
- Cooperate with various agencies of the federal, State, and local governments in establishing, planning, constructing, operating, and maintaining flood control works.
- Maintain the integrity of the existing flood control system and designated floodways through its regulatory authority by issuing permits for projects that may encroach upon, improve, alter, or affect the SRFCP.

**TABLE 3.7-2
 DEFINED BENEFICIAL USES FOR MAJOR WATER BODIES IN THE PROJECT AREA**

Beneficial Uses	Sacramento River	Sutter Bypass	Lower Feather River
Municipal and Domestic Supply	x		x
Irrigation	x	x	x
Stock Waters			
Process			
Service Supply			
Power			
Contact Recreation	x	x	x
Noncontact Recreation	x		x
Warm Freshwater Habitat	x	x	x
Cold Freshwater Habitat	x		x
Warm-Water Migration	x		x
Cold-Water Migration	x	x	x
Warm-Water Spawning	x		x
Cold-Water Spawning	x	x	
Wildlife Habitat	x	x	x
Navigation	x		

NOTE:
 x = existing beneficial use

SOURCE: Central Valley Regional Water Board, 2018

Local

The Sutter County General Plan (2030) includes goals and policies that are intended to preserve and protect the county’s water and groundwater resources. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.7.4 Impacts and Mitigation Measures

Methods of Analysis

The evaluation of potential impacts of the Proposed Project related to drainage, water quality, flooding, and other hydrologic resources was performed in light of current conditions in the project area, and applicable regulations and guidelines. In support of this analysis, relevant information was gathered from federal, State, and local water management agencies.

The *Sediment Budget Analysis Technical Memorandum* (ESA, 2019a; Appendix H) presents calculations of the suspended sediment budget for the Tisdale Bypass. The objective for the

sediment budget calculations was twofold: (1) Estimate the amount of suspended sediment deposited in the Tisdale Bypass each year under existing conditions; and (2) assess how the amount of suspended sediment deposited in the bypass could change with implementation of the Proposed Project. The analysis used two methods: detecting topographic changes and estimating the discharge of suspended sediment.

The topographic-change detection method involved calculating areas and volumes of net deposition and erosion in the Tisdale Bypass by differentiating between two digital elevation models. The two models spanned a 10-year period (November 15, 2007, to October 5, 2017) that began immediately after the bypass sediment removal project in fall 2007. Raw differencing values were adjusted to account for the errors inherent in surveying and surface creation, and to provide a range of estimates for the magnitude of detectable topographic change in the Tisdale Bypass.

The analysis conducted to estimate the existing discharge of suspended sediment spanned the same 10-year period as the topographic-change detection analysis (November 15, 2007, to October 5, 2017). Using available sediment transport and flow data, the analysis estimated the volume of suspended sediment delivered to the Tisdale Bypass and the fraction of that volume that was deposited (or retained) in the bypass.

Sediment flux (flow) into the Tisdale Bypass under existing conditions was calculated for each water year, using the topographic-change detection period. (See Table 2 of the *Sediment Budget Analysis Technical Memorandum* [ESA, 2019a; Appendix H].) The bookended dates for the analysis of sediment flux were set to match the dates of the two topographic data collection efforts used for the change detection analysis. The analysis involved calculating both total flux and flux of sediment larger than 0.125 millimeters and 0.063 millimeters. These two size classes and associated volumes represent the assumed range for the fraction of sediment eventually deposited in the bypass during the 10-year analysis period.

The volume of eroded sediment identified by the topographic-change analysis was used to estimate the amount of sediment that may be removed from the Tisdale Bypass through erosion and/or resuspension with flows. The potential influence of the Proposed Project on erosion or resuspension of sediment in the bypass was not assessed.

The topographic-change analysis assessed only two snapshots in time, and does not provide information regarding potential changes throughout the 10-year analysis period. The proposed notch also may influence and change the volume and spatial pattern of sediment deposition within the basin footprint; this change is not captured in the analysis.

The *Flood Hydrologic and Hydraulic System Analysis Technical Memorandum* (ESA, 2019b; Appendix I) presents the findings of the analysis of the hydrologic and hydraulic system. The technical memorandum summarizes modeling assumptions and data sources used to analyze the hydrologic and hydraulic system's performance to determine how the Proposed Project could

change the performance of the State-federal flood control system. The hydraulic analysis was conducted in two parts:

- First, the system was analyzed to determine any flooding impacts that could result if the fish passage gate were to remain open under a range of hydraulic loadings (0.2 to 50 percent annual chance exceedance). This first part of the analysis was conducted for “gate open” conditions without and with the Proposed Project, using unsteady-flow assumptions and hydraulic loadings to determine the potential of the Proposed Project to transfer risk to other parts of the system. The analysis accounted for these potential flooding risks by analyzing the potential change in water surface elevation during flood peaks without and with the Proposed Project.
- Second, the hydraulic analysis investigated whether the Proposed Project would adversely affect the system’s hydraulic performance under the system’s authorized design flow. The second part of the analysis used a steady-state hydraulic analysis.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if the Proposed Project would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water or groundwater quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
 - Result in substantial erosion or siltation on- or off-site;
 - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; or
 - 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;
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Impacts Not Evaluated Further

The following issues were evaluated and the Proposed Project was determined to result in either no impact or a less-than-significant impact; therefore, these topics are not evaluated further in this EIR. The analyses are summarized below. For a complete discussion, see the Initial Study Environmental Checklist in **Appendix B** of this EIR.

Substantially decrease groundwater supplies or interfere substantially with groundwater recharge. The Proposed Project would involve rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements. Construction of the project would include minor modifications and some demolition and reconstruction of the existing weir. The installation of equipment pads, a concrete connection channel, a concrete fish collection basin, and a control building to house mechanical equipment would result in a minor increase in impervious surfaces over existing conditions. However, this minor increase would not be anticipated to substantially interfere with recharge of the underlying groundwater, especially given the amount of land in the Tisdale Bypass where recharge can occur. In addition, during construction, surface water would be used for dust control and groundwater would not be used for this purpose. Therefore, construction and operation of the Proposed Project would not result in a substantial decrease in groundwater supplies or substantially interfere with groundwater recharge, and this impact would be less than significant.

Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; or 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. During O&M activities, the Proposed Project would remove sediment and debris from portions of the Tisdale Bypass immediately adjacent to Tisdale Weir and from within the energy dissipation and fish collection basin. These elements of the Proposed Project would improve the system's ability to accommodate runoff and would minimize the potential for on- and off-site flooding. The rehabilitated weir would continue to be operated in a manner consistent with existing conditions to minimize flooding. Project features would increase the impervious surfaces in the project area by only a small amount. These features would not cause stormwater runoff to increase. In addition, these impervious surfaces would generally be located away from roadways and structures that typically collect water quality pollutants. Runoff from the impervious surfaces would neither degrade water quality nor affect or interfere with beneficial uses of waters in the project area. Therefore, these impacts would be less than significant.

In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation. The Proposed Project would rehabilitate and reconstruct Tisdale Weir to address structural deficiencies and extend its design life; reduce fish stranding at the weir's energy dissipation basin; and improve fish passage to the Sacramento River at the weir. Rehabilitating the weir would support DWR in meeting its responsibilities to maintain and operate the SRFCP by extending the useful life of the weir.

Construction activities would be required to comply with numerous hazardous materials regulations. In addition, construction contractors would be required to acquire coverage under the NPDES General Stormwater Permit from the Central Valley Regional Water Board to properly control and store hazardous materials and prevent pollutants from entering receiving waters

during construction. O&M activities would be similar to existing O&M activities and would not result in a risk of release of pollutants as a result of project inundation. Therefore, this impact would be less than significant.

Conflict with or obstruct implementation of a sustainable groundwater management plan.

As described above, construction and operation of the Proposed Project would not result in substantial interference with groundwater recharge of the underlying groundwater basin. The Tisdale Bypass would continue to be used as an overflow bypass for high Sacramento River flows, and thus, would continue to provide for groundwater recharge. Therefore, the Proposed Project would not conflict with or obstruct implementation of a sustainable groundwater management plan, and this impact would be less than significant.

Project-Specific Impacts and Mitigation Measures

Table 3.7-3 summarizes the impact conclusions presented in this section.

**TABLE 3.7-3
 SUMMARY OF IMPACT CONCLUSIONS—HYDROLOGY AND WATER QUALITY**

Impact Statement	Impact Conclusion
3.7-1: Construction of the Proposed Project would involve activities that could result in a release of sediment and other pollutants that could substantially degrade receiving water quality.	LSM
3.7-2: Operation of the Proposed Project could result in a release of sediment that could substantially degrade receiving water quality.	LS
3.7-3: Operation of the Proposed Project could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk.	LS
3.7-4: Operation of the Proposed Project could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion.	LS
3.7-5: Operation of the Proposed Project could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk.	LS
3.7-6: Construction of the Proposed Project in combination with other projects being constructed in the project area could result in the release of sediment and other pollutants that could cumulatively degrade receiving water quality.	LSM
3.7-7: Operation of the Proposed Project in combination with the operation of other projects in the project area has the potential to release sediment that could cumulatively degrade receiving water quality.	LS
3.7-8: Operation of the Proposed Project in combination with other projects in the project area could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk.	LS
3.7-9: Operation of the Proposed Project in combination with other projects in the project area could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion.	LS
3.7-10: Operation of the Proposed Project in combination with other projects in the project area could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk.	LS

NOTES: LS = Less than Significant; LSM = Less than Significant with Mitigation

SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.7-1: Construction of the Proposed Project would involve activities that could result in a release of sediment and other pollutants that could substantially degrade receiving water quality. (Less than Significant with Mitigation)

The Proposed Project would involve the rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements. The project footprint, including staging areas, the spoils site, and the haul route to the spoils site, is approximately 131 acres. Temporary staging may also occur in the bypass. Staging areas and the construction footprint would be cleared and grubbed before construction. Site preparation and construction would include excavation of soils and concrete and other ground-disturbing activities. This work could temporarily increase the rate of soil erosion, leading to an increase in sediment loading and turbidity in the Sacramento River and other receiving waters. In addition, although work on the weir would occur primarily on the dry, downstream side of the weir, the possibility remains that in-water work could take place during construction of the connection channel, which could agitate sediment and lead to downstream sedimentation and increased turbidity.

Construction vehicles and equipment would be used on-site and in the staging and spoils areas. A concrete batch plant may be used on-site to facilitate concrete mixing and production. If needed, the concrete batch plant would be located in the southernmost staging area or in the spoils site. Existing roads and the proposed access ramp would be used to transport material from the batch plant to the basin in 10-yard batches in mixer trucks. Spills of fuels, lubricants, and/or other pollutants during operation, refueling, and parking could contaminate riverbank and bed soils. In addition, improper handling, storage, or disposal of these materials in the project vicinity could degrade surface water quality if the materials were eventually washed into the Tisdale Bypass or the Sacramento River.

The contractor would be required to obtain coverage under the NPDES Construction General Permit from the Central Valley Regional Water Board before the start of ground-disturbing activities. To obtain coverage under this permit, the contractor must electronically file permit registration documents, which include a notice of intent, a storm water pollution prevention plan (SWPPP), and other compliance-related documents. An appropriate permit fee must also be mailed to the State Water Board. The SWPPP identifies best management practices (BMPs) that must be implemented to reduce the impacts of construction on receiving water quality, based on potential pollutants. The BMPs would involve implementing sediment and erosion control measures and other measures to control potential chemical contaminants. The specific BMPs to be implemented would be determined by the Central Valley Regional Water Board before issuance of the Construction General Permit. The SWPPP also describes the BMPs to reduce pollutants in stormwater discharges after all construction (maintenance) work has been completed at the site (post-construction or post-maintenance BMPs).

Construction would occur outside the flood season, between April 16 and October 31. However, should water be present in the bypass at the start of construction, a fish rescue and dewatering operation with approved screening on pump intakes would be conducted (see Section 3.4, *Biological Resources*). As described in Chapter 2, *Project Description*, pump discharges would

comply with approved BMPs and equipment working below ordinary high water would be cleaned to prevent the spread of invasive species. After the initial dewatering, maintenance dewatering would be completed to provide dry site conditions. Water from dewatering operations would be discharged directly to a percolation area within the bypass and project footprint, and turbidity would be monitored as appropriate (i.e., the discharged water would likely percolate into the bed of the bypass). In addition, the construction contractor would be required to obtain a General Order for Dewatering and Other Low Threat Discharges to Surface Waters Permit for the management of dewatering activities to minimize the risk of adverse effects on groundwater water quality.

Although the Proposed Project would obtain and comply with the requirements of the NPDES Construction General Permit and General Order for Dewatering and Other Low Threat Discharges to Surface Waters Permit, project construction could still release sediment and other pollutants that could substantially degrade receiving water quality. For example, water quality could be impaired by sediment or pollutants if water were to overtop the weir during the construction window.

Because construction of the Proposed Project could affect receiving water quality through the release of sediment and other pollutants, the impact of the Proposed Project on receiving water quality would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this construction-related impact to a less-than-significant level.

Mitigation Measures: Implement Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c.

Impact Significance after Mitigation: Less than Significant.

Mitigation Measure 3.4-7a requires that work be suspended if Tisdale Weir is forecast to be overtopped during the construction window. Mitigation Measure 3.4-7b requires implementing BMPs consistent with the NPDES Construction General Permit, such as requiring the development of a SWPPP and other practices to reduce water turbidity, reduce surface erosion, control stormwater flows, retain sediment within the construction site, and stabilize disturbed areas. Mitigation Measure 3.4-7c identifies the steps that would be undertaken to ensure the consistency of the Proposed Project with the standards of the Central Valley Regional Water Board's Basin Plan regarding turbidity for work that would occur within the bank and channel of the Sacramento River.

Additionally, DWR would address any impacts of the Proposed Project on waters of the United States in accordance with USACE's requirements under the CWA Section 404 permit process (also discussed in Impact 3.4-13 in Section 3.4, *Biological Resources*). Impacts on the Tisdale Bypass would be subject to CWA Section 401 requirements, and DWR would comply with

requirements set forth by the Central Valley Regional Water Board (also discussed in Impact 3.4-13 in Section 3.4).

These mitigation measures, and adherence to the requirements of the NPDES permit and CWA Sections 401 and 404, would reduce the effects of construction of the Proposed Project on receiving water quality from the release of sediment and other pollutants that could substantially degrade receiving water quality. Implementing these mitigation measures would reduce the impact to a less-than-significant level.

Impact 3.7-2: Operation of the Proposed Project could result in a release of sediment that could substantially degrade receiving water quality. (Less than Significant)

After construction of the Proposed Project, soil disturbed during construction could become mobilized in the water column when flood flows inundate the Tisdale Bypass. As described in the *Sediment Budget Analysis Technical Memorandum* (ESA, 2019a; Appendix H), with the Proposed Project, more water would enter the bypass. As a result, the amount of suspended sediment delivered to and deposited in the bypass would also increase. Turbidity in the inundated Tisdale Bypass would result primarily from the excess sediment load naturally picked up by the Sacramento River when it is in flood stage before its waters reach and overtop Tisdale Weir. The Proposed Project would be anticipated to have the potential to increase the volume of suspended sediment delivered to the Tisdale Bypass and areas downstream by approximately 8 percent (ESA, 2019a; Appendix H).

DWR would generally remove sediment and debris for the Proposed Project annually between April 16 and October 31. However, the frequency of these removal activities may vary based on the type of water year (e.g., very dry or very wet); the rate at which sediment and debris accumulate at the site; and the effects of the magnitude of sediment and debris accumulation on conveyance capacity, energy dissipation, and/or fish passage conditions. DWR's Flood Maintenance Yard staff or contractors would seek to conduct this work in dry channels or when water levels are at their lowest.

The Proposed Project would increase the amount of suspended sediment in the Tisdale Bypass during project operation. However, suspended sediment would be delivered to the bypass primarily from the natural sediment load of the Sacramento River when it is in flood stage. Because the Proposed Project is expected to increase the volume of suspended sediment delivered to the Tisdale Bypass by 8 percent, it would not substantially increase the amount of suspended sediment in the bypass. Therefore, operation of the Proposed Project would have a less-than-significant impact on water quality as a result of the release of sediment.

Mitigation Measures: None required.

Impact 3.7-3: Operation of the Proposed Project could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk. (Less than Significant)

The Proposed Project would involve installation of fish passage facilities at Tisdale Weir to reduce stranding of salmon and sturgeon and improve passage from the Tisdale Bypass to the Sacramento River. The proposed fish passage facilities would consist of a reconstructed energy dissipation and fish collection basin on the downstream side of the weir, a notch and operable gates installed within the weir, and a channel connecting the notch in the weir to the Sacramento River. During operation of the Proposed Project, the notch gates would likely be opened within a few hours after a weir overtopping event, remaining open until the Sacramento River's water surface recedes below the invert elevation of the notch. Under Proposed Project conditions, more water—and thus more sediment—would enter the bypass with the presence of the notch and operation of the gates.

The following discussion describes existing deposition of sediment into the Tisdale Bypass and in the energy dissipation basin, then analyzes the sediment deposition expected to occur in the basin and the bypass with the Proposed Project.

Sediment Deposition under Existing Conditions

The *Sediment Budget Analysis Technical Memorandum* (ESA, 2019a; Appendix H) presents calculations of the suspended sediment budget for the Tisdale Bypass. Two methods—detecting topographic change and estimating the discharge of suspended sediment—were used to calculate the suspended sediment budget.

The topographic-change detection results compare well with the sediment budget estimates that were developed separately using flow and suspended-sediment data. The topographic-change detection results indicate that 129,000–327,000 cubic yards of total (or gross) sediment deposited in the Tisdale Bypass over a 10-year period, while the sediment flux analysis yields *total* deposition estimates of 181,200–344,400 cubic yards. Therefore, total sediment deposited in the Tisdale Bypass over the 2007–2017 time frame appears to be on the order of 150,000–350,000 cubic yards.

Based on the topographic-change detection results, the *net* volume of sediment deposited in the Tisdale Bypass would be approximately 83 percent of the total (i.e., after accounting for erosion from the bypass) (see Table 1 in Appendix H). Therefore, the range of *net* deposition in the Tisdale Bypass over the analysis period is likely on the order of 125,000–300,000 cubic yards.

Sediment Deposited in the Energy Dissipation Basin under Proposed Project Conditions

The existing energy dissipation basin on the downstream side of Tisdale Weir would be removed and replaced to provide necessary energy dissipation, reduce fish stranding, support fish passage to the notch, and improve operational flexibility for maintenance and, if necessary, fish rescues. Figure 2-3 in Chapter 2, *Project Description*, shows the energy dissipation basin.

Under existing conditions, very little sediment tends to accumulate within the proposed footprint of the basin, as the footprint essentially encompasses the hydraulic shadow area. For example, the net topographic change between 2007 and 2017 just within the basin's footprint was approximately 60–70 cubic yards of deposition, representing less than 0.05 percent of the total net deposition in the Tisdale Bypass as calculated in the topographic-change detection analysis.¹ Assuming that the Proposed Project may increase the volume of net deposition in the bypass by up to 9 percent, only up to an additional 6 cubic yards (for a total of 76 cubic yards) would be deposited within the basin's footprint over a 10-year period equivalent to 2007–2017. However, the topographic-change analysis assessed only two snapshots in time, and information is lacking on the potential changes throughout the 10-year analysis period. Further, the notch may influence and change the volume and spatial pattern of sediment deposition within the basin footprint.

Sediment Deposition in the Tisdale Bypass under Proposed Project Conditions

The results of the sediment flux analysis indicate that under Proposed Project conditions, an estimated 194,800–370,200 cubic yards of sediment would have deposited in the Tisdale Bypass for the 2007–2017 time frame, compared with 181,200–344,400 cubic yards under existing conditions. The Proposed Project may increase the volume of suspended sediment delivered to the bypass and areas downstream by approximately 8 percent, and may increase the *net* volume of sediment deposited in the bypass by up to approximately 9 percent (assuming that the eroded volume would not change). Figure 5 in the *Sediment Budget Analysis Technical Memorandum* (ESA, 2019a; Appendix H) summarizes the estimated annual suspended sediment budget for the Tisdale Bypass for both existing and Proposed Project conditions.

The analysis and results clarify potential shorter-term or seasonal, sediment-related impacts of the notch on the proposed basin, and the potential implications for fish passage and maintenance of the proposed energy dissipation and fish collection basin. As described above, for the analysis of sediment flux under Proposed Project conditions, the estimate was divided to reflect two flow conditions: days when flow is spilling into the Tisdale Bypass only through the notch, and days when flow is spilling both through the notch and over the weir crest.

Days when flow would spill only through the notch would most likely occur when the Sacramento River's water surface is below the weir crest elevation. This condition may be followed by another overtopping event, when scour and turbulence on the downstream face of the weir would likely create or maintain the hydraulic shadow area in the basin (as discussed previously).

However, if the river were to continue receding, or if a subsequent overtopping event were particularly brief or nonexistent, the deposition of sediment entering via the notch would more likely be directly influenced by the basin. This sediment would be deposited in the basin to some extent. In this case, the basin could also act as a sediment trap to some degree, and the pattern of

¹ DWR conducts some annual maintenance and grading in this area, although these activities are primarily limited to cleaning out the existing energy dissipation basin on the downstream side of the weir (this feature is not included in the topographic-change detection analysis) and leveling out the bypass surface just downstream (e.g., cut-fill balance).

deposition just downstream of the weir would likely look different than under existing conditions, at least until the next overtopping event or implementation of a maintenance action.

At low to moderate flows, the pattern of sediment deposition—and potentially the volume—may change compared to existing conditions, both within the basin footprint and in areas immediately downstream. There may be a tendency for a bar to deposit in the eddy along the south side of the flow jet created by the notch. At higher flows, there is not much difference in shear stresses, and under high-flow conditions, the hydraulic shadow is likely to be created and maintained through scour and flow turbulence.

Between 2007 and 2017, with the Proposed Project, an average of approximately 700–1,300 cubic yards of sediment per year would have been deposited into the Tisdale Bypass on days with flow only through the proposed notch. This range of estimated annual deposition during notch-only flow conditions is equivalent to approximately 17–31 percent of the proposed basin’s volume of approximately 4,150 cubic yards.

However, not all incoming sediment during notch-only flow conditions would deposit or remain in the basin for an extended period of time (i.e., throughout the wet season). The supply of sediment to the bypass can be highly variable from year to year; on the scale of a decade, sediment could be delivered mainly in one or two wet years, adding to the uncertainty involved in estimating the amount of sediment that may deposit only in the basin during any given year. The development of sediment conditions, particularly in years with few and/or relatively brief overtopping events, would be monitored and addressed as outlined in the *Tisdale Weir Operations, Maintenance, and Long-Term Management Plan* being developed for the Proposed Project.

Sediment and debris may also accumulate in the connection channel during operation of the Proposed Project. However, such accumulation is expected to be comparatively limited; scouring velocities in the connection channel and notch would generally be relatively high, particularly on the receding limb of the flood hydrograph. Thus, the connection channel is expected to be self-maintaining to a large degree. However, sediment and debris may need to be removed from the connection channel and notch periodically.

DWR would generally remove the accumulated sediment and debris from Tisdale Weir and its appurtenances (e.g., connection channel, fish collection basin) annually between April 16 and October 31, as part of its continued and ongoing maintenance. However, the frequency of these removal activities may vary based on the type of water year (e.g., very dry or very wet); the rate at which sediment and debris accumulate at the site; and the effects of the magnitude of sediment and debris accumulation on conveyance capacity, energy dissipation, and/or fish passage conditions.

Impact Summary

As shown in **Table 3.7-4**, previous sediment removal efforts have occurred at irregular intervals and have removed fluctuating amounts of sediment. As discussed previously, under Proposed Project conditions, sediment deposition is expected to increase by approximately 8 percent, with

an anticipated 194,800–370,200 cubic yards deposited during the 2007–2017 time frame. Although the Proposed Project would increase the volume of sediment deposited, this amount of expected deposition is within the historical range of sediment removed, and well below the maximum of 1,712,800 cubic yards. With sediment and debris removal anticipated to occur annually, the Proposed Project would not cause a significant increase in sediment deposition relative to existing amounts and would not require increased removal of sediment and debris compared to existing O&M activities.

**TABLE 3.7-4
HISTORIC REMOVAL OF SEDIMENT FROM THE TISDALE BYPASS**

Year	Cubic Yards Removed
1984	244,000
1985	211,000
1986	1,301,000
1987	270,000
2007	1,712,800
2020*	400,000*

NOTE:

* Proposed

SOURCE: Data compiled by Environmental Science Associates in 2019

Although operation of the Proposed Project would increase the volume of sediment deposited in the Tisdale Bypass, the increase is expected to be minimal relative to existing conditions. In addition, the increase in sediment deposition is expected to be within the historical range of sediment removed as part of existing O&M activities. Therefore, impacts from sediment deposition in the Tisdale Bypass and the Sacramento River that could alter drainage patterns and reduce flood conveyance capacity, resulting in an increase in the flood risk, would be less than significant.

Mitigation Measures: None required.

Impact 3.7-4: Operation of the Proposed Project could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion. (Less than Significant)

Higher velocity flows through the proposed notch during certain flow conditions could result in scour. Channel scour can create uneven ground surfaces as the erosive force of flowing water excavates material from the bed and banks and carries it away. Channel scour can occur across large areas or as more localized depressions (e.g., around bridge foundations and weir structures). If left unrepaired, scour can grow and damage flood conveyance facilities, including through bank erosion and undermining of structures. The proposed erosion repair and scour protection measures in the project area (e.g., use of riprap and concrete) would reduce the potential for erosion during operation of the Proposed Project.

Debris in flood control channels can obstruct flow, reduce channel capacity, accelerate erosion, affect the proper functioning of the flood protection system, and damage structures or facilities. Such debris can also be damaging to fish, wildlife, and the environment. Debris consists of trash, beaver dams, woody and herbaceous vegetation deposited by floods, downed trees and branches, and other items (e.g., vehicles, tires, refrigerators). Debris is typically removed using hand tools, tractors, truck-mounted cranes, bulldozers, backhoes, and excavators. Removed material would be hauled off-site to an approved disposal site. Debris removal work occurs year-round, which would also be the case with the Proposed Project, and generally takes one day to complete, although up to one week may be needed to clear debris after a high-water event at a specific location.

As discussed previously, the connection channel from the Sacramento River to the proposed notch would be constructed with riprap or concrete, or both, to prevent scour. Sub-angular riprap could be installed adjacent to the channel to resist scour. Sediment and debris may accumulate in the connection channel during operation of the Proposed Project. However, such accumulation is expected to be comparatively limited, as scouring velocities in the connection channel and notch would generally be relatively high, particularly on the receding limb of the flood hydrograph. The connection channel would also be inspected each year for areas of potential scour, and additional riprap (and engineered streambed material, if applicable) would be placed as needed. The Proposed Project would not change the course of the Sacramento River.

Although operation of the Proposed Project could result in erosion and scour from high-velocity flows through the notch and the accumulation of debris, the proposed erosion repair and scour protection measures (e.g., use of riprap and concrete), the regular removal of debris, and the inspection and repair of riprap would reduce this impact to less than significant.

Mitigation Measures: None required.

Impact 3.7-5: Operation of the Proposed Project could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk. (Less than Significant)

The Proposed Project would include structural rehabilitation of the existing Tisdale Weir and abutments and weir modifications to incorporate a notch with operable gates to improve fish passage between the Sacramento River and the Tisdale Bypass.

The *Flood Hydrologic and Hydraulic System Analysis Technical Memorandum* (ESA, 2019b; Appendix I) documented changes to the performance of the State-federal flood control system that could result from the Proposed Project. As the project is currently proposed, the fish passage gates at Tisdale Weir presumably would be closed during flood events that exceed an approximately 10 percent annual chance exceedance (10-year) design storm. The results of the analysis indicated that even if the gates were to remain open during flood operations, and slightly more water were to enter the Sutter Bypass, adverse changes to the hydraulic performance of the flood control

system and the extent of flooding in the Sutter Bypass would be negligible. Therefore, the Proposed Project would not affect the operation of the SRFCP or increase the risk of flooding.

The Proposed Project would not change the flow of the Sacramento River. Flows in the river downstream of Tisdale Weir are expected to be similar to existing conditions (i.e., to change by 2.2 percent or less). As shown in Section 3.4, *Biological Resources*, Table 3.4-10 and Table 3.4-11, the Proposed Project would decrease flows in the Sacramento River relative to existing conditions, but only during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, which occur during the summer and early fall, the Proposed Project would not affect flow conditions in the Sacramento River because the river's stage would remain below the base elevation of the notch.

The Proposed Project would result in a negligible change to the hydraulic performance of the SRFCP. Changes to flows in the Sacramento River would occur only during episodes of high flow and would not result in substantially different flow conditions. Therefore, impacts related to alteration of the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system would be less than significant.

Mitigation Measures: None required.

Cumulative Impacts and Mitigation Measures

Often, both regional and local activities affect hydrology, drainage, and water quality conditions. The project area is located in the Sacramento River Hydrologic Region, and more specifically, the Sacramento Valley subregion.

The following evaluation of cumulative hydrology and water quality impacts examines the extent to which regional and local activities could affect hydrologic conditions in and downstream of the project area. All waterways in the project area are tributaries to the lower Sacramento River reach, generally defined as the portion of the river from Princeton (in Colusa County) to the Delta, at Chipps Island. Past and present water supply and agricultural diversions, flood management projects, urban development, and river channelization in the lower Sacramento River affect hydrology and water quality conditions in the project area.

The existing conditions described in Section 3.7.2, *Environmental Setting*, reflect the ongoing impacts of past and existing projects. It is within the context of these conditions that potential cumulative impacts on water resources are considered. Projects in the project area that are currently in the planning stages and could be implemented in the foreseeable future include DWR's Sutter Bypass Pumping Plant Rehabilitation Project, which proposes to retrofit maintenance structures at three separate pumping plants along the East Levee of the Sutter Bypass; and the U.S. Bureau of Reclamation and CDFW's Sutter National Wildlife Refuge Lift Station Project, which includes construction of a lift station that would allow the Sutter National

Wildlife Refuge to divert water from the East Borrow Ditch. Past projects in the vicinity of the project area include DWR's Tisdale Bypass Sediment Removal 2020 Project, the Sutter Bypass East Borrow Canal Water Control Structures Project (2009), Tisdale Bypass Channel Rehabilitation Project (2007), Garmire Road Bridge Replacement Project (2004), and Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009).

Impact 3.7-6: Construction of the Proposed Project in combination with other projects being constructed in the project area could result in the release of sediment and other pollutants that could cumulatively degrade receiving water quality. (Less than Significant with Mitigation)

Ground disturbance during site preparation and construction activities for the Proposed Project could increase sediment loading and turbidity in the Sacramento River and other receiving waters. In addition, potential in-water work during construction of the connection channel could agitate sediment, leading to downstream sedimentation and increased turbidity. Construction vehicles and equipment would be used on-site and in the staging and spoils areas. The use, storage, disposal, or improper handling of fuels, lubricants, or other pollutants could contaminate riverbank and bed soils and degrade the surface water quality of the Sacramento River and other receiving waters.

The handling of such materials for all cumulative projects would be regulated in accordance with applicable federal, State, and local requirements. SWPPPs and/or BMP plans and erosion control practices like those that would be required of the Proposed Project are standard construction industry practice, legally required for projects with disturbance areas that exceed specified thresholds, and reflect limits that are set with cumulative conditions in mind.

However, implementation of the Proposed Project in conjunction with the separately considered projects in the project vicinity has the potential to result in a release of sediment and other pollutants, resulting in potentially cumulative significant impacts on receiving water quality.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measures: Implement Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c.

Impact Significance after Mitigation: Less than Significant.

Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c would reduce the contribution of the Proposed Project to this cumulative impact to less than considerable because these measures would avoid and minimize the degradation of water quality.

Impact 3.7-7: Operation of the Proposed Project in combination with the operation of other projects in the project area could result in a release of sediment that could cumulatively degrade receiving water quality. (Less than Significant)

After construction of the Proposed Project, soil disturbed during construction could be mobilized in the water column. In addition, implementing the Proposed Project would increase the amount of suspended sediment delivered and deposited in the Tisdale Bypass by approximately 8 percent. The release of sediment could degrade receiving water quality, contributing to a cumulative direct impact. However, as discussed under Impact 3.7-2, suspended sediment would be delivered to the bypass primarily from the Sacramento River's natural sediment load when the river is in flood stage. DWR would also perform maintenance activities that would generally remove sediment from the bypass on an annual basis, depending on the type of water year (e.g., very dry or very wet); the rate at which sediment and debris accumulate at the site; and the effects of the magnitude of sediment and debris accumulation on conveyance capacity, energy dissipation, and fish passage conditions. Therefore, the Proposed Project's incremental contributions to cumulative effects on receiving water quality from the release of sediment during operation would not be cumulatively considerable. This impact would be less than significant.

Mitigation Measures: None required.

Impact 3.7-8: Operation of the Proposed Project in combination with other projects in the project area could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk. (Less than Significant)

Operation of the Proposed Project would increase the volume of sediment deposited in the Tisdale Bypass, which could lead to a substantial cumulative alteration of drainage patterns and reduction of flood conveyance capacity that could increase flood risk; however, the increase would not represent a significant increase over existing amounts. The increase in sediment deposition is expected to be within the historical range of sediment removed as part of existing O&M activities and would not require increased removal of sediment and debris relative to existing O&M activities. Therefore, the Proposed Project's incremental impacts would not combine to cause or contribute to a significant cumulative impact related to the alteration of drainage patterns from the amount of sediment deposited in the Tisdale Bypass and the Sacramento River that could lead to an increase in flood risk. This impact would be less than significant.

Mitigation Measures: None required.

Impact 3.7-9: Operation of the Proposed Project in combination with other projects in the project area could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion. (Less than Significant)

Operation of the Proposed Project would result in higher velocity flows through the proposed notch during certain flow conditions, which could lead to scour that could alter the hydrology and hydraulics of the Tisdale Bypass. The proposed erosion repair and scour protection measures in the project area (e.g., use of riprap and concrete) would reduce the potential for erosion during operation of the Proposed Project. As discussed previously, the connection channel from the Sacramento River to the proposed notch would be constructed with riprap or concrete, or both, to prevent scour. Sub-angular riprap could be installed adjacent to the channel to resist scour.

Sediment and debris may accumulate in the connection channel during operation of the Proposed Project. However, such accumulation is expected to be comparatively limited; scouring velocities in the connection channel and notch would generally be relatively high, particularly on the receding limb of the flood hydrograph. The connection channel would also be inspected each year for areas of potential scour, and additional riprap (and engineered streambed material, if applicable) would be placed as needed. In addition, debris removal work occurs year-round, which would remain unchanged under the Proposed Project.

High-velocity flows through the notch and debris accumulation could occur during operation of the Proposed Project, resulting in erosion and scour. However, the proposed erosion repair and scour protection measures (e.g., use of riprap and concrete), regular removal of debris, and inspection and repair of riprap would reduce this impact to less than significant. Therefore, the Proposed Project's incremental impacts would not combine to cause or contribute to a significant cumulative impact related to alteration of the hydraulics of the Tisdale Bypass, which could result in substantial erosion. This impact would be less than significant.

Mitigation Measures: None required.

Impact 3.7-10: Operation of the Proposed Project in combination with other projects in the project area could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk. (Less than Significant)

As discussed previously, the results of the *Flood Hydrologic and Hydraulic System Analysis Technical Memorandum* (ESA, 2019b; Appendix I) indicated that even if the gates were to remain open during flood operations, and slightly more water were to enter the Sutter Bypass, adverse changes to the hydraulic performance of the flood control system and the extent of flooding in the Sutter Bypass would be negligible. Therefore, the Proposed Project would not affect the operation of the SRFCP or increase the risk of flooding.

As the project is currently proposed, the fish passage gates at Tisdale Weir would be closed during flood events that exceed an approximately 10 percent annual chance exceedance (10-year) design storm. The results of the analysis indicated that even if the gates were to remain open during flood operations, and slightly more water were to enter the Sutter Bypass, adverse changes to the hydraulic performance of the flood control system and the extent of flooding in the Sutter Bypass would be negligible. Therefore, the Proposed Project would not affect the operation of the SRFCP or increase the risk of flooding.

In addition, the Proposed Project would not change the flow of the Sacramento River. Flows in the Sacramento River downstream of Tisdale Weir are expected to be similar to existing conditions (i.e., to change by 5 percent or less). The Proposed Project would result in a negligible change to the hydraulic performance of the SRFCP. Changes to flows in the Sacramento River would occur only during episodes of high flow and would not result in substantially different flow conditions. Therefore, the Proposed Project's incremental impacts would not combine to cause or contribute to a significant cumulative impact related to alteration of the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk. This impact would be less than significant.

Mitigation Measures: None required.

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3.8 Recreation

3.8.1 Introduction

This section describes existing recreation uses in the project area and surrounding region, details the associated regulatory framework, and presents an analysis of potential impacts of the Proposed Project on recreation.

One comment letter regarding recreation was received in response to the Notice of Preparation (NOP). The topic of the letter, from Somach Simmons & Dunn, was whether changes to inundation in the Sutter Bypass resulting from the Proposed Project would have the potential to affect duck hunting opportunities. See **Appendix A** for NOP comment letters.

3.8.2 Environmental Setting

This section describes recreational resources at the project site and in the surrounding region. The project site is in the Sacramento Valley, partially within the Tisdale Bypass and near the Sutter Bypass, Sutter National Wildlife Refuge (SNWR), Sutter Bypass Wildlife Area (SBWA), and Sacramento River (**Figure 3.8-1**). In addition, private recreation areas and sites are dispersed throughout the region.

Sacramento River

The Sacramento River corridor is a Northern California recreation resource that supports a wide variety of uses: hiking and walking, fishing, camping, hunting, horseback riding, picnicking, motorized and non-motorized boating, and wildlife viewing. These uses are supported by numerous and varied federal, State, local, and commercial facilities and lands that provide river access. Facilities along the river include boat launches, trails and trail access points, fishing facilities, parks, wildlife areas, undeveloped open space areas, and marinas.

Near the project area, developed recreational facilities are limited, although portions of the Sacramento River adjacent to the Tisdale Bypass support water-based recreation, with boating and fishing access. The Tisdale Boat Launch Facility, the only boat access point to the Sacramento River from the Sutter County side of the river, is located at the western boundary of the project area. The facility was closed for the 2019 season because of debris accumulation within the facility and erosion of the access road and parking area that limited access.

The primary species for fishing in the Sacramento River nearest the project area are Chinook salmon, steelhead, striped bass, and sturgeon. In addition, the section of the Sacramento River in the project vicinity, stretching from Red Bluff Diversion Dam to Knights Landing, is the only stretch of river in the Sacramento Valley where fall salmon fishing is allowed (Sutter County, 2019).



SOURCE: Esri, 2018; CPAD, 2017; ESA, 2020

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 3.8-1
Recreational Areas in the
Project Area and Region

Use of the Sacramento River for fishing generally increases with the opening of the sturgeon fishing season (February) and continues until the Chinook salmon run decreases (typically after October). In this area, fishing typically occurs via boat, but shoreline fishing occurs sporadically throughout the area. Hunting opportunities seasonally include deer, waterfowl, mourning dove, valley quail, pheasant, rabbit, and turkey (CDFW, 2020a).

Sutter Bypass

The Sutter Bypass is a leveed floodway running north to south along the southwest portion of the Sutter Basin. Flows exiting the Tisdale Bypass flow through the Sutter Bypass to the Sacramento River. During major flood events, the Sutter Bypass fills with up to 12 feet of water. In general, the extent of flooding and inundation of the Sutter Bypass depends on the interaction of a variety of flow inputs (e.g., overflows from the Sacramento River at Tisdale Weir, Butte Basin inputs via Butte Creek/Slough, and overflows from the Feather River), their timing, and the water surface elevation of the Sacramento River near Fremont Weir (the downstream terminus of the Sutter Bypass). For additional information about the hydrology of the Sutter Bypass, see Section 3.2, *Agricultural Resources*, and the Flow Impacts Analysis included in **Appendix C**. The SBWA and private recreation areas are located within the Sutter Bypass and described below.

Sutter National Wildlife Refuge

The SNWR, owned and operated by the U.S. Fish and Wildlife Service (USFWS), is within the Sutter Bypass northeast of the project area. The SNWR is part of the Sacramento National Wildlife Refuge complex and consists of approximately 2,590 acres of wetlands, grasslands, and riparian habitat. During major flood events, portions of the SNWR are covered by up to 12 feet of water. The SNWR typically supports approximately 200,000 ducks and 100,000 geese from September through April, with peaks during January and February. The SNWR also provides habitat for federally listed and State-listed endangered and threatened species such as the giant garter snake, Chinook salmon, yellow-billed cuckoo, and Swainson's hawk (USFWS, 2018a).

The SNWR provides opportunities for fishing, wildlife viewing, and public hunting on parts of the refuge, following certain refuge-specific guidelines and criteria. Hiking trails for wildlife observation and photography are open seasonally, February 15–June 30. Waterfowl and pheasant hunting is permitted seasonally (USFWS, 2018a).

Although the SNWR is owned and operated by USFWS, public hunting opportunities are administered by the California Department of Fish and Wildlife (CDFW). CDFW manages the SNWR as a Type A wildlife area, a wildlife area that restricts hunter access during waterfowl season and requires the purchase of a hunting pass in advance (California Code of Regulations Title 14, Section 551[e] [14 CCR Section 551(e)]). Hunting season for waterfowl (ducks and geese) within the Sutter Bypass is open between September 28 and February 12 (CDFW, 2020b), and many of the duck blinds in the Sutter Bypass are accessed by boat.

Sutter Bypass Wildlife Area

The SBWA, managed by CDFW, is located within, downstream of, and upstream of the project area on the Sacramento River. The SBWA consists of the Tisdale Bypass and two long, narrow parcels on either side of the Sutter Bypass, and totals approximately 3,200 acres. The SBWA provides opportunities for fishing, wildlife viewing, and hunting.

The primary species for fishing in the SBWA are Chinook salmon, catfish, bullheads, largemouth bass, bluegill, sunfish, and black crappie. Fishing use generally increases with the opening of the Chinook salmon fishing season, typically from October to November. Seasonal hunting for deer, waterfowl, and mourning dove occurs in the SBWA. Valley quail, pheasant, rabbits, and turkeys may also be found in the wildlife area (CaliforniaLandCAN, 2019). CDFW manages the SBWA as a Type C wildlife area, an area that is generally open daily for hunting for all legal species in season and does not require the purchase of a pass for entry (CDFW, 2020a).

Tisdale Bypass

The Tisdale Bypass is bounded by the Sacramento River to the west and the Sutter Bypass to the east. The bypass is designated and managed by CDFW as part of the SBWA. In the late fall and winter, the Tisdale Bypass is used as a floodway when the bypass is periodically inundated to provide flood relief for the Sacramento River. Public use of the CDFW-managed areas typically occurs in the spring through early winter, or when the Tisdale Bypass is not used as a floodway for the Sacramento River. When the bypass is inundated, public access and recreational uses are limited.

Private Recreation Areas and Sites

In addition to the public recreation areas, the region provides private recreational opportunities. More than 10 private hunting clubs operate in the region, with the closest being the Duck Blind at Sutter Refuge, south of the project area. Based on aerial imagery from 2018, two private hunting clubs are located within the Sutter Bypass downstream of the Tisdale Bypass; these areas comprise a total of three parcels and are enrolled in Williamson Act contracts (see Section 3.2, *Agricultural Resources*). Two private marinas and boat clubs are also located south of the project area. Most private recreational use and opportunities occur on the expansive private lands throughout the region, often in areas without developed recreational facilities.

3.8.3 Regulatory Setting

Federal

North American Waterfowl Management Plan

The *North American Waterfowl Management Plan* was adopted in 1986 and amended in 2012 and 2018. The international plan was established by Canada and the United States and was expanded in 1994 to include Mexico. In the United States, this management plan is administered by USFWS and provides a broad framework for waterfowl conservation and management. The plan identified

population objectives for key species and established habitat goals to sustain these populations. The plan sets forth three overarching goals for waterfowl conservation (NAWMP, 2018):

- **Goal 1:** Abundant and resilient waterfowl populations to support hunting and other uses without imperiling habitat.
- **Goal 2:** Wetlands and related habitats sufficient to sustain waterfowl populations at desired levels while providing places to recreate and ecological services that benefit society.
- **Goal 3:** Growing numbers of waterfowl hunters, other conservationists, and citizens who enjoy and actively support waterfowl and wetlands conservation.

U.S. Fish and Wildlife Service's Recreational Fisheries Policy

This policy (USFWS, 1989) defines USFWS's stewardship role in management of recreational fishery resources. The policy was designed to unify agencies, organizations, and individuals throughout the United States to enhance the vitality of the recreational fisheries at the local, state, and national levels. Specifically, the policy is to take the following actions:

- (1) Protect, restore, and enhance fish populations and their habitats.
- (2) Promote recreational fishing on USFWS and other lands to provide the public with a high quality recreational experience.
- (3) Ensure that recommendations concerning recreational fisheries potentials and opportunities are included as part of appropriate field studies and management assistance efforts performed by USFWS on non-USFWS waters.
- (4) Serve as an active partner with other Federal governmental agencies, states, Tribes, conservation organizations, and the public in developing recreational fisheries programs.
- (5) Promote the conservation and enhancement of the nation's recreational fisheries through USFWS's grant and aid programs.
- (6) Improve and expand quantifiable economic valuations of the nation's recreational fisheries to demonstrate the importance of this resource to the health and welfare of society and the nation's economy.

National Wildlife Refuge System Improvement Act of 1997

The National Wildlife Refuge System Improvement Act ensures that the refuge system is managed as a national system of related lands, water, and interests for the protection and conservation of wildlife resources in the United States (USFWS, 2018b). The law guides the overall management of the refuge system and identifies the following main components:

- A strong and singular wildlife conservation Mission for the Refuge System.
- A requirement that the Secretary of the Interior maintain the biological integrity, diversity, and environmental health of the Refuge System.
- A new process for determining compatible uses on refuges.

- A recognition that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, when determined to be compatible, are legitimate and appropriate public uses of the Refuge System.
- That these compatible wildlife-dependent recreational uses are the priority general public uses of the Refuge System.
- A requirement for preparing a Comprehensive Conservation Plan for each refuge.

Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges Final Comprehensive Conservation Plan

The Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges Final Comprehensive Conservation Plan (CCP) guides management of the SNWR through 2025. The CCP addresses USFWS's policies, goals, and compliance for the wildlife refuge system (USFWS, 2009).

The following goals, objectives, and strategies for the CCP specifically address recreation at the SNWR.

Goal 1, Wildlife and Habitat Goal: Conserve, manage, restore, and enhance habitats and associated plant and wildlife species, with an emphasis on supporting an abundance and natural diversity of wintering and migrating waterfowl, shorebirds, birds of prey, and songbirds.

Goal 3, Visitor Services Goal: Provide visitors of all ages and abilities with quality wildlife dependent recreation (hunting, wildlife observation, photography, environmental education, and interpretation), and volunteer opportunities to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitats, and cultural resources.

Goal 5, Resource Protection Goal: Adequately protect and maintain all natural and cultural resources, staff and visitors, equipment, facilities, and other property on the Refuges.

Objective 3.1, Hunting: Implement a high quality hunting program including opportunities for approximately 22,000 annual hunting visits on 8,525 acres by 2024, depending on season length and climatic conditions.

Objective 3.2, Wildlife Observation: Provide quality opportunities for 100,000 wildlife viewing annual visits on 8,575 acres by 2024.

Objective 3.3, Wildlife Photography: Provide quality opportunities for 80 photography blind visits and 10,000 wildlife photography annual visits on 8,758 acres by 2024.

Objective 5.3, Facility Maintenance: By 2024, perform and document preventive and corrective maintenance on 100 percent of the buildings, structures, and access routes, including facilities with historic significance.

Sutter Bypass Management Strategy 1.5.1: Work closely with DWR, Sutter County, and Central Valley Flood Protection Board (formerly The Reclamation Board) staff on floodplain management issues at Sutter Refuge. Provide each agency with copies of annual habitat management plans.

Anadromous Fisheries and Native Fisheries Strategy 1.11.1: Coordinate with Department of Water Resources (DWR) to keep the weirs clean in the Sutter Bypass.

Anadromous Fisheries and Native Fisheries Strategy 1.11.3: Continue to provide and monitor the flow-through water management system at Sutter Refuge to prevent entrapment of native fish.

Hunting Strategy 3.1.10: Work cooperatively with CDFG [CDFW] wardens to enforce State Fish and Game hunting laws and Refuge-specific regulations to provide a quality experience for all visitors.

Wildlife Observation Strategy 3.2.7: Open selected portions of the hunt area (2,275 acres) and modify parking areas to provide wildlife observation from February through June (post waterfowl season).

Wildlife Photography Strategy 3.3.4: Open selected portions of the hunt area (2,275 acres) and modify parking areas to provide wildlife photography from February through June (post waterfowl season).

Facility Maintenance Strategy 5.3.3: Maintain roads, levees, fences, gates, water conveyance system, and other Real Property to Service standards.

State

CDFW owns and manages the SBWA, located within the Tisdale Bypass. Visitor use of all CDFW lands is subject to the general regulations listed in 14 CCR Sections 550 and 550.5. Visitor use of wildlife areas is also subject to 14 CCR Sections 551(a) through 551(h) and any other sections of Title 14 that apply. These regulations also include several property-specific regulations of public use of CDFW lands, which are summarized for each area in **Table 3.8-1**.

**TABLE 3.8-1
REGULATIONS FOR PUBLIC USE AT CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
WILDLIFE AREAS**

Subsection of CCR Title 14	Regulation
551(o)(58), Designated Closures and Restrictions on Wildlife Areas	(58) Those portions east and west levees of the area adjacent to the Sutter National Wildlife refuge are closed to hunting. The west levee of the area is closed to hunting from the northern boundary of the SNWR south to Oswald/Hughes Road. The east levee of the area is closed to hunting from the northern boundary of the SNWR south to the SNWR check station parking lot. The remaining portion of the east levee from the SNWR parking lot south of the southern boundary of the SNWR is closed to hunting pursuant to Section 625 of these regulations.
551(x)(22), Number of Hunters Per Reservation	(22) Number of hunters: Four persons but not more than two junior hunters or non-shooters. Reservation expires: One before shoot time.
551(r)(51), Firearm Restrictions on Type C Wildlife Areas	(51) Rifles and pistols are prohibited.
2.35, Taking Fish Near Dams, Fishways, Screens, and Egg-Taking Stations	No fish may be taken within 250 feet of: (b) any dam or any weir or rack that has a fishway or an egg-taking station.

NOTES: CCR = California Code of Regulations; SNWR = Sutter National Wildlife Refuge

SOURCE: Data compiled by Environmental Science Associates in 2019

Local

The Sutter County General Plan (2030) includes goals and policies that are intended to ensure that adequate park, recreation, and open-space lands and programs are provided to meet the diverse needs of Sutter County's residents. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.8.4 Impacts and Mitigation Measures

Methods of Analysis

Environmental Science Associates (ESA) prepared a TUFLOW Model Results and CEQA Impacts Analysis (Flow Impacts Analysis), included as Appendix C, to analyze hydrology and hydraulics under existing and project conditions and quantify any changes in inundation downstream in the Sutter Bypass that could result from the Proposed Project (ESA, 2020). For this analysis, ESA developed a coupled one-dimensional/two-dimensional hydrodynamic model of the Tisdale and Sutter Bypasses using the TUFLOW HPC commercial software package (TUFLOW), and an approach and methodology for assessing the modeling results in the context of CEQA impact criteria. For additional information about the methodology and hydraulic model, see Section 3.2, *Agricultural Resources*, and Appendix C. The Flow Impacts Analysis evaluates areas within the Sutter Bypass generally south of State Route 20, which includes the entire extent of the SNWR to the lower Sutter Bypass (see Figure 3 in Appendix C).

Hunting season for waterfowl (ducks and geese) within the Sutter Bypass is open between September 28 and February 12. (Hunting within the SNWR may be limited to discrete periods within the hunting season.) Therefore, the Flow Impacts Analysis assumes that potential flow-related impacts of the Proposed Project on waterfowl hunting areas would be changes to the extent, depth, and/or duration of inundation on parcels used for hunting waterfowl. These changes could affect the extent of recreational area (e.g., cause a change in available waterfowl habitat) or preclude access along roads that may be newly inundated relative to existing conditions.

It is important to note that hunting areas are inside the Sutter Bypass, a floodway that conveys floodwaters and frequently inundates these hunting sites at depths considerably greater than a few feet and closes access roads. Further, when the sites are not inundated by floodwaters, some areas are actively managed (via diversion and pumping) to generate the desired, shallow-flooded habitat (less than 18 inches in depth). The exact timing of the active management of these sites is unknown; therefore, the interaction of natural floodwaters and any supplemental flow or water movement is complex and not readily assessed.

To assess any potential flow-related impacts of the Proposed Project, a comparative assessment of the additional wet days resulting from increased flows from the Proposed Project was used as a proxy for a lack of access/too wet to hunt. A *wet day* was determined to be a day during the waterfowl hunting season (September 28 through February 12 [CDFW, 2020b]) when the

TUFLOW modeling results indicate that water on 30 percent of the parcel or more is at least 0.1 feet deep (Appendix C).

Additional methods of data collection and analysis for recreation resources consisted of the following:

- Review of the plans and policies referenced in Section 3.8.3, *Regulatory Setting*
- Review of the Proposed Project's operation and maintenance activities described in Chapter 2, *Project Description*
- Use of geographic information system data for existing public recreation areas and project components

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact is considered significant if the Proposed Project would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

In addition, an impact is considered significant if the Proposed Project would result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.

Impacts Not Evaluated Further

The following impact was evaluated and determined to result in no impact; therefore, this topic is not evaluated further in this EIR. The analysis is summarized below. For a complete discussion, see the Initial Study Environmental Checklist in **Appendix B** of this EIR.

Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. The Proposed Project does not require the construction of new or expanded recreational facilities and would not cause a population increase in the project area that would increase demand for recreational facilities. Therefore, the Proposed Project would not result in an adverse physical impact on the environment.

Project-Specific Impacts and Mitigation Measures

Table 3.8-2 summarizes the impact conclusions presented in this section.

**TABLE 3.8-2
 SUMMARY OF IMPACT CONCLUSIONS—RECREATION**

Impact Statement	Impact Conclusion
3.8-1: Implementation of the Proposed Project could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS
3.8-2: Implementation of the Proposed Project could potentially result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.	LS
3.8-3: Implementation of the Proposed Project in conjunction with past, present, and potential future development in the surrounding region could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS
3.8-4: Operation and maintenance of the Proposed Project in conjunction with past, present, and potential future development in the surrounding region could result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.	LS

NOTE: LS = Less than Significant

SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.8-1: Implementation of the Proposed Project could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (Less than Significant)

Construction

The project area is in the SBWA, but no portion of the project area lies within the SNWR. The existing parking lot west of Tisdale Weir provides access to the SBWA and the Tisdale Boat Launch Facility. The Proposed Project could directly affect recreational access to the SBWA and the Tisdale Boat Launch Facility by requiring the temporary closure of areas where construction activities would occur. Portions of the eastern edge of the parking lot would be blocked off to public access during construction. As noted in Chapter 2, *Project Description*, construction workers would manage the flow of vehicles maneuvering in and out of the parking lot. The boat ramp is anticipated to remain open during construction of the Proposed Project.

Construction activities would occur between April 16 and October 31, which overlaps with several hunting seasons and summer recreational boat use in the Sacramento River. The Proposed Project is not anticipated to result in reduced access for hunting that could result in an incremental increase in hunting use in other nearby wildlife areas, including within the SNWR, which offers similar recreational opportunities. Limited access at the Tisdale Boat Launch Facility could result in a slight incremental increase in the use of other boat launch facilities. Increased use of nearby recreational areas could affect the condition of those facilities. This would be a significant impact if the use of existing facilities were to increase such that substantial physical deterioration of the facility would occur or be accelerated.

The potential temporary increase in use levels in other adjacent recreation areas would be short-term and temporary (approximately 6½ months per construction season over two construction seasons), and a variety of other recreational areas are available in the project vicinity. Therefore, construction activities for the Proposed Project would not result in the substantial physical deterioration or accelerated deterioration of nearby recreation areas.

Operation and Maintenance

Operation of the Proposed Project could cause a minimal seasonal reduction in the amount of land available for recreation in established wildlife areas and at private hunting clubs near the project area by increasing flows in the Sutter Bypass during the waterfowl hunting season. This would be a significant impact if a reduction in access to wildlife areas were to cause an incremental increase in the use of other nearby wildlife areas and the resulting use of existing facilities were to increase such that substantial physical deterioration of the facility would occur or be accelerated.

Impact 3.8-2 discusses the predicted average annual change in the number of wet days compared to existing conditions, by parcel, as a result of the Proposed Project. For the private hunting clubs in the Sutter Bypass and the SNWR, the range of additional wet days (based on annual average) is 0 to 3.9 days for the water year and 0 to 1.9 days for just the waterfowl season (i.e., September 28 through February 12). Specifically, for the private waterfowl hunting clubs, the predicted increase in the number of wet days, on average, is at most 1 day.

Therefore, the Proposed Project is not anticipated to cause a reduction in access to wildlife areas during project operation that, in turn, could cause an incremental increase in the use of other nearby wildlife areas that offer similar recreational opportunities. A variety of other recreational areas are available in the project vicinity, and potential increases in the use of other areas caused by changes in the number of wet days in the Sutter Bypass would be very limited and seasonal.

The Proposed Project would not result in the substantial physical deterioration of nearby recreation areas or accelerated deterioration of nearby recreation areas. This impact would be less than significant.

Mitigation Measures: None required.

Impact 3.8-2: Implementation of the Proposed Project could result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities. (Less than Significant)

Construction

As stated in Impact 3.8-1, the Proposed Project could directly affect recreational access to the SBWA and the Tisdale Boat Launch Facility by requiring the temporary closure of areas where construction activities would occur. Portions of the eastern edge of the parking lot would be

blocked off to public access during construction. Construction workers would manage the flow of vehicles maneuvering in and out of the parking lot. The boat ramp is anticipated to remain open during construction of the Proposed Project.

The reduced access for the Tisdale Boat Launch Facility could result in increased use in other nearby wildlife and recreational areas, particularly SNWR, which offers similar recreational opportunities. However, construction would be short-term and temporary and would not permanently displace existing recreational facilities or cause a substantial permanent decrease in access to existing recreational facilities or opportunities.

Operation and Maintenance

The Sutter Bypass downstream of the project area contains two private hunting clubs that are operated specifically to create beneficial habitat for migratory waterfowl. In addition, the SNWR manages certain areas for the benefit of migratory waterfowl.

Table 3.8-3 presents the results of the analysis of potential impacts of the Proposed Project on hunting clubs in the Sutter Bypass and the SNWR (see also Figures 11 and 12 in Appendix C). The table shows the predicted average annual change in the number of wet days, by parcel, as a result of implementation of the Proposed Project. For the hunting clubs and the SNWR, the range of additional wet days (based on annual average) is 0 to 3.9 days for the water year and 0 to 1.9 days for just the waterfowl season (i.e., from September 28 through February 12). Specifically, for the private waterfowl hunting clubs, the predicted increase in the number of wet days, on average, is at most one day (Appendix C).

**TABLE 3.8-3
 ADDITIONAL NUMBER OF WET DAYS, ANNUAL AVERAGE BY PARCEL(S) (PROJECT CONDITION MODEL RESULTS, WATER YEARS 1997–2018)**

Land Use	Water Year (simulation period, September 28–June 30)	Waterfowl Season (September 28–February 12)
Sutter National Wildlife Refuge	0.0 to 3.9 days	0.0 to 1.9 days
Williamson Act lands*	0.9 to 3.0 days	0.5 to 1.0 days

NOTE:

* Current agricultural compatible use = duck/hunting club

SOURCE: Data compiled by Environmental Science Associates in 2020; Appendix C

More broadly, the average annual change in the number of wet days, by parcel, does not exceed approximately 7 days (or 1 week) throughout the modeled domain of the Sutter Bypass. The largest changes, which are outside of this range, are all within the Tisdale Bypass; lands within the Tisdale Bypass are generally perennially idle, and none of the land use designations related to recreation are relevant.

Based on the modeling results, implementing the Proposed Project would result in very little to no increase in the average annual number of wet days on recreational parcels, including SNWR.

Given the seasonal and year-to-year variation in inundation within the Sutter Bypass under existing conditions, there is nothing to suggest that this small, predicted change would result in any substantial loss of recreational opportunities with regard to waterfowl hunting. On the contrary, the small increase in the duration of wet conditions may be beneficial to areas used for waterfowl hunting (e.g., it may provide additional habitat or maintain existing habitat for a longer period) (Appendix C).

Given the limited increases in average wet days that could occur with operation of the Proposed Project, no existing recreational facilities would be permanently displaced, and access to existing recreational facilities or opportunities would not be substantially permanently decreased. This impact would be less than significant.

Mitigation Measures: None required.

Cumulative Impacts and Mitigation Measures

This evaluation of cumulative impacts considers the potential of the Proposed Project, in combination with other past, present, and future projects, to result in significant impacts on recreation resources. The area of analysis for these cumulative impacts includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the connection to the Tisdale Bypass. Projects include DWR's Sutter Bypass Pumping Plant Rehabilitation Project, which proposes to retrofit maintenance structures at three separate pumping plants along the East Levee of the Sutter Bypass; and the U.S. Bureau of Reclamation and CDFW's Sutter National Wildlife Refuge Lift Station Project, which includes construction of a lift station that would allow the SNWR to divert water from the East Borrow Ditch. Past projects in the vicinity of the project area include DWR's Tisdale Bypass Sediment Removal 2020 Project (2020), the Sutter Bypass East Borrow Canal Water Control Structures Project (2009), the Tisdale Bypass Channel Rehabilitation Project (2007), the Garmire Road Bridge Replacement Project (2004), and the Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009).

Impact 3.8-3: Implementation of the Proposed Project in conjunction with past, present, and potential future development in the surrounding region could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (Less than Significant)

Although some of the cumulative projects and plans could adversely affect recreational resources by increasing the use of existing parks and recreational facilities, the Proposed Project would not substantially contribute to those cumulative effects, given the availability and variety of other recreational areas in the project vicinity. In addition, if any of the cumulative projects would have significant short-term impacts on the area of analysis, these impacts would likely be reduced to a less-than-significant level. Therefore, the Proposed Project's incremental contributions to the

cumulative effects associated with recreation resources would not be cumulatively considerable. This impact would be less than significant.

Mitigation Measures: None required.

Impact 3.8-4: Operation and maintenance of the Proposed Project in conjunction with past, present, and potential future development in the surrounding region could result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities. (Less than Significant)

Some of the cumulative projects could change the frequency and duration of flooding at the established wildlife and recreational areas in the region, resulting in permanent displacement of existing facilities or a substantial permanent decrease in access to facilities. However, the Proposed Project would result in a minimal increase in additional wet days (based on annual average), occurring 0 to 3.9 days for the water year and 0 to 1.9 days for just the waterfowl season (i.e., from September 28 through February 12).

Operation of the Proposed Project would not permanently displace existing recreational facilities or recreational opportunities. In addition, if any of the cumulative projects would have significant short-term impacts on the area of analysis, these impacts would likely be reduced to a less-than-significant level. Therefore, the Proposed Project's incremental contributions to cumulative effects on recreation resources would not be cumulatively considerable. This impact would be less than significant.

Mitigation Measures: None required.

3.9 Tribal Cultural Resources

3.9.1 Introduction

This section examines the potential impacts of the Proposed Project on tribal cultural resources. Much of the background context and methods used to analyze potential impacts of the Proposed Project are the same for tribal cultural resources and cultural resources. Therefore, to avoid redundancy, this information is presented in Section 3.5, *Cultural Resources*, and is not repeated here.

For the purposes of this analysis, the term *tribal cultural resource* is defined as follows:

Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are listed, or determined to be eligible for listing, in the National Register of Historic Places (National Register), California Register of Historical Resources (California Register), or a local register of historical resources.

The term *indigenous*, rather than *prehistoric*, is used as a synonym for “Native American–related” (except when quoting). *Pre-contact* is used as a chronological adjective to refer to the period before the arrival of Euroamericans in the subject area. “Indigenous” and “pre-contact” are often, but not always, synonymous: The former term refers to a cultural affiliation and the latter is chronological.

This section relies on the information and findings in the *Tisdale Weir Rehabilitation and Fish Passage Project, Sutter County, California: Cultural Resources Inventory and Evaluation Report* (Hoffman and Cleveland, 2019). That report (**Appendix G** [confidential appendix]) details the results of the cultural resources study, which examined the environmental, ethnographic, and historic background of the project area, emphasizing aspects of human occupation.

The California State Lands Commission and California Native American Heritage Commission (NAHC) provided comments regarding tribal cultural resources in response to the Notice of Preparation (NOP) (see **Appendix A**). The State Lands Commission recommended that the EIR address impacts on submerged cultural resources and include a mitigation measure requiring that work be stopped in the event of accidental discovery. See Section 3.5, *Cultural Resources*. The State Lands Commission also suggested that the EIR discuss how the scope and extent of resources meeting the definition of tribal cultural resources was determined and whether locally affiliated Tribes were consulted as part of this determination. The NAHC summarized Assembly Bill (AB) 52 requirements, recommended early consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the Proposed Project, and provided recommendations for cultural resources assessments. See also Section 3.5.

3.9.2 Environmental Setting

The environmental setting for tribal cultural resources is encompassed by that presented for cultural resources in Section 3.5.2 of this DEIR. Therefore, only select, focused portions of the environmental setting are repeated in this section.

Ethnographic Setting

Before Euroamericans occupied California, the CEQA Area of Potential Effects was traditionally occupied by the Patwin. The Patwin territory covered an extensive area of north-central California, including the lower west side of the Sacramento Valley west of the Sacramento River from about the present-day town of Princeton in the north to Benicia in the south. The Patwin territory was bounded to the north, northeast, and east by the territories of other Penutian-speaking peoples (Nomlaki, Wintu, and Maidu, respectively). The Pomo and other coastal groups were located to the west. In their large territory, the Patwin have traditionally been divided into River, Hill, and Southern groups, although more complex linguistic and cultural differences existed than these three geographic divisions indicate.

A review of ethnographic literature for the Proposed Project revealed that several Native American villages have been documented near the project area, including five within 2 miles, although all are at least 0.25 mile from the project area. The Patwin village *Ko-sim'-po* and the Maidu village *Hól'-lup-pi*, both located east of the Sacramento River, are south of the project area. Villages documented west of the Sacramento River were all associated with the Patwin, and include *No'-wis-ap'-pe*, *No'-mah-chup'-pin*, and *No'-we-'hla'-ah*, respectively located southwest, northwest, and south of the project area.

Existing Cultural Environment

Archival Research

The California Historical Resources Information System has records of two previously recorded indigenous cultural resources (P-06-000029 and P-51-000004) within 0.5 mile of the project area. Both resources were recorded in 1936, at locations outside the project area. P-06-000029 was recorded as an archaeological site consisting of a leveled mound, projectile points, shell, and midden soil, while P-51-000004 was described as an archaeological site consisting of a mound, shell, and midden soil. **Table 3.9-1** summarizes these resources.

**TABLE 3.9-1
 PREVIOUSLY RECORDED INDIGENOUS CULTURAL RESOURCES WITHIN 0.5 MILE OF THE PROJECT AREA**

Primary (P-)	Trinomial (CA-)	Type	Age/Affiliation	Name/Description	Recorder(s)	Previous Eligibility
06-000029	COL-5	Site	Indigenous	Leveled mound, projectile points, shell, midden	Heizer and Krieger (1936)	Unevaluated
51-000004	SUT-4	Site	Indigenous	Mound, shell, midden	Heizer and Krieger (1936)	Unevaluated

SOURCE: Search of California Historical Resources Information System records in 2019

Native American Correspondence

Environmental Science Associates (ESA) contacted the NAHC on October 5, 2018, requesting a search of the NAHC's Sacred Lands File and a list of Native American representatives who may have interest in the Proposed Project. The NAHC replied on October 9, 2018, stating that the Sacred Lands File has no record of sacred sites in the project area. The reply also listed Native

American representatives to contact regarding these resources, indicating that they may be interested in the Proposed Project.

United Auburn Indian Community of the Auburn Rancheria

On October 31, 2018, DWR sent a letter via certified mail to Gene Whitehouse, Chairperson of the United Auburn Indian Community of the Auburn Rancheria (UAIC). The letter provided information about the Proposed Project and asked UAIC to notify DWR if they would like to consult under California Public Resources Code (PRC) Section 21080.3.

On November 1, 2018, DWR emailed UAIC Cultural Resources Manager Marcos Guerrero. The email informed Mr. Guerrero that a letter with details of the Proposed Project had been mailed and asked whether UAIC would like to participate in the cultural resources field survey. Mr. Guerrero replied that UAIC was interested in participating, and ESA and UAIC exchanged emails to schedule the survey. DWR met UAIC Tribal Monitor Rene Guerrero and ESA in the field on November 2, 2018, before a field survey, in which UAIC and ESA participated.

On November 28, 2018, DWR received a letter from UAIC Chairperson Whitehouse (dated November 13, 2018). The letter stated that UAIC would like to formally consult on the Proposed Project under PRC Section 21080.3, and to schedule a meeting. On April 2, 2019, DWR emailed UAIC representatives to ask how UAIC would like to proceed with consultation. UAIC responded via email on April 12, 2019, stating that although a UAIC representative was present during the cultural resources pedestrian survey, UAIC still had some concerns because a Native American village had been documented in the project vicinity. The UAIC email also provided mitigation measures to incorporate into the EIR, regarding inadvertent discovery of cultural resources and tribal cultural resources and a tribal cultural resources awareness training.

Between August and December 2019, DWR and UAIC conducted consultation, via email, regarding potential impacts of the Proposed Project on cultural resources and tribal cultural resources and appropriate mitigation measures to reduce any such impacts. During the consultation, UAIC did not identify any tribal cultural resources that could be affected by the Proposed Project. In December 2019, DWR and UAIC agreed on the impact conclusions for cultural resources and tribal cultural resources and accompanying mitigation measures for this EIR, with UAIC agreeing to conclude consultation if the language was incorporated into the EIR. The discussion of impacts and mitigation measures for cultural resources and tribal cultural resources in this EIR are those agreed to during the consultation.

Correspondence with Other Native American Representatives

On November 14, 2018, DWR sent letters via certified mail to each contact provided in the NAHC reply, other than the UAIC representative. The letters provided information on the Proposed Project and asked the recipients to provide information on cultural resources that may be affected by the Proposed Project, if they would like to do so. The only response to these letters came from the Tribal Historic Preservation Officer for the Yocha Dehe Wintun Nation (YDWN), who stated that the Proposed Project is not within the YDWN aboriginal territories, and that therefore, the YDWN declined to comment on the Proposed Project.

Appendix G presents documentation of the correspondence with Native American representatives regarding the Proposed Project that has occurred to date.

Field Survey

In November 2018, ESA archaeologists and a UAIC tribal monitor conducted a cultural resources pedestrian survey of all portions of the project area except the northeast staging area and the western portion of the southern staging area. In May 2019, ESA archaeologists conducted a cultural resources pedestrian survey of the northeast staging area portion of the project area. In September 2020, an ESA archaeologist conducted a cultural resources pedestrian survey of the western portion of the southern staging area. The pedestrian surveys used intensive methods that consisted of walking parallel transects spaced no more than 15 meters apart and inspecting the surface for cultural materials (archaeological or architectural) or evidence. When ground visibility was poor, cleared areas and areas disturbed by rodents along and between the transect lines were checked with special attention. Between the pedestrian surveys, all portions of the project area were covered except for a narrow stretch of very dense understory paralleling the north side of the Tisdale Bypass. No archaeological resources or potential tribal cultural resources were identified in the project area.

Summary

Through archival research, records searches, correspondence with Native American representatives, and pedestrian surveys, no tribal cultural resources or potential tribal cultural resources were identified in the project area, nor were any such resources that could be affected by the Proposed Project identified.

3.9.3 Regulatory Setting

State

California Environmental Quality Act

CEQA (PRC Section 21000 et seq.) is the principal statute governing environmental review of projects occurring in California. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including a significant effect on tribal cultural resources. Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment.

Assembly Bill 52 and Tribal Cultural Resources

AB 52, enacted in September 2014, recognizes that California Native American Tribes have expertise with regard to their tribal history and practices. The law established a new category of cultural resources in CEQA, *tribal cultural resources*, to consider tribal cultural values when determining the impacts of projects on cultural resources (PRC Sections 21080.3.1, 21084.2, and 21084.3).

PRC Section 21074(a) defines a tribal cultural resource as follows:

- 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.
 - Included in a local register of historical resources, as defined in PRC Section 5020.1(k).
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. 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 PRC Section 21074(a) is also a tribal cultural resource if the landscape is geographically defined in terms of the size and scope. A historical resource as described in PRC Section 21084.1, a unique archaeological resource as defined in PRC Section 21083.2, or a non-unique archaeological resource as defined in PRC Section 21083.2 may also be a tribal cultural resource under CEQA if it meets the criteria identified in PRC Section 21074(a).

AB 52 requires CEQA lead agencies to analyze the impacts of projects on tribal cultural resources separately from impacts on archaeological resources (PRC Sections 21074 and 21083.09) because archaeological resources have cultural values beyond their ability to yield data important to prehistory or history. AB 52 also defines tribal cultural resources in a new section of the Public Resources Code (PRC Section 21074; see above). Lead agencies must engage in additional consultation with California Native American Tribes (PRC Sections 21080.3.1, 21080.3.2, and 21082.3).

The provisions of AB 52 apply to projects for which an NOP or a notice of negative declaration/mitigated negative declaration was filed on or after July 1, 2015. As such, AB 52 applies to the Proposed Project.

California Register of Historical Resources

The California Register 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” (PRC Section 5024.1[a]). Per PRC Section 5024.1, certain resources are automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a cultural resource must be significant at the federal, State, and/or local level under one or more of the following four criteria:

- (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.

A resource eligible for the California Register must be of sufficient age, and retain enough of its historic character or appearance (integrity), to convey the reason for its significance. The California Register consists of both resources that are listed automatically and resources that must be nominated through an application and public hearing.

The California Register automatically includes the following resources:

- California properties listed in the National Register and those formally determined eligible for the National Register.
- California Registered Historical Landmarks from No. 770 onward.
- California Points of Historical Interest that have been evaluated by the California Office of Historic Preservation and have been recommended to the State Historical Commission for inclusion in the California Register.

The following other resources may be nominated to the California Register:

- Historical resources with a significance rating of Categories 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register).
- Individual historic resources.
- Historic resources contributing to historic districts.
- Historic resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

California Public Resources Code Section 5097

PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains that are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any Native American artifacts or human remains is guilty of a felony punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect, or with malice or wantonness, is also guilty of a felony punishable by imprisonment.

California Native American Historic Resources Protection Act

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to \$50,000 per violation, for persons who unlawfully and maliciously excavate upon, remove, destroy, injure, or deface a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

California Health and Safety Code Section 7050.5

Section 7050.5 of the California Health and Safety Code protects human remains by prohibiting the disinterment, disturbance, or removal of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (reiterated in State CEQA Guidelines Section 15064.59[e]) also identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

California Natural Resources Agency Tribal Consultation Policy

The California Natural Resources Agency’s Final Tribal Consultation Policy, adopted November 12, 2012, was developed in response to Governor Brown’s Executive Order B-10-11 (September 19, 2011), which states, “[t]he purpose of this policy is to ensure effective government-to-government consultation between the Natural Resources Agency, its Departments...and Indian Tribes...to provide meaningful input into the development of regulations, rules, policies, programs, projects, plans, property decisions, and activities that may affect tribal communities.”

DWR Tribal Engagement Policy

DWR adopted a Tribal Engagement Policy, effective March 8, 2016, to strengthen DWR’s commitment to improving communication, collaboration, and consultation with California Native American Tribes. This policy is consistent with Executive Order B-10-11, the California Natural Resources Agency’s Tribal Consultation Policy, and AB 52, and includes principles that facilitate early and meaningful tribal engagement with California Native American Tribes.

Submerged Cultural Resources

The title to (submerged) cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the State Lands Commission (PRC Section 6313[a]). Also, according to PRC Section 6313(c), any submerged cultural resource remaining in State waters for more than 50 years is presumed to be archaeologically or historically significant.

Local

The Sutter County General Plan (2030) includes goals and policies that are intended to identify, protect, and enhance Sutter County’s important tribal cultural resources. While DWR, as a State agency, is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County (County) regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.9.4 Impacts and Mitigation Measures

Methods of Analysis

Effective for projects for which an NOP or a notice of negative declaration/mitigated negative declaration was filed on or after July 1, 2015, CEQA requires that a project’s impacts on tribal cultural resources be considered as part of the overall analysis of project impacts (PRC Sections 21080.3.1, 21084.2, and 21084.3). The significance of a tribal cultural resource is assessed by

evaluating: (1) its eligibility for listing in the California Register; (2) its eligibility as a unique archaeological resource pursuant to PRC Section 21083.2; and (3) its listing status in the NAHC's Sacred Lands File. In addition, a lead agency can independently determine a resource to be a tribal cultural resource.

California Native American Tribes are considered experts with respect to tribal cultural resources. Thus, the analysis of whether project impacts may result in a substantial adverse change to the significance of a tribal cultural resource depends heavily on consultation between the lead agency and culturally affiliated California Native American Tribes during the CEQA process.

Standards of Significance

Based on Appendix G of the State CEQA Guidelines, an impact related to tribal cultural resources is considered significant if the Proposed Project would:

- Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:
 - Listed or eligible for listing in the California Register, or in a local register of historical resources as defined in PRC Section 5020.1(k); or
 - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.

Project-Specific Impacts and Mitigation Measures

Table 3.9-2 summarizes the impact conclusions presented in this section.

TABLE 3.9-2
SUMMARY OF IMPACT CONCLUSIONS—TRIBAL CULTURAL RESOURCES

Impact Statement	Impact Conclusion
3.9-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.	LSM
3.9-2: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of a tribal cultural resource, as defined in PRC Section 21074.	LSM

NOTE: LSM = Less than Significant with Mitigation Measures

SOURCE: Data compiled by Environmental Science Associates in 2019

Impact 3.9-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074. (Less than Significant with Mitigation)

No tribal cultural resources, as defined in PRC Section 21074, have been identified in the project area through archival research, a field survey, or Native American consultation. Furthermore, extensive work, including excavation for installing deep foundations for the Garmire Road Bridge, has been conducted in this area without any findings. Therefore, there is no substantial evidence of the presence of any tribal cultural resources in the project area. As a result, the Proposed Project is not expected to result in an impact on any tribal cultural resources, as defined in PRC Section 21074.

Although there is no substantial evidence of the presence of tribal cultural resources in the project area, including those meeting the definition under PRC Section 21074, the Proposed Project would involve ground-disturbing activities that may extend into undisturbed soil. It is possible that such activities could unearth, expose, or disturb subsurface tribal cultural resources that were not identified on the surface. Any impacts of the Proposed Project on tribal cultural resources, as defined in PRC Section 21074, would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure 3.9-1a: Before construction, DWR will prepare a cultural resources awareness and sensitivity training program for all construction and field workers involved in ground-disturbing activities. Before DWR provides this training, an advance copy of the material will be shared with culturally affiliated California Native American Tribes to confirm that it captures all elements of the awareness and sensitivity training associated with the work. The training program developed will include a presentation and awareness brochure that covers, at minimum, the types of potential tribal cultural resources common to the area; consequences of violating State laws and regulations; regulatory protections for tribal cultural resources; and the protocol for inadvertent discovery of archaeological resources (see Mitigation Measures 3.9-1b and 3.5-1b). Written materials associated with the program will be provided to project personnel as appropriate. Personnel assigned to work in areas of ground-disturbing activities will receive the training before starting work in these areas.

Mitigation Measure 3.9-1b: If indigenous archaeological resources are encountered during project development or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. DWR, in consultation with affiliated tribal parties, will develop and implement appropriate protection and avoidance measures, where feasible. Procedures will be developed in accordance with State CEQA Guidelines Section 15126.4, which specifies procedures for post-review discoveries. Treatment may include, as feasible, processing materials for reburial; minimizing handling of cultural objects; leaving objects in place within the landscape; returning objects to a location in the project area where they will not be subject to future impacts; avoidance; and treating with culturally appropriate dignity. “Avoidance” means that no activities associated with the project may affect the tribal cultural resources. “Treating with culturally appropriate

dignity” means taking into account the tribal cultural values and meaning of the resource by implementing measures including, but not limited to, the following:

- Protecting the cultural character and integrity of the resource
- Protecting the traditional use of the resource
- Protecting the confidentiality of the resource
- Protecting the resource

Construction work at the location of the find may begin upon authorization by DWR. Work may proceed in other parts of the project area while the mitigation is being carried out.

Mitigation Measure 3.9-1c: If human remains are discovered during construction, all work shall immediately halt within 100 feet of the find and the Sutter County Coroner shall be contacted to evaluate the remains and follow the procedures and protocols set forth in State CEQA Guidelines Section 15064.5(e)(1). If the County Coroner determines that the remains are Native American, the County shall contact the NAHC, in accordance with Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. As required by PRC Section 5097.98, DWR shall ensure that further development activity avoids damage or disturbance in the immediate vicinity of the Native American human remains, according to generally accepted cultural or archaeological standards or practices, until DWR has conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

Impact Significance after Mitigation: Less than Significant.

The area has a history of extensive work, and cultural surveys, database searches, and coordination with affiliated tribes have occurred. Mitigation Measures 3.9-1a through 3.9-1c were developed in consultation with the UAIC as part of Proposed Project consultation pursuant to PRC Section 21080.3. Therefore, with implementation of these mitigation measures, the potential for ground-disturbing activities to unearth, expose, or disturb previously unidentified subsurface archaeological resources that could be found to qualify as tribal cultural resources would be reduced to less than significant.

Cumulative Impacts and Mitigation Measures

This evaluation of cumulative impacts considers the potential of the Proposed Project in combination with other past, present, and future projects to result in significant impacts on tribal cultural resources. The area of analysis for these cumulative impacts includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the connection to Tisdale Bypass. These include DWR’s Sutter Bypass Pumping Plant Rehabilitation Project, which proposes to retrofit maintenance structures at three separate pumping plants along the East Levee of the Sutter Bypass; and the U.S. Bureau of Reclamation and California Department of Fish and Wildlife’s Sutter National Wildlife Refuge Lift Station Project, which includes construction of a lift station that would allow the Sutter National Wildlife Refuge to divert water from the East Borrow Ditch. Past projects in the vicinity of the project area include DWR’s Tisdale Bypass Sediment Removal 2020 Project (2020), the Sutter Bypass East Borrow Canal Water Control Structures Project (2009), the Tisdale Bypass Channel Rehabilitation Project (2007), the Garmire Road Bridge Replacement

Project (2004), and the Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009). This area of analysis considers the traditional territory of the local Native American community.

Impact 3.9-2: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of a tribal cultural resource, as defined in PRC Section 21074. (Less than Significant with Mitigation)

The cumulative context for impacts on tribal cultural resources includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the confluence with the Tisdale Bypass, considering the traditional territory of the local Native American community.

The project area and vicinity may contain previously undocumented archaeological resources with value independent of the scientific information that they can provide and that may qualify as tribal cultural resources. Therefore, the potential exists for ongoing and future development projects in the project area and vicinity to disturb landscapes and archaeological resources that may qualify as tribal cultural resources. Implementation of the Proposed Project, in conjunction with the separately considered projects, has the potential to affect such tribal cultural resources, resulting in a potentially cumulative significant impact on those resources.

In summary, development and operation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of a tribal cultural resource, as defined in PRC Section 21074. Overall, the cumulative effect of the Proposed Project on tribal cultural resources would be potentially significant.

Mitigation Measures:

Implementing the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure: Implement Mitigation Measures 3.9-1a through 3.9-1c.

Impact Significance after Mitigation: Less than Significant.

Implementing Mitigation Measures 3.9-1a through 3.9-1c would reduce the Proposed Project's contribution to cumulative impacts on tribal cultural resources to a less-than-considerable level and the impact would be less than significant.

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CHAPTER 4

Other CEQA Considerations

Section 15126 of the State CEQA Guidelines requires that all aspects of a project—planning, acquisition, development, and operation—be considered when evaluating impacts on the environment. As part of this analysis, the EIR must also identify all of the following:

- Significant environmental effects of the proposed project
- Significant environmental effects that cannot be avoided if the proposed project is implemented
- Significant irreversible environmental changes that would result from implementation of the proposed project
- Growth-inducing impacts of the proposed project

Section 15130(a) of the State CEQA Guidelines requires that an EIR assess the cumulative impacts potentially associated with implementation of the proposed project. Section 4.1 presents the cumulative impact assessment for this project.

Section 15126.2(c) of the State CEQA Guidelines requires a discussion of any significant and irreversible environmental changes that would be caused by the project. This analysis is presented in Section 4.2.

Section 15126.2(b) of the State CEQA Guidelines requires that an EIR describe any significant impacts that cannot be avoided, even with implementation of feasible mitigation measures. Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR presents the effects of the Proposed Project on various aspects of the environment. Section 4.3 identifies any significant and unavoidable impacts identified in Chapter 3.

Section 15126.2(d) of the State CEQA Guidelines requires that an EIR evaluate the growth-inducing impacts of the project. This analysis is presented in Section 4.4.

4.1 Cumulative Impacts

The State CEQA Guidelines require that an EIR assess the cumulative environmental impacts of a project when the project’s incremental effect is “cumulatively considerable.” An EIR must assess the cumulative impacts of a project with respect to past, current, and probable future projects in the region. Section 15355 of the State 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 State CEQA Guidelines Section 15130(b), the purpose of the cumulative impacts discussion is to reflect “the severity of the impacts and their likelihood of occurrence,” and the discussion shall “be guided by the standards of practicality and reasonableness.”

The State CEQA Guidelines further indicate that the discussion of cumulative impacts should include all of the following information:

- Either (a) a list of past, present, and probable future projects producing related cumulative impacts or (b) a summary of projections in an adopted general plan or similar document, or an adopted or certified environmental document, that described or evaluated conditions contributing to a cumulative impact.
- A discussion of the geographic scope of the area affected by the cumulative effect.
- A summary of the environmental effects expected to be produced by these projects.
- Reasonable, feasible options for mitigating or avoiding the project’s contribution to any significant cumulative effects.

4.1.1 Cumulative Context

The cumulative context considers both the geographic scope and the timing of projects related to a proposed project. To evaluate the cumulative impacts of the Proposed Project, the geographic scope is defined as the project area, which includes the features described in Chapter 2, *Project Description*, and shown in Figures 2-1 through 2-4. The evaluation of cumulative impacts considers the locations of impacts of the Proposed Project relative to the geographic extent of other projects with which it may be combined. Some impacts would be site-specific or localized, confined to an area directly adjacent to or near the project area, and would not contribute to the cumulative impacts of other related projects in the project area. For example, noise impacts from the Proposed Project’s construction and operations and maintenance (O&M) activities would not combine with noise impacts from other projects located beyond the distance at which construction and O&M noise can be measured above ambient levels.

As noted, the geographic scope for the cumulative impact assessment includes the project area as defined in Chapter 2, *Project Description*. The project area is within the boundaries of Sutter County. Sutter County and other counties and cities in the area are facing numerous regional issues, such as air quality degradation, increased traffic, habitat loss, water quality degradation, and other rural and urban environmental changes. The context in which cumulative impacts are assessed also considers the timing of related projects relative to activities for the Proposed Project.

The cumulative context for each resource topic is included in the individual sections of Chapter 3 and summarized in Section 4.1.3.

4.1.2 Criteria for Identifying Related Projects in the Project Area

Projects were considered for inclusion in the cumulative impact analysis based on whether they could affect resources in the project area that the Proposed Project could also affect. A list of such past, present, and reasonably foreseeable future projects was developed based on the following criteria:

- (1) The project would affect a portion of the physical environment that could also be affected by the Proposed Project (i.e., could interact with the Proposed Project on a cumulative basis).
- (2) Sufficiently detailed information about the project is available to allow meaningful analysis without undue speculation.
- (3) The project meets all of the following criteria:
 - The project is actively under development (i.e., an identified sponsor is actively pursuing project development or construction).
 - A notice of preparation or notice of intent has been released and/or environmental clearance documentation has been completed, or substantial progress has been made toward completion.
 - The project is “reasonably foreseeable” given other considerations, such as site suitability, funding availability and economic viability, and regulatory limitations (e.g., the project has required regulatory permits).
- (4) The project is not considered part of the Proposed Project.

This cumulative impact discussion considers projects identified under existing conditions (which include the current effects of past projects) and reasonably foreseeable and probable future projects. The criterion used by this EIR analysis for considering whether a project is reasonably foreseeable and probable is whether the project has been defined in adequate detail to assess potential impacts, through the completion of either publicly available preliminary evaluations, feasibility studies, or draft environmental and engineering documents. The availability of funding and regulatory permits are also considerations for whether a project is reasonably foreseeable. Projects that were only in the development phase without detailed descriptions, operations criteria, or general locations, or that were not funded or permitted at the time that this cumulative impact assessment was written, are considered speculative. Thus, those projects are not considered further in this evaluation.

For example, as part of ongoing coordination efforts for the Mid and Upper Sacramento River Regional Flood Management Plan,¹ DWR is assessing regional flood management issues at State

¹ The Mid and Upper Sacramento River Regional Flood Management Plan is one of six regionally led regional flood management plans (RFMPs) that describe regional and local flood management priorities and challenges. DWR is funding the RFMPs in support of the 2012 Central Valley Flood Protection Plan and subsequent updates. The Mid and Upper Sacramento River regions include portions of Butte, Colusa, Glenn, Lake, Sutter, Tehama, and Yolo Counties. Plan participants include landowners, public agencies, and community organizations.

facilities within the Mid Sacramento River Region, the Upper Sacramento River Region, and the Feather River Flood Management Planning Region. Issues being considered include but may not necessarily be limited to future management of the Tisdale and Sutter Bypasses to sustain flood conveyance and reduce flood risk, improve floodplain habitat, and support sustainable operations and maintenance practices. Future multi-benefit actions and projects in the Tisdale and Sutter Bypasses by DWR and others are speculative at this time and are not evaluated in this Draft EIR because they do not meet the definition of a reasonably foreseeable project, as outlined by the above criteria.

4.1.3 List of Related Projects in the Project Area

The following projects were determined to meet the four criteria listed in Section 4.1.2 for past, present, and reasonably foreseeable future projects and were selected for inclusion in the cumulative impact analysis:

- Tisdale Bypass Sediment Removal 2020 Project (2020)
- Sutter Bypass Pumping Plant Rehabilitation Project (currently under environmental review)
- Sutter National Wildlife Refuge Lift Station Project (under construction)
- Sutter Bypass East Borrow Canal Water Control Structures Project (2009)
- Tisdale Bypass Channel Rehabilitation Project (2007)
- Garmire Road Bridge Replacement Project (2004)
- Tisdale Weir Boat Ramp Improvement Project (2001, 2005, and 2009)

4.1.4 Summary of Cumulative Impacts

The cumulative impact analysis considers whether the projects identified in Section 4.1.3, in combination with the Proposed Project, would have the potential to affect the same resources. If a combined effect would not occur, then a finding of no cumulative impact is made. If a combined effect would occur, then a determination is made as to whether (1) that combined effect would result in a significant cumulative impact and (2) the contribution to the effect by the Proposed Project would be considerable. Finally, a determination is made as to whether mitigation measures recommended for the project-specific impact would reduce the Proposed Project's contribution to the cumulative impact to a less-than-considerable level, thereby resulting in a less-than-significant cumulative impact. If not, then the cumulative impact would be significant and unavoidable.

The cumulative impact analysis is presented by technical issue area in the order in which these issue areas are presented in the Chapter 3 sections under *Impacts and Mitigation Measures*. For a complete discussion of cumulative impacts, see Chapter 3, Sections 3.2 through 3.9.

Agricultural Resources

The geographic context for changes to agricultural resources attributable to the Proposed Project is the local watershed because it could be affected directly by project activities or indirectly by

changes in flow. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance exists in the project area, nor are any of the project area's parcels in Williamson Act contracts. The Proposed Project would not result in the permanent conversion of agricultural lands, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, to nonagricultural use; it also would not cause conflicts with a Williamson Act contract. Therefore, the Proposed Project would not contribute to a cumulative impact on agricultural resources. This cumulative impact would be less than significant.

Air Quality

The geographic context for changes to the air quality environment attributable to the Proposed Project is the jurisdictional area of the Feather River Air Quality Management District (FRAQMD). In developing thresholds of significance for air pollutants, air districts consider the emissions levels at which a project's individual emissions would be cumulatively considerable. If a project's emissions would exceed the identified significance thresholds, those emissions would be cumulatively considerable, resulting in significant adverse impacts on the region's existing air quality.

Because the Proposed Project would exceed FRAQMD's significance threshold for construction-related emissions of oxides of nitrogen (see Table 3.3-5), the Proposed Project's contribution to localized or regional cumulative air quality impacts would be cumulatively significant. Mitigation Measures 3.3-1a through 3.3-1c would be implemented to reduce the Proposed Project's construction emissions to below the FRAQMD significance thresholds for all pollutants and reduce the Proposed Project's construction-related fugitive dust emissions. Therefore, implementing these mitigation measures would reduce the contribution of the Proposed Project to this cumulative impact to less than cumulatively considerable.

Biological Resources

The geographic context for changes to biological resources attributable to the Proposed Project is the local project area. The project area includes a variety of natural community types/land cover types: annual grassland, riparian forest, seasonal floodplain, seasonal wetland, riverine, irrigation ditch, developed, and disturbed. In the cumulative context, there may be a net loss of riparian habitats potentially used by federally listed and State-listed bird species, special-status bats, and migratory birds. There would be a net benefit for listed fish species in the cumulative context. Implementing the Proposed Project in conjunction with the separately considered projects in the project vicinity could affect sensitive habitats and special-status species, resulting in potentially significant cumulative impacts on those biological resources. Mitigation Measures 3.4-2a, 3.4-2b, 3.4-2c, 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, 3.4-3e, 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, 3.4-5e, 3.4-6a, 3.4-6b, 3.4-6c, 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, 3.4-9, 3.4-12a, 3.4-12b, 3.4-12c, and 3.4-13 would be implemented to avoid, minimize, and/or compensate for the loss of sensitive habitats and special-status species. Therefore, implementing these mitigation measures would reduce the contribution of the Proposed Project to this cumulative impact to less than cumulatively considerable.

Cultural Resources

The geographic context for changes to cultural resources attributable to the Proposed Project includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the confluence with the Tisdale Bypass, considering the traditional territory of the local Native American community.

Continued development in the region runs the inherent risk of damaging or destroying unknown significant archaeological resources that could yield information important to history or prehistory or previously unidentified human remains, resulting in a significant cumulative impact. Proposed Project activities could affect previously unidentified archaeological resources or human remains in the CEQA Area of Potential Effects, resulting in a considerable contribution to this cumulative impact. Development and operation of the Proposed Project could contribute to significant direct or indirect cumulative changes to the significance of an archaeological resource or significant cumulative damage to unidentified human remains.

Implementing Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c would reduce the Proposed Project's contribution to cumulative impacts on archaeological resources. Adhering to State laws regarding human remains and implementing Mitigation Measure 3.5-2 would reduce the Proposed Project's contribution to cumulative impacts on human remains to a less-than-considerable level. This cumulative impact would be less than significant.

Greenhouse Gas Emissions

Climate change is a global problem and the effects of greenhouse gas (GHG) emissions are experienced globally. Therefore, in the context of CEQA, impacts of GHG emissions on global climate change are inherently cumulative. No single project could generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, GHG emissions from present and future projects combine to contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

GHG emissions from construction of the Proposed Project would be less than significant. The Proposed Project would also comply with the goals and actions of applicable State and local GHG emissions reduction plans to achieve the Senate Bill 32 target to reduce California's GHG emissions by 40 percent by 2030 compared to 1990 levels. Therefore, the contribution of the Proposed Project to the global cumulative impact would be less than cumulatively considerable, and this impact would be less than significant.

Hydrology and Water Quality

The geographic context for changes to hydrology and water quality attributable to the Proposed Project is the Sacramento Valley subregion of the Sacramento River Hydrologic Region.

Implementing the Proposed Project in conjunction with the separately considered projects in the project vicinity could release sediment and other pollutants, resulting in potentially significant

cumulative impacts on receiving water quality. The handling of fuels, lubricants, or other pollutants for all cumulative projects would be regulated in accordance with applicable federal, State, and local requirements. In addition, implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c would reduce the contribution of the Proposed Project to this cumulative impact to less than considerable because these measures would avoid and minimize the degradation of water quality.

Operation of the Proposed Project would increase the volume of sediment deposited in the Tisdale Bypass, which could lead to a substantial cumulative alteration of drainage patterns and reduction of flood conveyance capacity that could increase flood risk; however, the increase in sediment volume would not represent a significant increase over existing amounts. Therefore, the Proposed Project's incremental impacts would not combine with those of the other projects considered to cause or contribute to a significant cumulative impact related to alteration of drainage patterns from sediment deposition in the Tisdale Bypass and the Sacramento River that could lead to an increase in flood risk.

High-velocity flows through the notch and debris accumulation could occur during operation of the Proposed Project, resulting in erosion and scour. However, the proposed erosion repair and scour protection measures (e.g., use of riprap and concrete), regular debris removal, and inspection and repair of riprap would reduce this impact to less than significant. Therefore, the Proposed Project's incremental impacts would not combine with those of the other projects considered to cause or contribute to a significant cumulative impact related to alteration of the hydraulics of the Tisdale Bypass, which could result in substantial erosion.

The Proposed Project would not affect the operation of the Sacramento River Flood Control Project (SRFCP) or increase the risk of flooding. In addition, flows in the Sacramento River downstream of Tisdale Weir are expected to be similar to existing flows (i.e., to change by 5 percent or less). Therefore, the Proposed Project's incremental impacts would not combine with those of the other projects considered to cause or contribute to a significant cumulative impact related to alteration of the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk. These cumulative impacts would be less than significant.

Recreation

The geographic context for changes to recreation attributable to the Proposed Project is the local watershed because it could be affected directly by project activities or indirectly by changes in flow. Some of the cumulative projects and plans could adversely affect recreational resources by increasing the use of existing parks and recreational facilities, or by changing the frequency and duration of flooding at the region's established wildlife and recreational areas, resulting in permanent displacement of existing facilities or a substantial permanent decrease in access to facilities. The Proposed Project would not substantially contribute to those cumulative effects because it would result in only a minimal increase in the number of wet days (based on annual average)—0 to 3.9 days for the water year and 0 to 1.9 days for just the waterfowl season (September 28 through February 12)—and because of the availability and variety of other

recreational areas in the project vicinity. Therefore, the Proposed Project's incremental contributions to cumulative effects on recreation resources would not be cumulatively considerable. This cumulative impact would be less than significant.

Tribal Cultural Resources

The geographic context for changes to tribal cultural resources attributable to the Proposed Project includes the entire Tisdale Bypass and portions of the Sutter Bypass downstream of the confluence with the Tisdale Bypass, considering the traditional territory of the local Native American community.

The project area and vicinity may contain previously undocumented archaeological resources that have value independent of the scientific information they can provide and that may qualify as tribal cultural resources. Therefore, the potential exists for ongoing and future development projects in the project area and vicinity to disturb landscapes and archaeological resources that may qualify as tribal cultural resources. Implementing the Proposed Project in conjunction with the separately considered projects could affect such tribal cultural resources, resulting in a cumulative potentially significant impact on those resources. Implementing Mitigation Measures 3.9-1a through 3.9-1c would reduce the Proposed Project's contribution to cumulative impacts on tribal cultural resources to a less-than-considerable level and the impact would be less than significant.

4.2 Significant Irreversible Environmental Changes

The State CEQA Guidelines (Section 15126.2[c]) require an evaluation of the significant irreversible environmental changes that would be caused by a project if implemented:

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 thereafter 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. Irrecoverable commitments of resources should be evaluated to assure that such current consumption is justified.

In general, the State CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which a project would commit future generations to similar uses of nonrenewable resources. In addition, CEQA requires that an EIR evaluate irreversible damage resulting from an environmental accident associated with the project.

Several resources, both natural and built, would be expended during construction and operation of the Proposed Project. Construction activities would require using equipment and vehicles that would result in the irreversible and irretrievable commitment of energy and material resources in the form of gasoline, diesel fuel, and oil. The Proposed Project would use additional resources such as rock for bank protection (riprap) and concrete. O&M activities for the Proposed Project would use energy to operate the notch and operable gates at the weir. Vehicles and equipment

would use gasoline, diesel fuel, and oil to travel to and from the Tisdale Weir and Bypass for routine maintenance and removal of sediment and debris.

By adhering to DWR's Climate Action Plan and GHG emissions reduction policies to increase the replacement of vehicles and equipment with those that are more energy efficient, the Proposed Project would reduce its energy requirements and reduce future consumption of fossil fuels and electricity. Construction staff from DWR's maintenance yards would use best available engineering techniques, construction and design practices, and equipment operating procedures. Further, DWR would comply with all applicable regulations and policies, mitigation measures, and standard conservation measures (e.g., recycling and/or reuse of materials) to ensure that natural resources are conserved to the maximum extent possible.

This analysis assumes that the amount of energy consumed by the Proposed Project and the rate of energy consumption would not result in the unnecessary, inefficient, or wasteful use of resources, and that energy would be consumed in a manner consistent with applicable laws and regulations. Therefore, the Proposed Project would not result in substantial long-term consumption of energy and natural resources.

4.3 Significant and Unavoidable Impacts

State CEQA Guidelines Section 15126.2(b) states that an EIR must describe impacts that would be significant and unavoidable if a proposed project were implemented. An impact is determined to be significant and unavoidable when either no mitigation, or only partial mitigation, is feasible to reduce the impact to a less-than-significant level. As part of its certification action, DWR makes the final determination of the significance of impacts and feasibility of mitigation measures. The potential environmental impacts of the Proposed Project are presented in Chapter 3 of this Draft EIR and summarized in the Executive Summary. All impacts can be feasibly mitigated to less-than-significant levels. Therefore, no significant and unavoidable adverse impacts would occur.

4.4 Growth-Inducing Impacts

The State CEQA Guidelines require that an EIR evaluate the growth-inducing impacts of a proposed project (Section 15126.2[d]). The State CEQA Guidelines describe a growth-inducing impact as:

[T]he way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either

individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have the potential for direct and/or indirect growth inducement. Direct growth inducement would result if the project were to establish new demand for public services, facilities, or infrastructure, such as construction of new housing. A project can have indirect or secondary growth inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises), or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, as explained in the State CEQA Guidelines, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint or increasing the capacity of a required public service (e.g., water supply).

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 land use development patterns and growth policies that allow for the “orderly” expansion of urban development supported by adequate urban public services, such as water supply, sewer service, and new roadway infrastructure. A project that would induce “disorderly” growth (i.e., a project conflicting with local land use plans) could indirectly cause adverse environmental impacts, such as the loss of agricultural land that has not been addressed in the planning process. To assess whether a project with the potential to induce growth is expected to result in significant impacts, it is important to assess the degree to which the growth associated with a project would or would not be consistent with applicable land use plans.

The Proposed Project consists of the rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements. The primary objectives of the Proposed Project are to (1) structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years; and (2) reduce fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

Construction of the Proposed Project is anticipated to involve up to 34 workers and would occur over two construction seasons. These temporary employees would likely come from the region’s existing labor pool. Existing DWR Flood Maintenance Yard staff, potentially with the help of contractors, would operate and maintain Tisdale Weir and the fish passage facility after project construction. Therefore, it is anticipated that minimal if any new jobs would be created, no additional housing would be needed to accommodate workers from outside the area, and the Proposed Project would not affect the local workforce.

Population growth and urban development in the project area are driven by national, regional, and local economic conditions. Local land use decisions are within the jurisdiction of Sutter County.

Sutter County has adopted a general plan consistent with State law that provides a framework for growth and development, and considers the level of flood protection required to protect the county's population and land uses. Inconsistency with local land use regulations, in and of itself, is not considered an adverse effect on the environment. However, the analysis must consider conflicts with any land use plan, policy, or regulation adopted to avoid or mitigate an environmental effect. As described in the resource topics addressed in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, although DWR is not subject to local regulations without legislative consent, DWR would implement the Proposed Project in a manner that would not conflict with applicable Sutter County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

Tisdale Weir is one of five major overflow weirs in the SRFCP. The SRFCP operates overflow weirs to divert flows from the Sacramento River into bypass channels, including the Tisdale Bypass, during peak-flow events to reduce the potential for levee failure and flooding downstream of the weir. The Proposed Project would structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years to maintain the existing level of flood protection in the SRFCP, including the project area. The Proposed Project would not increase the area of Sutter County available for development over existing conditions, and therefore, would not result in indirect growth-inducing impacts. Further, implementing the Proposed Project would not result in the construction of new housing or any other public or private services or utilities, or in improvements to access roads or extension of any new transportation routes that would provide access to new areas. Therefore, the Proposed Project would not result in direct growth-inducing impacts.

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CHAPTER 5

Alternatives

5.1 Introduction

Section 15126.6 of the State CEQA Guidelines requires an evaluation of “a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects and evaluate the comparative merits of the alternatives.”

The purpose of a CEQA alternatives analysis is to determine whether a variation of a proposed project would reduce or eliminate significant impacts of the project, using the basic framework of the proposed project’s objectives. The alternatives analysis should discuss whether the alternative would meet the project objectives and describe how the impacts of each alternative compare to the impacts of the proposed project.

In accordance with Section 15126.6(f) of the State CEQA Guidelines, the focus and definition of the alternatives evaluated in this EIR are governed by the “rule of reason”: Only those alternatives “necessary to permit a reasoned choice” require evaluation. Ultimately, the lead agency determines the feasibility of an alternative based on factors such as site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and site accessibility and control (State CEQA Guidelines Section 15126.6[f][1]). Further, an EIR “need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative” (State CEQA Guidelines Section 15126.6[f][3]).

The alternatives that were found to attain some of the basic project objectives are included in the detailed analysis in this chapter. Project options that were not found to attain most basic project objectives or were determined to lack a feasible means of achieving the objectives were eliminated from further detailed consideration.

Section 5.2, *Engineering Feasibility*, describes the Tisdale Weir Rehabilitation and Fish Passage Project engineering feasibility process, including the development of engineering alternatives (or options) that were evaluated and screened based on engineering feasibility and other factors. Section 5.3, *CEQA Alternatives Considered and Screening Criteria*, describes the development of a reasonable range of alternatives to the Proposed Project and the alternatives considered but eliminated from detailed consideration in this document. Section 5.4, *CEQA Project Alternatives Carried Forward for Analysis*, describes the alternatives that were selected for analysis of their

potential impacts compared to the impacts of the Proposed Project. Section 5.5, *Comparison of Alternatives to the Proposed Project*, summarizes the impacts of each alternative carried forward for analysis and compares the ability of the alternatives to meet the project objectives.

The State CEQA Guidelines also require that the environmentally superior alternative be identified in the EIR. Section 5.6, *Environmentally Superior Alternative*, identifies the environmentally superior alternative.

5.2 Engineering Feasibility

The Tisdale Weir Rehabilitation and Fish Passage Project Engineering Feasibility Report (**Appendix J**; ESA, 2020) was developed to identify, evaluate, and recommend feasible solutions for identified problems and opportunities associated with the Tisdale Weir and Bypass. This report was an initial step in evaluating how to rehabilitate the flood control structure; provide passage for special-status fish species from the Tisdale Bypass to the Sacramento River; form a set of potentially viable project alternatives (or options); and evaluate those alternatives based on project-specific criteria.

As described below, the Engineering Feasibility Report determined that installation of a notch, an operable gate (for flow regulation), and attendant facilities at the north end of the weir was the most feasible alternative. Therefore, this alternative became the Proposed Project and is evaluated in this Draft EIR.

This section describes the development and screening of engineering alternatives within the Engineering Feasibility Report. The engineering alternatives developed through the Engineering Feasibility Report contributed to the reasonable range of alternatives developed through the CEQA process. For a description of the alternatives evaluated according Section 15126.6 of the State CEQA Guidelines, see Section 5.4, *CEQA Project Alternatives Carried Forward for Analysis*, below.

The Engineering Feasibility Report identified goals and planning objectives for rehabilitating Tisdale Weir and for addressing fish passage and stranding issues at the weir, including consistency with the California Water Action Plan and Central Valley Flood Protection Plan (CVFPP) goals. The following goals and planning objectives were identified during development of the Engineering Feasibility Report:

- Perform structural rehabilitation of the aging Tisdale Weir.
- Reduce stranding and delay of fish passage at the weir.
- Increase fish passage across Tisdale Weir during more of the flood hydrograph.
- Facilitate maintenance of the weir and fish passage improvements, including sediment and debris removal.

- Maintain the conveyance capacity of the Tisdale Bypass and the flood flow split between the Sacramento River and Tisdale Weir, so that the project will not change the flood control system's ability to serve its authorized purpose.
- Deliver a cost-effective, efficient, and sustainable project within identified funding, design, and risk constraints.

In addition, the Engineering Feasibility Report defined problems, opportunities, and constraints associated with Tisdale Weir. Problems were defined in terms of the major features and functions: the weir structure, fish passage, operations and maintenance (O&M), local infrastructure including the boat ramp, parking lot and utilities, and flood management. Opportunities to incorporate multiple resource benefits with the flood management function of the weir by integrating features to improve fish passage were discussed.

The Engineering Feasibility Report identified planning constraints that represent significant barriers or restrictions limiting the extent of the planning process and/or the range of alternatives that could be proposed. These constraints included the sill elevation and its relation to passage and topographic constraints, structural considerations, natural resources, regulatory and legal issues, overall bypass topography, flood management considerations and legal requirements, existing land use and local infrastructure, and important O&M considerations.

The Engineering Feasibility Report formulated engineering alternatives, comprising a system of structural and/or nonstructural management measures. Structural management measures involve a feature (e.g., facility improvement) that can be implemented to address one or more planning objectives. The structural management measures considered were weir rehabilitation, fish passage improvements, fish passage improvement location(s), improvements to the energy dissipation and fish collection basin, and other related site improvements (e.g., utility pole relocation, permanent equipment access locations). Nonstructural management measures are activities (e.g., incentives, regulations, land use changes, and emergency preparations) that can be implemented to address one or more planning objectives.

An engineering alternative included one or more management measures functioning together to achieve the planning objectives. Engineering alternatives were developed considering problems, opportunities, and constraints. The engineering alternatives developed through the Engineering Feasibility Report included:

- No-Action (or No-Project) Alternative
- Alternative 1–North Notch
- Alternative 2–South Notch
- Alternative 3–North and South (Dual) Notches

Screening criteria for the engineering alternatives were developed to determine how well each alternative achieved each individual goal and planning objective through a direct comparison of their strengths, weaknesses, and tradeoffs. A multi-criteria alternatives analysis was also

conducted using the evaluation criteria to identify a recommended alternative. This was done by developing an alternatives evaluation matrix that considered a range of goals and objectives associated with the project alternatives and provided a mechanism for scoring each alternative relative to each other. **Table 5-1** provides a summary of the multi-criteria alternatives matrix.

The relative importance (weighting) of each evaluation criterion associated with each objective was established by qualitatively assessing the relative importance of each criterion relative to all criteria, with weights based on a scale from 1 (less important) to 3 (more important). Each evaluation criterion was scored based on a scale from 0 (worst) to 3 (best) for each of the three alternatives and a no-action alternative. Rationales are provided to explain the scoring. Weighted scores were derived for each evaluation criterion and summed for each associated set of goals and objectives.

Weighted scores varied for each set of goals and objectives. All three alternatives scored similarly for the CVFPP goals. Alternative 1 scored higher for general project goals and O&M objectives, tied with Alternatives 2 and 3 for fish passage objectives, and almost achieved a tie for weir rehabilitation objectives. The no-action alternative scored lower for all sets of goals and objectives, including flood management objectives, because the no-action alternative holds an increased risk of failure of the structure absent any rehabilitation.

The final weighted scoring resulted in Alternative 1–North Notch scoring highest, followed by Alternative 2–South Notch, then Alternative 3–North and South (Dual) Notches.

While Alternative 1–North Notch scored the highest, the three alternatives for the notch concept are similar in terms of their ability to meet the target fish passage conditions for salmon and sturgeon passage from the Tisdale Bypass to the Sacramento River. **Tables 5-2 and 5-3** show salmon and sturgeon passage results, respectively, for early iterations of the notch and connection channel configurations, and the last column in both tables summarizes the passage results for the current Proposed Project at a higher level of design detail.

**TABLE 5-1
MULTI-CRITERIA ALTERNATIVES ANALYSIS**

Goals and Objectives		Evaluation Criteria	Weighted Score: No Action Alternative	Weighted Score: Alternative 1–North Notch	Weighted Score: Alternative 2–South Notch	Weighted Score: Alternative 3–Dual Notches
Central Valley Flood Protection Plan Goals	Improves Flood Risk Management	Improves public safety, preparedness, and emergency response (repairs aging infrastructure)	0	9	9	9
	Promotes Ecosystem Functions	Integrates the recovery of key species into flood management system improvements	0	9	9	9
	Promotes Multi-benefit Projects	Contributes to broader integrated water management objectives	0	9	9	9
	Improves Operations and Maintenance	Reduces systemwide maintenance and repair requirements	6	4	4	2
	Improves Institutional Support	Enables effective and adaptive integrated flood management	0	6	6	6
	Subtotal			6	37	37
General Construction Project Goals	Results in a Cost-Effective Project	Provides greater benefits for the associated cost	0	9	9	6
	Results in a Constructible Project	More likely to be constructed on time and save the project money	0	6	4	2
	Results in an Efficient Project	Can be operated and maintained with a lower cost	0	6	4	2
	Results in a Sustainable Project	Supports the continuity of economic, social, institutional, and environmental aspects of human society and the environment	0	3	2	2
	Results in a Safe Project	Maintains the welfare and protection of the general public at the weir	3	2	2	1
	Subtotal			3	26	21
Weir Rehabilitation Objectives	Restores the Structural Integrity of the Weir Structure	Provides repairs to stop structural degradation	0	9	9	9
	Extends the Design Life of the Weir Structure	Incorporates new engineering technologies/ techniques in repairs to further extend design life	0	9	6	6
	Provides Improved Monitoring of Weir Overflow	Augments single north flow gage with gages at south end and at weir sill	0	3	3	3
	Subtotal			0	21	18

**TABLE 5-1 (CONTINUED)
MULTI-CRITERIA ALTERNATIVES ANALYSIS**

Goals and Objectives ¹		Evaluation Criteria	Weighted Score: No Action Alternative	Weighted Score: Alternative 1–North Notch	Weighted Score: Alternative 2–South Notch	Weighted Score: Alternative 3–Dual Notches
Fish Passage Objectives	Reduces Fish Passage Problems	Reduces flow depth, velocity, jump height, burst speed/distance passage barriers	0	9	9	9
	Increases Passage during Larger Portions of the Flood Hydrograph	Increases the total time available for passage across the weir	0	6	6	6
	Reduces Fish Stranding and Delay Problems	Reduces the extent and timing of hydraulic disconnection in the bypass	0	6	6	6
	Subtotal		0	21	21	21
Operations and Maintenance Objectives	Reduces Operations Impacts from Large Wood Debris	Reduces flow blockages and differential weir overflow and physical damages to operable gates from large wood debris	0	9	3	3
	Facilitates Maintenance/Removal of Large Wood Debris	Provides procedures/equipment to remove large wood debris throughout the year	0	6	2	2
	Reduces Operations Impacts of Sediment Deposition	Reduces sediment impacts on gate operations and bypass flow conveyance	0	9	3	3
	Facilitates Maintenance of Fish Passage Improvements	Provides procedures/equipment to remove sediment throughout the year	0	6	2	2
	Facilitates Fish Rescue Efforts	Provides improved access for net rescue and wadeable conditions	0	6	6	4
	Reduces Incidents of and Impacts from Vandalism	Reduces opportunities for degradation of infrastructure and/or aesthetics (graffiti)	3	2	2	1
	Subtotal		3	38	18	15
Flood Management Objectives	Maintains or Minimizes Flood Elevation Increases	Does not increase flood risk in the Tisdale Bypass or Sacramento River	9	9	9	9
	Maintains the River/Weir Flood Split and Conveyance Capacity	Maintains Central Valley Flood Protection Plan flood management functions	9	9	9	9
	Maintains or Minimizes Flood Risk to Downstream Land Uses	Does not increase inundation in Butte Slough and the Sutter Bypass for ag or waterfowl hunting	9	6	6	3
	Subtotal		27	24	24	21
Total			39	167	139	123

SOURCE: ESA, 2020; Appendix J

**TABLE 5-2
SALMON PASSABILITY FOR EXISTING CONDITIONS AND THE NORTH NOTCH, SOUTH NOTCH, AND NORTH AND SOUTH NOTCHES ALTERNATIVES**

Sacramento River ¹ Stage (ft, NAVD88) ²	Sacramento River Flow (cfs)	Sacramento River % Exceedance ³	Salmon Passability Existing Conditions	Salmon Passability Early Notch Design Potential: ⁴ North	Salmon Passability Early Notch Design Potential: ⁴ South	Salmon Passability Early Notch Design Potential: ⁴ North and South	Salmon Passability Proposed Project: North Notch ⁵
48	47,419	0.31		*			
47	41,215	3.18	*	*			
46	27,970	8.23				*	*
45	22,525	10.60			*		*
44	19,077	12.94		*			*
43	17,684	14.07					*
42	16,493	14.93					
41	15,226	16.01					
40	14,149	16.99					
39	13,066	18.30					
38	11,971	20.12					
37	10,881	22.55					not applicable
36	9,875	24.68					not applicable
35	8,974	25.47					not applicable
34	8,072	not applicable					not applicable
33	7,172	not applicable					not applicable

NOTES:

- Just upstream of the weir.
- Stage for existing conditions, falling limb stage, which is higher than stage under with-notch conditions given the decrease in downstream river flow and associated backwater, due to notch spill into the bypass.
- For water years 1978–2017 and only for flow events during which the river and bypass would be connected per the Proposed Project.
- 50 ft gate width, 0° skew angle, 31.5 ft invert elevation, 2:1 side slopes. The associated hydraulic model runs used a normal depth downstream boundary condition for the bypass, which did not differ significantly from the Sutter Bypass rating curve used in later runs with the recommended notch alternative.
- 32.6 ft gate width, 45° south skew angle, vertical to 2:1 side slope transition, 33 ft invert elevation

KEY:

Passage category	Depth	Velocity	Continuous distance with these conditions
	> long distance min	< long distance max	<200 feet
*	> short distance min	< short distance max	<60 feet
	> short distance min	< short distance max	60–200 feet
	< short distance min or:	> short distance max	<200 feet
	Basin drainage condition		

SOURCE: ESA, 2019a; Appendix F

**TABLE 5-3
STURGEON PASSABILITY FOR EXISTING CONDITIONS AND THE NORTH NOTCH, SOUTH NOTCH, AND NORTH AND SOUTH NOTCHES ALTERNATIVES**

Sacramento River ¹ Stage (ft, NAVD88) ²	Sacramento River Flow (cfs)	Sacramento River % Exceedance ³	Sturgeon Passability Existing Conditions	Sturgeon Passability Early Notch Design Potential: ⁴ North	Sturgeon Passability Early Notch Design Potential: ⁴ South	Sturgeon Passability Early Notch Design Potential: ⁴ North and South	Sturgeon Passability Proposed Project: North Notch ⁵
48	47,419	0.31		*			
47	41,215	3.18		*			
46	27,970	8.23				*	*
45	22,525	10.60					
44	19,077	12.94		*	*		*
43	17,684	14.07					*
42	16,493	14.93					
41	15,226	16.01					
40	14,149	16.99					
39	13,066	18.30					
38	11,971	20.12					
37	10,881	22.55					not applicable
36	9,875	24.68					not applicable
35	8,974	25.47					not applicable
34	8,072	–					not applicable
33	7,172	–					not applicable

NOTES:

- Just upstream of the weir.
- Stage for existing conditions, falling limb stage, which is higher than stage under with-notch conditions given the decrease in downstream river flow and associated backwater, due to notch spill into the bypass.
- For water years 1978–2017 and only for flow events during which the river and bypass would be connected per the Proposed Project.
- 50 ft gate width, 0° skew angle, 31.5 ft invert elevation, 2:1 side slopes. The associated hydraulic model runs used a normal depth downstream boundary condition for the bypass, which did not differ significantly from the Sutter Bypass rating curve used in later runs with the recommended notch alternative.
- 32.6 ft gate width, 45° south skew angle, vertical to 2:1 side slope transition, 33 ft invert elevation

KEY:

Passage category	Depth	Velocity	Continuous distance with these conditions
	> long distance min	< long distance max	<200 feet
*	> short distance min	< short distance max	<60 feet
	> short distance min	< short distance max	60–200 feet
	< short distance min or:	> short distance max	<200 feet
	Basin drainage condition		

SOURCE: ESA, 2019a; Appendix F

However, DWR identified significant complications associated with Alternative 2–South Notch and Alternative 3–North and South (Dual) Notches, including susceptibility to debris accumulation and potential risk of facility damage, equipment access, and complications with other existing infrastructure. Specifically, Alternative 2–South Notch and Alternative 3–North and South (Dual) Notches would require construction at a location associated with the following complications:

1. **Large Wood Debris Accumulation.** The southern section of Tisdale Weir is much more prone to large wood debris accumulation than the northern section. Heavy debris loading on the south end of the weir has been documented by the Sutter Maintenance Yard, supported by focused observations and forensic research performed as part of the Engineering Feasibility Report. Floating large wood debris from the Sacramento River is much more likely to block or damage a southern notch than a northern notch. Debris loading in the southern location could affect fish passage, substantially increase maintenance costs for debris removal, and increase maintenance crew members' exposure to potentially dangerous conditions, as compared to a northern location.
2. **Existing Infrastructure.** Design and construction of a southern notch would also be complicated and more costly because the existing Sutter County Tisdale Boat Launch Facility is located in front of and along the southern weir crest. DWR would need to mitigate any southern notch design to reduce impacts on the boat launch with additional elements, including a bridge (with removable deck to accommodate large wood debris–related O&M) across the notch entrance channel to accommodate boat launch access and parking. DWR would need to explore and confirm the potential existence of sheet piles at the river side of the parking lot in this area, which could add design challenges and substantial cost increases. Annual operations to remove and reinstall the bridge deck would also increase annual costs and removal of the bridge deck would close the boat launch through flood season, limiting recreational river access.
3. **Construction Costs.** A second notch would double the construction costs for the notch, connection channel, gate, and related structural, mechanical, electrical, and control items.
4. **Bypass Sedimentation.** The sediment budget analysis indicates that construction of a single notch in Tisdale Weir may increase volumes of suspended sediment in the bypass by an average of approximately 8 percent compared with existing conditions, based on the 2007 to 2017 existing-condition flows. This increases the amount of sediment that would need to be removed from the energy dissipation and fish collection basin and the Tisdale Bypass to maintain conveyance. Though not explicitly analyzed, the construction of a second notch could further increase sediment deposition in the bypass and require increased maintenance.
5. **Maintenance Access.** Both the northern and southern locations would require an adjacent area to provide heavy equipment access and a gate control building. The southern site is partially occupied by the boat launch access road and would require extensive modifications or road relocation, while the northern area appears to provide all necessary space on State-owned land.
6. **Redundancy.** Any redundancy provided by a second notch in terms of pre-mitigating debris accumulations and blockage would be outweighed by the higher likelihood of debris accumulating in a southern notch itself, negating the potential benefits.
7. **Public Safety.** Construction of a southern notch in the vicinity of the existing boat launch could increase the overall risk of accidents and injuries to recreationists.

While the fish passage assessment indicates that all alternatives would provide similarly suitable fish passage, these factors collectively establish that Alternative 2–South Notch and Alternative 3–North and South (Dual) Notches are likely to result in undesirable risks of impaired future performance. Those alternatives also have associated increased costs for design, construction, operation, maintenance, and repair; have complications from the existing parking lot/boat ramp; and may have public safety impacts on existing recreational river users.

Therefore, Alternative 1–North Notch was selected as the Proposed Project.

During the CEQA process, additional alternatives were developed to reduce impacts relative to the Proposed Project, including the North Notch with Modified Gate Operation Alternative and the Tisdale Weir Structural Improvements Alternative. For a description of all alternatives selected and an analysis of their potential impacts compared to the Proposed Project alternatives, see Section 5.3, *CEQA Project Alternatives Considered and Screening Criteria*.

5.3 CEQA Alternatives Considered and Screening Criteria

This section describes the development of a reasonable range of alternatives to the Proposed Project and the alternatives considered but eliminated from detailed consideration in this document.

5.3.1 Development of Alternatives

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 alternatives to the Proposed Project considered in this EIR were developed based on information gathered during development of the Engineering Feasibility Report (see Section 5.2, *Engineering Feasibility*; Appendix J) and during the EIR scoping process.

In developing the Proposed Project, various ways to rehabilitate Tisdale Weir and provide fish passage were evaluated based on input received from technical experts, subject matter experts, and the public during meetings and workshops. In total, eight informational meetings, workshops, and Interagency Work Group (IWG) meetings and site visits were held during development of the Proposed Project from November 2018 through November 2019. Comments were also received during scoping of the EIR in response to the Notice of Preparation (NOP). See **Appendix A** for the NOP comment letters.

The IWG meetings included agency representatives from the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the California Department of Fish and Wildlife, the Central Valley Flood Protection Board, and others. During the series of IWG meetings and site visits, various notch locations, sizes, orientations, and combinations were discussed and considered for locations near the northern and southern weir abutments. The

efficacy of the notch concepts in meeting the passage criteria for salmonids and green sturgeon was discussed. Modeling results and key considerations were presented, refined, reviewed, and discussed over the course of three IWG meetings.

DWR staff held three additional meetings with agency fisheries engineers and biologists to examine the hydraulic modeling, analysis, and fish passage assessment in greater detail.

Comments during the development of the Proposed Project addressed a variety of topics and themes, including the following:

- Some comments requested that the EIR include an appropriate range of reasonable and feasible alternatives that would attain most of the basic project objectives and avoid or minimize significant impacts of the Proposed Project.
- Some comments requested analysis of a south notch option.
- Some comments requested that the EIR include solutions that would address the problem without incurring such a significant cost for taxpayers and resulting in potential operational impacts on area farmers.

5.3.2 Method Used to Screen CEQA Alternatives

Potential alternatives were screened based on their ability to feasibly attain most of the basic project objectives and to reduce or eliminate any significant environmental impacts of the Proposed Project.

Meeting Project Objectives

As stated in Section 2.2, *Project Objectives*, the primary objectives of the Proposed Project are:

- Structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.
- Reduce fish stranding at Tisdale Weir by improving fish passage through Tisdale Weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

An evaluation of the ability of each alternative to meet the project objectives is located in Section 5.5, *Comparison of Alternatives to the Proposed Project*.

Avoiding or Lessening any Potentially Adverse Environmental Effects of the Proposed Project

Consistent with the State CEQA Guidelines, alternatives should avoid or substantially lessen one or more of the significant environmental effects of the Proposed Project. Alternatives that would not lessen or avoid a potentially significant environmental impact may be eliminated from detailed evaluation in the EIR.

An evaluation of the ability of each alternative to avoid or lessen any potentially adverse environmental effects as compared to the Proposed Project is located in Section 5.5, *Comparison of Alternatives to the Proposed Project*.

5.3.3 Alternatives Considered for Further Evaluation but Rejected

The alternatives described below were rejected for further consideration and analysis because they would not avoid or substantially lessen significant environmental impacts, failed to meet most of the basic program objectives, and/or were determined to be infeasible.

Fish Ladder Alternative

A fish ladder alternative was considered but rejected during the development of the Proposed Project. This alternative would have provided passage across Tisdale Weir by a step-pool type of fish ladder that would have been located up to the elevation of the Tisdale Weir crest. This alternative was rejected for further consideration because it failed to meet the basic project objectives and was not feasible:

- The fish ladder alternative did not include rehabilitating Tisdale Weir to extend its design life. Therefore, it failed to meet the project objective to structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.
- The fish ladder alternative was deemed not feasible because of physical site constraints, the lack of functionality at stage levels in the Sacramento River lower than the weir crest elevation, and the stringent hydraulic criteria required for green sturgeon passage.

Gated Notch in Middle of Weir Alternative

An alternative including a gated notch in the middle of Tisdale Weir was considered but rejected during development of the Proposed Project. This alternative would have provided passage across the weir; however, this alternative was rejected for further consideration because it did not avoid or lessen any potentially adverse environmental effects as compared to the Proposed Project and was not feasible:

- This alternative would have required greater construction efforts to build the control systems for the operable gate in the middle of the weir.
- This alternative was deemed not feasible because it would not have allowed direct maintenance access.

5.4 CEQA Project Alternatives Carried Forward for Analysis

This section presents the alternatives that were selected for an analysis of their potential impacts compared to the impacts of the Proposed Project. The alternatives were also evaluated for their ability to achieve the project objectives, which are presented in Chapter 2, *Project Description*, and repeated above in Section 5.3.2, *Method Used to Screen CEQA Alternatives*, for reference.

This section presents evaluations of the following alternatives:

- No Project Alternative

- South Notch Alternative
- North and South Notches Alternative
- North Notch with Modified Gate Operation Alternative
- Tisdale Weir Structural Improvements Alternative

As described above, the alternatives were developed with consideration of existing problems at Tisdale Weir, opportunities, and constraints, as well as project objectives. A range of concepts was explored, with a goal of achieving multiple benefits while meeting the primary project objectives. Alternatives were developed by combining management measures, and screening criteria were used to develop a focused array of alternatives. These alternatives are summarized below, along with the No Project Alternative.

In this alternatives analysis, “future conditions” are the conditions forecast for the next 50 years, during the anticipated design life of Tisdale Weir after rehabilitation.

Given the fundamental need to rehabilitate and reconstruct Tisdale Weir, all notch alternatives would include the proposed structural and site improvements described in Chapter 2, *Project Description*. Therefore, the notch alternatives address the location of the proposed modification(s) along the weir to achieve the fish passage objective.

Under all notch alternatives, the dimensions of the notch and connection channel, construction methods, anticipated construction equipment, and staging areas would generally be the same as described for the Proposed Project in Chapter 2. The respective alternatives would include varied structural improvements for reconstruction of the integrated energy dissipation and fish collection basin, such as additional cement for the reconstructed basin or armoring of the banks. The improvements used would be based on the location of each alternative’s structural modifications for fish passage. All notch alternatives would require energy dissipation for water that overflows the weir into the Tisdale Bypass, and would consider how a new notch opening(s) and other factors would cause hydraulic conditions to change. Design objectives include:

- Allow weir overflow and notch flows to enter the Tisdale Bypass without causing scour or erosion.
- Facilitate drainage of the basin as Sacramento River flows recede.
- Minimize fish stranding/injury and poaching.
- Minimize maintenance needs.
- Minimize disturbance of the Tisdale Boat Launch Facility.
- Facilitate constructability.

The following describes each of the alternatives considered in the analysis.

5.4.1 No Project Alternative

Section 15126.6(e) of the State CEQA Guidelines requires consideration of a no project alternative. The purpose of this alternative is to allow decision makers to compare the impacts of approving a project with the impacts of not approving a project. Under the No Project Alternative, DWR would not repair Tisdale Weir's existing structural problems as identified during site inspections, and would not construct fish passage facilities at the weir or low-flow bypass channel's connection facilities. DWR would continue to conduct O&M activities at the weir and within the bypass, including grading to level and fill scour holes; hauling away excess sediment located near the weir, as necessary; and removing sediment and large wood debris.

Under the No Project Alternative, the following damage to and existing problems with the weir structure would not be repaired:

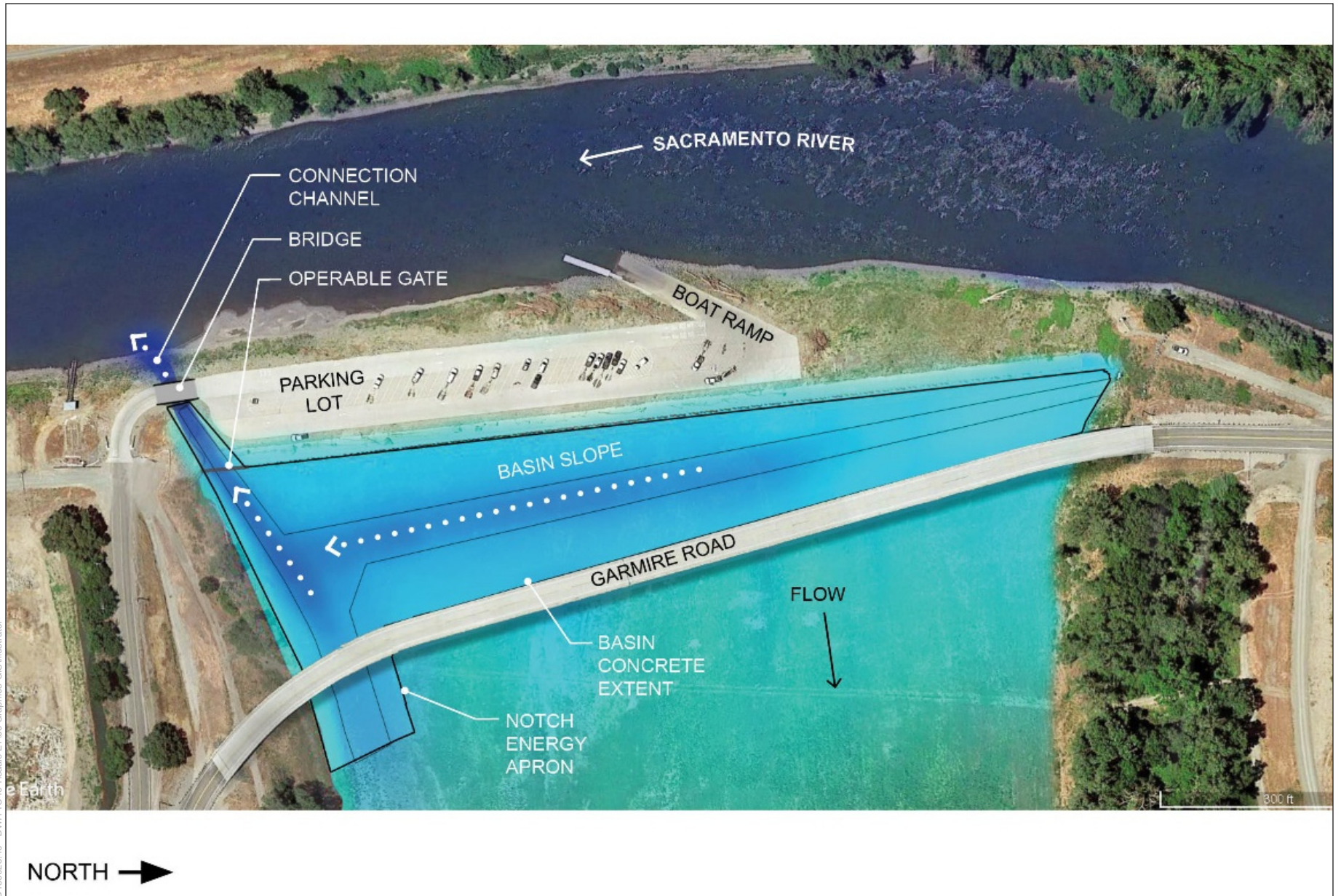
- Spalling, scaling, and cracking of the structure's concrete and rebar
- Displacement of the abutment wall and extensive horizontal and vertical cracks throughout the walls
- Eroded concrete and exposed rebar in the weir sill
- Missing or badly damaged buttresses in the existing energy dissipation basin
- Eroded revetment adjacent to the top of the concrete weir

5.4.2 South Notch Alternative

Under the South Notch Alternative, DWR would construct a single notch with an operable gate at the south end of Tisdale Weir with a connection channel to the Sacramento River (**Figure 5-1**). The gate would be operated in the same manner as under the Proposed Project. The gate would generally begin in the up (closed) position as the Sacramento River stage rises. Once the river stage exceeds the elevation of the weir crest, the gate would be fully opened (into the Tisdale Bypass) to allow fish passage as water stages fluctuate in the river-weir-bypass system.

The gate would be closed again when the Sacramento River stage falls below the bottom of the notch opening. This cycle would repeat as necessary, triggered by the frequency of weir overflow events in a given water year.

An equipment pad would be constructed on the south abutment to place the compressor and other mechanical and electrical equipment and facilitate gate O&M. The existing energy dissipation basin would be extended farther east to accommodate dissipation of energy under this alternative. The basin would be reconstructed as a wide trapezoidal channel to provide fish passage past debris and sediment deposits; it also would be sloped to the south to facilitate drainage to the notch opening and enable fish to pass through the weir as Sacramento River elevations decrease.



D:\30028_40 - DWIR TO-40 Tisdale E1\05 Graphics-GIS\Illustrator

SOURCE: ESA, 2019

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 5-1
 Illustration of South Notch Alternative



A bridge would be constructed over the southern notch connection channel to allow vehicles to access Sutter County's Tisdale Boat Launch Facility. Field observations, a historical assessment, and mapping of large wood debris accumulated at Tisdale Weir indicate that most debris is deposited along the southern two-thirds of the weir, with the largest accumulations occurring in the Tisdale Boat Launch Facility's parking lot (ESA, 2019b; Appendix B in DEIR Appendix J). Given the high potential for large wood debris to collect in this location, the bridge (and railings) would be designed to be removed annually to reduce blockage of the channel by debris and facilitate maintenance.

The South Notch Alternative would include all weir rehabilitation and reconstruction activities and associated project site improvements described for the Proposed Project in Chapter 2, *Project Description*. Maintenance activities for the weir notch, gate, and connection channel would be similar to the activities described for the Proposed Project in Chapter 2.

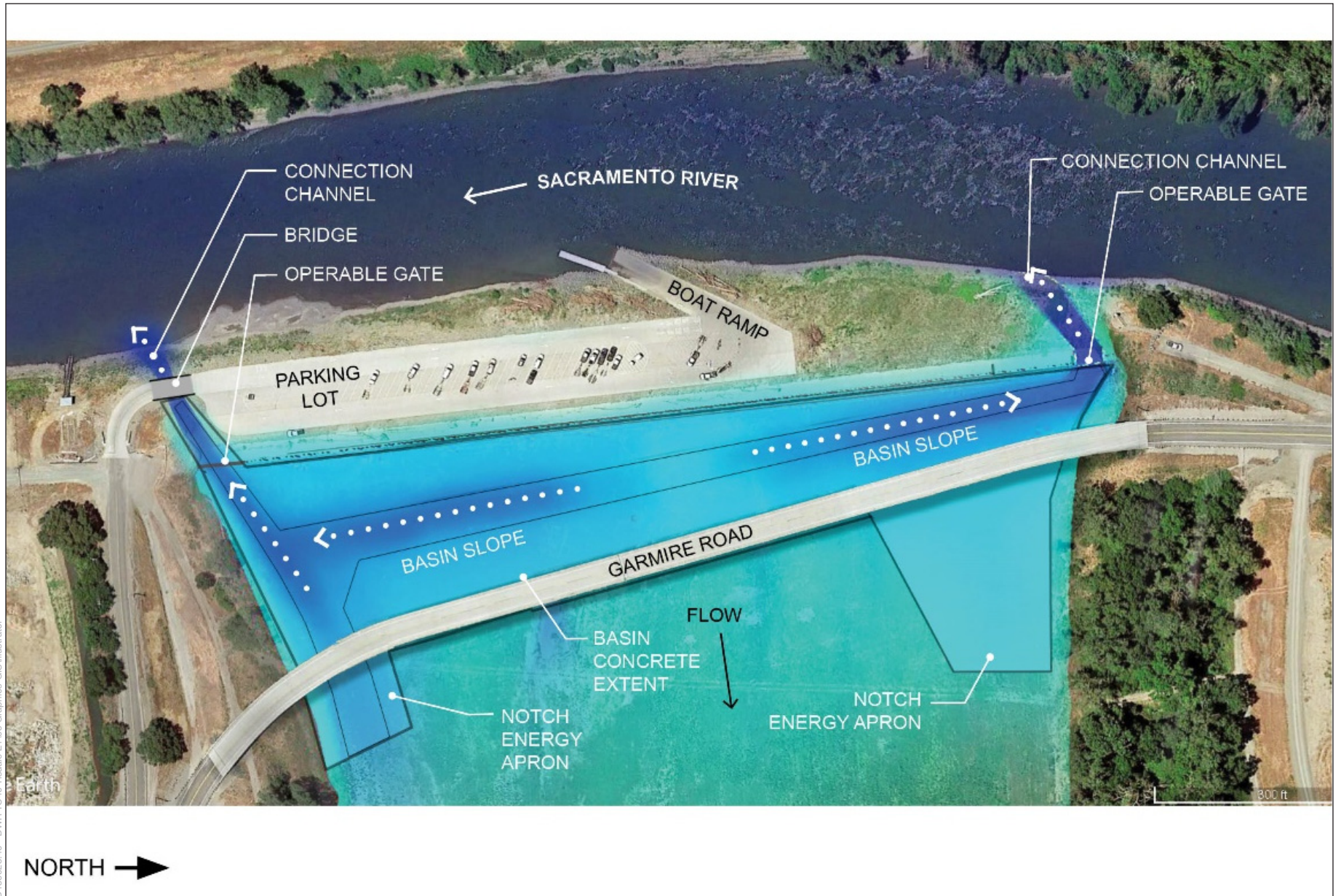
5.4.3 North and South Notches Alternative

Under the North and South Notches Alternative, DWR would construct two notches with operable gates, one each at the north and south ends of Tisdale Weir. Each notch would include a connection channel to the Sacramento River (**Figure 5-2**) and would be equivalent in size to the notch constructed for the Proposed Project. The gates would be operated in a manner similar to operation under the Proposed Project or the South Notch Alternative: the gates would be fully opened (into the Tisdale Bypass) to allow fish passage at the weir as the river stage exceeds the weir crest elevation.

Equipment pads would be constructed on both abutments to facilitate gate O&M. The existing energy dissipation basin would be extended farther east to accommodate dissipation of energy under this alternative. The basin would be reconstructed as a wide channel to provide fish passage past debris and sediment deposits. The basin also would be sloped to both the north and south, from a high point at approximately the midpoint of Tisdale Weir, to facilitate drainage from across the weir's width to the respective notch openings and enable fish to pass through the weir as Sacramento River elevations fall.

A bridge over the southern notch connection channel would allow vehicles to access the Tisdale Boat Launch Facility. As under the South Notch Alternative, given the high potential for large wood debris to collect in the southern two-thirds of the weir, the bridge (and railings) would be designed to be removed annually to reduce blockage of the channel by debris and facilitate maintenance.

The North and South Notches Alternative would include all proposed weir rehabilitation and reconstruction activities and associated project site improvements described for the Proposed Project in Chapter 2, *Project Description*. Maintenance activities for the weir notches, gates, and connection channels would be similar to the activities described for the Proposed Project in Chapter 2.



D:\30028_40 - DWG TO-40 Tisdale E1\05 Graphics-GIS\Illustrator

SOURCE: ESA, 2019

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 5-2
Illustration of North and South Notches Alternative



5.4.4 North Notch with Modified Gate Operation Alternative

Under the North Notch with Modified Gate Operation Alternative, DWR would construct the same fish passage facilities as described for the Proposed Project in Chapter 2, *Project Description*, including a notch on the north side of Tisdale Weir. However, under this alternative, the gate would remain in the up (closed) position as the Sacramento River stage rises and exceeds the elevation of the weir crest. Once the river stage recedes below the Tisdale Bypass's topographic "hinge point" (located approximately 1,000–2,000 feet east of the weir sill, at elevation 37 feet North American Vertical Datum of 1988) (**Figure 5-3**) and the eastward flow of water through the bypass ends, the gate would be opened to allow stranded fish to exit to the Sacramento River. The gate would be closed once the river stage falls below the bottom of the notch opening and fish have passed from the bypass into the river. This cycle would repeat as necessary, triggered by the frequency of weir overflow events in a given water year.

The North Notch with Modified Gate Operation Alternative would include all proposed weir rehabilitation and reconstruction activities and associated project site improvements described for the Proposed Project in Chapter 2, *Project Description*. Maintenance activities for the weir notch, gate, and connection channel would be similar to the activities described for the Proposed Project in Chapter 2.

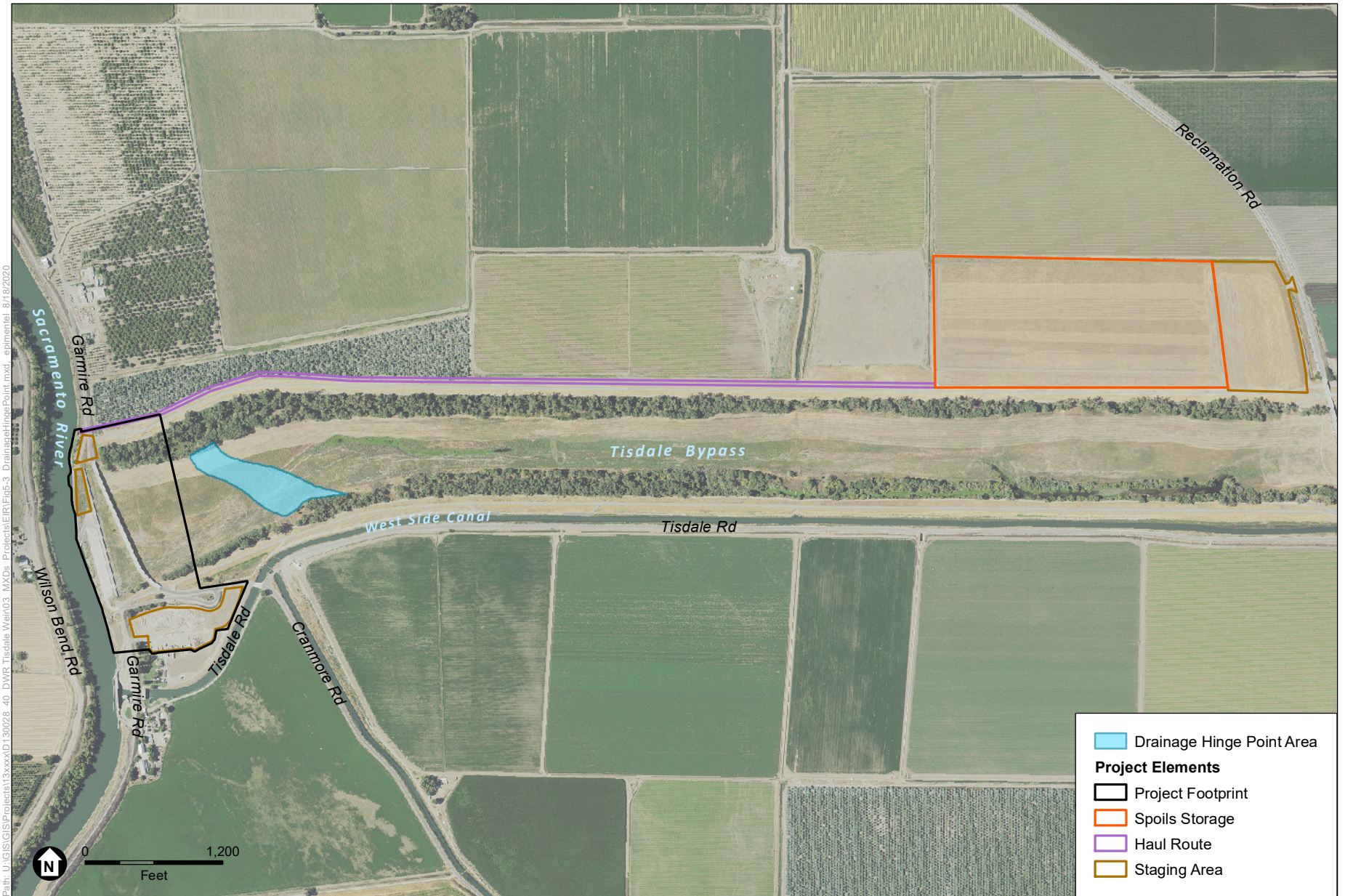
5.4.5 Tisdale Weir Structural Improvements Alternative

Under the Tisdale Weir Structural Improvements Alternative, DWR would rehabilitate and reconstruct Tisdale Weir and construct the same project site improvements as described for the Proposed Project in Chapter 2, *Project Description*. This work would generally include the following elements:

- Repairing the weir crest
- Repairing or rebuilding the structural components of the existing energy dissipation basin
- Demolishing and reconstructing the two abutments (south and north)
- Filling scour holes north of the Tisdale Boat Launch Facility parking lot and south of the north abutment
- Providing scour countermeasures around the Garmire Road Bridge piers
- Stabilizing existing cobble along the leading (upstream) edge of the weir

Two construction staging areas would be used for the Tisdale Weir Structural Improvements Alternative: the current parking area/turnout at the north end of the weir and the open area just north of the Tisdale Boat Launch Facility parking lot. The other two staging areas identified for the Proposed Project adjacent to the Sutter Mutual Water Company maintenance yard and adjacent to the spoils site would not be used under this alternative.

Like the No Project Alternative, the Tisdale Weir Structural Improvements Alternative would not include fish passage facilities at the weir.



Path: U:\GIS\GIS\Projects\13\xxxx\1300028_40_DWR\Tisdale Weir\03_MXD\Projects\ER\Fig5-3_DrainageHingePoint.mxd, epimintel, 8/18/2020

SOURCE: USDA, 2014; DWR, 2019; ESA, 2020

Tisdale Weir Rehabilitation and Fish Passage Project

Figure 5-3
Drainage Hinge Point Area

5.5 Comparison of Alternatives to the Proposed Project

5.5.1 No Project Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project Land Use

The No Project Alternative would be located in the same area as the Proposed Project: the Tisdale Bypass, a flood control structure bounded by levees and agricultural land to the north and south.

Therefore, this alternative would result in land use impacts similar to those of the Proposed Project. The project area already contains a functioning weir that would continue to operate as under existing conditions. Thus, the No Project Alternative would not physically divide an established community or conflict with any land use designations. This alternative would not involve any construction work, and O&M activities would be the same as under existing conditions and would not conflict with existing land use designations. Therefore, as under the Proposed Project, no impact on land use would occur under the No Project Alternative.

Mineral Resources

Both the No Project Alternative and the Proposed Project would be located in an area that does not contain known mineral resources of State or local importance. The No Project Alternative would not involve any construction work. Similar to current conditions, the O&M activities that would occur at Tisdale Weir and in the Tisdale Bypass, including removal of sediment and large wood debris, would not result in the loss of availability of or loss of access to known or locally important mineral resources. Therefore, as under the Proposed Project, no impact on mineral resources would occur under the No Project Alternative.

Population and Housing

The Proposed Project and the No Project Alternative would not result in the construction of new homes, businesses, road extensions, or similar infrastructure that would induce substantial unplanned population growth in the project area or displace any housing. O&M activities under this alternative would be the same as existing activities and would continue to be conducted by existing DWR Flood Maintenance Yard staff; such work would not induce substantial unplanned population growth. Therefore, as under the Proposed Project, no impact related to population and housing would occur under the No Project Alternative.

Public Services

Like the Proposed Project, the No Project Alternative would not result in the construction of new facilities or in an increase in the population that would increase the demand for police protection, fire protection, and community amenities (schools, parks, or libraries) that could result in the construction or need for new or physically altered government facilities. Therefore, as under the Proposed Project, no impact on public services would occur under the No Project Alternative.

Wildfire

The project area is located in a Local Responsibility Area that is designated as a Moderate Fire Hazard Severity Zone. Like the Proposed Project, the No Project Alternative would not include any residential structures or infrastructure that could exacerbate fire risk. This alternative would not involve any construction work, and O&M activities would be the same as existing activities. Therefore, given the rural nature of the project area, the relatively low traffic volumes, and the short-term nature of maintenance activities, the No Project Alternative would not impair an adopted emergency response or emergency evacuation plan. As under the Proposed Project, wildfire impacts would be less than significant under the No Project Alternative.

Impacts Identified as Less Severe than Impacts of the Proposed Project**Aesthetics**

The visual character of the project area is the same for the No Project Alternative as for the Proposed Project and is defined by the Sacramento River, Tisdale Weir, and riparian vegetation along the bypass. The No Project Alternative would not involve construction work, and O&M activities would not substantially change the character of the project vicinity relative to current conditions. Unlike the Proposed Project, the No Project Alternative would not include the presence of construction equipment and materials, vehicles, and crews adjacent to the Sacramento River, or permanent structures.

For these reasons, aesthetics impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Agriculture and Forestry Resources

Like the Proposed Project, the No Project Alternative would not be located on farmland, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and no parcels on the site of the No Project Alternative would be in Williamson Act contracts (Impact 3.2-1). The No Project Alternative site also would not be located on or in the vicinity of land zoned as forest land, timberland, or Timberland Protection.

The No Project Alternative would not involve any construction work, and O&M activities would be similar to existing activities and would likely not result in the conversion of downstream farmland or impacts on Williamson Act land (Impact 3.2-1). The No Project Alternative would not involve any activities that would change the frequency, duration, or extent of inundation downstream of the project area in the Tisdale and Sutter Bypasses; potential impacts of the No Project Alternative on farmland would be less than those of the Proposed Project.

Like the Proposed Project, the No Project Alternative would not contribute to cumulative impacts on agricultural resources by converting Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use, or conflicting with a Williamson Act contract (Impact 3.3-2).

For these reasons, impacts of the No Project Alternative on agriculture and forestry resources would be less severe than those of the Proposed Project, and impacts would be less than significant.

Air Quality

The No Project Alternative is less likely than the Proposed Project to result in growth-inducing effects, or in long-term increases in population or vehicle miles traveled that would lead to increased emissions levels and potentially conflict with or obstruct implementation of an applicable air quality plan (Impact 3.3-1). The No Project Alternative would not include activities that would expose sensitive receptors to substantial pollutant concentrations (Impact 3.3-3).

Unlike the Proposed Project, the No Project Alternative would not involve any construction work, and it would not result in a cumulatively considerable net increase of criteria pollutants (Impact 3.3-2) or temporarily add to localized and regional cumulative air quality impacts (Impact 3.3-4). Therefore, the No Project Alternative would not require implementing Mitigation Measures 3.3-1a, 3.3-1b, and 3.3-1c to reduce air quality impacts to less-than-significant levels.

This alternative would include ongoing O&M activities (grading to level and fill scour holes; hauling away excess sediment located near the weir, as necessary; and removing sediment and large wood debris) that would require the use of equipment that would contribute to pollutants; however, these activities would be the same as existing activities and would not result in an increase in air emissions over current conditions.

Because no construction work would occur, air quality impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Biological Resources—Terrestrial

The No Project Alternative would not involve any construction work; therefore, this alternative would result in no impacts associated with the disturbance, mortality, or loss or modification of habitat of special-status terrestrial species (Impacts 3.4-1 through 3.4-6); loss or degradation of riparian forest (Impact 3.4-12); or interference with the movement of native resident or migratory terrestrial wildlife species (Impact 3.4-14). Because no construction activities would occur, no local policies or ordinances protecting biological resources would be affected (Impact 3.4-15) and no cumulative temporary or permanent loss of sensitive habitat or impacts on special-status terrestrial species would occur (Impact 3.4-16).

O&M activities of the No Project Alternative would be similar to existing activities. This alternative, unlike the Proposed Project, would not involve the development of infrastructure. Thus, the No Project Alternative would not have the potential to affect terrestrial biological resources (Impacts 3.4-1 through 3.4-6, 3.4-12, and 3.4-14 through 3.4-16), and it would not require implementation of Mitigation Measures 3.4-2a, 3.4-2b, 3.4-2c, 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, 3.4-3e, 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, 3.4-5e, 3.4-6a,

3.4-6b, 3.4-6c, 3.4-12a, 3.4-12b, and 3.4-12c to reduce impacts on special-status terrestrial species and habitat to less-than-significant levels.

For these reasons, impacts of the No Project Alternative on terrestrial biological resources would be less severe than those of the Proposed Project, and impacts would be less than significant.

Cultural and Tribal Cultural Resources

The No Project Alternative would not include any construction or ground-disturbing activities that could cause a substantial adverse change to archaeological resources (Impact 3.5-1), disturb human remains (Impact 3.5-2), or result in cumulative impacts on cultural resources (Impacts 3.5-3 and 3.5-4). The No Project Alternative also would not result substantial impacts on cultural and tribal cultural resources (Impacts 3.9-1 and 3.9-2).

The No Project Alternative would not involve construction work that could affect archaeological resources and human remains; therefore, unlike the Proposed Project, it would not require mitigation to ensure that these resources are not affected (Mitigation Measures 3.5-1a, 3.5-1b, 3.5-1c, and 3.5-2). Also, the No Project Alternative would not result in a substantial adverse change to or cumulative impacts on tribal cultural resources; therefore, it would not need to implement Mitigation Measures 3.9-1a, 3.9-1b, or 3.9-1c to reduce impacts to less-than-significant levels.

Because no construction or ground-disturbing activities would occur, impacts of the No Project Alternative on cultural and tribal cultural resources would be less severe than those of the Proposed Project, and impacts would be less than significant.

Energy

Unlike the Proposed Project, the No Project Alternative would not involve any construction work that would consume fuel. The No Project Alternative would include ongoing O&M activities similar to existing and Proposed Project O&M activities; however, unlike the Proposed Project, the No Project Alternative would not include gate operation or a control building that would use energy.

Similar to existing conditions, the No Project Alternative would have negligible energy impacts. Energy impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Geology and Soils

Similar to the Proposed Project, the site of the No Project Alternative is located in Sutter County and not in an earthquake fault zone. There are no known active faults in the project area or vicinity. Soils in the area have moderate to high potential for erosion and low shrink-swell potential. The site was previously disturbed during construction of the original weir and maintenance of the bypass. The No Project Alternative would not involve excavating native soil; therefore, no erosion, on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse would occur, and no paleontological resources would be disturbed.

Geology and soils impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Greenhouse Gas Emissions

The No Project Alternative would not involve any construction work; therefore, this alternative would not generate greenhouse gas (GHG) emissions that would have a significant impact on the environment (Impact 3.6-1); conflict with an applicable plan, policy, or regulations adopted for reducing GHGs (Impact 3.6-2); or contribute considerably to a cumulative impact on GHG emissions (Impact 3.6-3).

The No Project Alternative would have the same GHG emissions impacts as existing conditions because O&M activities would still occur and would require the use of equipment. Because no other construction activities would occur and fewer O&M activities would occur under this alternative than the Proposed Project, GHG emissions impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Hazards and Hazardous Materials

Because the No Project Alternative would not involve any construction work, there would be no potential for routine use or an accidental spill during construction to inadvertently release hazardous materials, which could adversely affect construction workers, the public, and the environment, as may occur during construction of the Proposed Project.

O&M activities would continue under the No Project Alternative. This ongoing work would require continued compliance with applicable laws and regulations governing the transportation, use, handling, and disposal of hazardous materials, like those that apply to O&M activities for the Proposed Project. The project area is not located within an airport land use plan area or within one-quarter mile of a school and is not on a list of hazardous materials sites compiled under Government Code Section 65962.5 (the Cortese List). Given the rural nature of the project area and its relatively low traffic volumes, and the lack of construction activities, the No Project Alternative would not interfere with an adopted emergency response or evacuation plan and would likely not expose people or structures to wildland fires.

For these reasons, impacts of the No Project Alternative related to hazards and hazardous materials would be less severe than those of the Proposed Project, and impacts would be less than significant.

Hydrology and Water Quality

Volume, peak flow, and total duration of flow through Tisdale Weir were modeled for existing conditions (without the notch), which would be the same as the No Project Alternative condition, and a one-notch scenario, which would be the same as the Proposed Project condition (**Table 5-4**). Under the No Project Alternative, an average of 838,412 acre-feet of water would pass over the weir annually, compared to 924,569 acre-feet with the Proposed Project.

**TABLE 5-4
FLOW CONDITIONS AT TISDALE WEIR—EXISTING (NO PROJECT ALTERNATIVE CONDITION) AND WITH
ONE NOTCH (PROPOSED PROJECT CONDITION)**

Water Year Type¹	Average of Volume (acre-feet): Existing Condition	Average of Peak Flow (cfs): Existing Condition	Average of Total Flow Duration (days): Existing Condition	Average of Volume (acre-feet): One Notch	Average of Peak Flow (cfs): One Notch	Average of Total Flow Duration (days): One Notch
Wet²	2,030,303	22,083	83	2,196,891	22,298	140
Above Normal³	864,830	18,176	49	976,952	18,558	94
Below Normal⁴	346,392	13,914	21	401,219	14,357	50
Dry⁵	155,882	14,985	11	188,397	15,413	30
Critical⁶	115,877	10,837	9	143,985	11,108	23
2019 Wet (assumed)	1,648,157	22,498	76	1,772,855	22,712	121
Total	838,412	16,806	40	924,569	17,145	75

NOTES:

- 1 Includes water years 1997 through 2019.
- 2 Wet Water Years include 1997, 1998, 1999, 2006, 2011, and 2017.
- 3 Above Normal Water Years include 2000, 2003, and 2005.
- 4 Below Normal Water Years include 2004, 2010, 2012, 2016, and 2018.
- 5 Dry Water Years include 2001, 2002, 2007, 2009, and 2013.
- 6 Critical Water Years include 2008, 2014, and 2015.

SOURCE: Data compiled by Environmental Science Associates in 2020.

Under the No Project Alternative, sediment deposition along Tisdale Weir and the Tisdale Bypass would continue as floodwaters travel through the bypass. However, the No Project Alternative would cause less sediment accumulation along the weir and bypass than the Proposed Project (Impacts 3.7-2, 3.7-3, 3.7-7, and 3.7-8), because with no notch in the weir under the No Project Alternative, less water would enter the bypass. Approximately 181,200 to 344,400 cubic yards of sediment would have deposited in the bypass during the 2007 to 2017 time frame with the No Project Alternative (or existing conditions), compared to an estimated 194,800 to 370,200 cubic yards of sediment that would have deposited in the bypass under the Proposed Project.

Unlike the Proposed Project, the No Project Alternative would not involve any construction work that could cause the release of sediment and other pollutants that could substantially degrade receiving water quality (Impacts 3.7-1 and 3.7-6). Therefore, this alternative would not require implementation of Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project in Impact 3.7-1 to reduce construction-related impacts on receiving water quality.

The No Project Alternative would not alter the hydrology or hydraulics of the Tisdale Bypass (see Table 5-4) or the Sacramento River compared to existing conditions (Impacts 3.7-4, 3.7-5, 3.7-9, and 3.7-10). The Proposed Project would result in minor changes (2.2 percent or less; Table 3.4-10) in the Sacramento River during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, which occur during the summer and early fall,

both the No Project Alternative and the Proposed Project would not affect flow conditions in the Sacramento River.

Therefore, impacts of the No Project Alternative on hydrology and water quality would be less severe than those of the Proposed Project, and impacts would be less than significant.

Noise

Unlike the Proposed Project, the No Project Alternative would not result in any groundborne construction noise or vibration because no construction work would occur. The No Project Alternative would include ongoing O&M activities that would be the same as existing activities (grading to level and fill scour holes; hauling away excess sediment located near the weir, as necessary; and removing sediment and large wood debris). As under the Proposed Project, those O&M activities could create some groundborne noise and vibration; however, there are no noise-sensitive receptors in the project vicinity.

Because this alternative would not involve construction work, noise impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Recreation

Unlike the Proposed Project, the No Project Alternative would not result in any constructed facilities or construction activities that could increase the use of existing neighborhood and regional parks or other recreational facilities, and no substantial physical deterioration would occur (Impacts 3.8-1 and 3.8-3).

O&M activities for the No Project Alternative would be the same as existing activities and would not result in the permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities (Impacts 3.8-2 and 3.8-4). By contrast, the Proposed Project could affect access to the Sutter Bypass Wildlife Area and the Tisdale Boat Launch Facility during construction and could result in the temporary loss of lands available for recreation during increased inundation periods.

Overall, recreation impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Transportation

The No Project Alternative would not involve any construction work, unlike the Proposed Project, which would include construction activities that may cause minimal temporary increases in traffic levels along local roadways. Like the Proposed Project, the No Project Alternative would require ongoing O&M activities that could temporarily increase traffic along local roadways. However, under the No Project Alternative, these activities would be similar to existing conditions and would not worsen travel times on roads in the project vicinity. Like the Proposed Project, this alternative would not conflict with a plan or ordinance, or with designated bicycle and pedestrian facilities.

For these reasons, transportation impacts of the No Project Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Utilities and Service Systems

Like the Proposed Project, the No Project Alternative would not result in construction of new facilities or in an increase in the population that would generate wastewater, nor would this alternative cause an increase in the volume of waste that would exceed the permitted capacity of landfills serving the project area. The No Project Alternative would not include the need for any new water or result in the relocation or construction of any new infrastructure.

Furthermore, unlike the Proposed Project, the No Project Alternative would not involve removing utility poles and filling the resulting holes in the Tisdale Bypass channel during the dry season. This alternative would not require implementation of Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c as identified for the Proposed Project to reduce impacts on nesting birds or roosting bats to a less-than-significant level.

For these reasons, impacts of the No Project Alternative on utilities and service systems would be less severe than those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as More Severe than Impacts of the Proposed Project

Biological Resources—Aquatic

The No Project Alternative would not involve any construction work, and Tisdale Weir would continue to operate as is. During normal flood operations, anadromous and other fish can become stranded in the weir's downstream energy dissipation basin. During certain flood flow conditions, the weir can prevent upmigrating fish in the Sutter Bypass from passing through the Tisdale Bypass and returning to the Sacramento River, especially when flood flows recede and weir overtopping ends. Therefore, impacts related to disturbance or mortality, including fish stranding, and loss of suitable habitat for special-status fish species (Impacts 3.4-8, 3.4-10, 3.4-11, and 3.4-16) would be more severe under the No Project Alternative than under the Proposed Project.

The No Project Alternative would not involve any construction work, so construction-related impacts on aquatic special-status species and habitat would not occur (Impacts 3.4-7, 3.4-8, 3.4-9, and 3.4-13). The mitigation measures identified for the Proposed Project to minimize construction impacts on aquatic resources (Mitigation Measures 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, 3.4-13, and the mitigation measures for Impact 3.4-16) would not apply.

The No Project Alternative would not reduce fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River. Therefore, the No Project Alternative would have more severe long-term impacts on aquatic biological resources than the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Ability to Meet the Project Objectives

Under the No Project Alternative, Tisdale Weir would not be rehabilitated to extend its design life by an additional 50 years. The weir would not be modified to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access, and fish stranding at the weir would not be reduced.

Therefore, the No Project Alternative would not meet either of the project objectives.

5.5.2 South Notch Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Aesthetics

The visual character of the project area is the same for the South Notch Alternative as for the Proposed Project, defined by the Sacramento River, Tisdale Weir, and riparian vegetation along the Tisdale Bypass. Construction of the South Notch Alternative would be more complex and extensive than construction of the Proposed Project; the Tisdale Boat Launch Facility access road would require modification or relocation to accommodate maintenance access and the gate control building, and annual O&M activities would include installing and removing a bridge.

From an aesthetic standpoint, however, these construction and O&M activities are considered generally similar to the activities required for the Proposed Project. Like the Proposed Project, the South Notch Alternative would include permanent structures and would affect the visual characteristics of the project area temporarily during the short-term construction period and the annual removal of the bridge for O&M activities. Therefore, aesthetics impacts of the South Notch Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Agriculture and Forestry Resources

Like the Proposed Project, the South Notch Alternative would not be located on farmland, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and no parcels on the site of the South Notch Alternative are in Williamson Act contracts (Impact 3.2-1). The South Notch Alternative project area is also not located on or near land zoned as forest land, timberland, or Timberland Protection.

Construction of the South Notch Alternative would be more complex and extensive than construction of the Proposed Project. However, the dimensions of the notch would be the same under either scenario, and the gate would be operated in the same manner under this alternative as under the Proposed Project. Thus, the South Notch Alternative and the Proposed Project would result in the same effects on downstream Sacramento River flows and the same frequency, duration, and extent of inundation downstream of the project area in the Tisdale and Sutter Bypasses.

The South Notch Alternative and the Proposed Project would not result in the conversion of downstream farmland or impacts on Williamson Act land (Impact 3.2-1), nor would they contribute to cumulative impacts on agricultural resources by converting Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use, or conflicting with a Williamson Act contract (Impact 3.2-2).

For these reasons, impacts of the South Notch Alternative on agriculture and forestry resources would be similar to those of the Proposed Project, and impacts would be less than significant.

Biological Resources–Aquatic

Like the Proposed Project, the South Notch Alternative would involve the rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements. Construction of this alternative would be more complex and extensive than construction of the Proposed Project, and O&M activities would require the annual installation and removal of a bridge. From an aquatic biological resources perspective, however, these activities would be generally similar to activities for the Proposed Project, and their impacts on aquatic biological resources would likely be similar.

The exception to this finding is that under the South Notch Alternative, large wood debris would continue to accumulate along the southern two-thirds of Tisdale Weir. Based on field observations, a historical assessment, and mapping of large wood debris accumulated at the weir, the largest accumulation is anticipated in the Tisdale Boat Launch Facility's parking lot (ESA, 2019b; Appendix B in DEIR Appendix J). This uneven pattern of debris deposition has been observed inducing a variation in flow depth across the weir crest, and potentially obstructing flow over a portion of the weir and stranding fish at the weir.

Construction activities for the South Notch Alternative, like those for the Proposed Project, could result in erosion or sedimentation into the Tisdale Bypass; disturb or remove riparian vegetation along aquatic habitat; permanently alter the riverbank; release hazardous materials or chemicals into aquatic habitat; create hydrostatic pressure waves and vibration; and increase the risks of predation of native fishes near and downstream of the construction footprint. As under the Proposed Project, these activities could disturb fish species and their habitat by:

- Altering water quality (Impact 3.4-7)
- Modifying aquatic habitat (Impact 3.4-8)
- Causing hydrostatic pressure waves, noise, and vibration (Impact 3.4-9)
- Increasing predation of native fishes (Impact 3.4-10)
- Affecting fish passage conditions (Impact 3.4-11)

Water quality impacts could increase the potential for eroded soils and hazardous materials to end up in the waterways (Impact 3.4-7). Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project would reduce this impact to a less-than-significant level.

As under the Proposed Project, construction work could affect fish if they are present in the Tisdale Bypass or the cofferdam area, and could disrupt their normal behavior if nighttime construction lighting spills into the Sacramento River (Impact 3.4-8). In addition, the facilities as designed under the South Notch Alternative may not perform as intended; or the debris that would accumulate if the notch were placed at the south end of the weir may cause fish to become stranded in the Tisdale Bypass during O&M activities. However, implementing Mitigation Measures 3.4-8a, 3.4-8b, and 3.4-8c as identified for the Proposed Project would reduce this impact to a less-than-significant level.

Like the Proposed Project, the South Notch Alternative could involve construction of a temporary cofferdam, which would require installing sheet piles. Using pile drivers to install sheet piles could cause pressure waves, resulting in harmful effects on fish swimming nearby, including the potential to rupture their internal organs (Impact 3.4-9). Mitigation Measure 3.4-9 as identified for the Proposed Project would be implemented to monitor noise levels and avoid or minimize the potential for injury or mortality of listed fish species from the use of an impact hammer to drive piles. Implementing Mitigation Measure 3.4-9 would reduce this impact to a less-than-significant level.

As under the Proposed Project, indirect effects of project construction under the South Notch Alternative (increased turbidity, potential for hazardous materials spills, and increased underwater vibration and pressure waves) could increase predation risks for native fishes (Impact 3.4-10). However, these impacts likely would be temporary, with no population-level effects. Furthermore, O&M activities under this alternative are expected to reduce the predation loss of native fish species.

Under existing conditions, anadromous fish migrating upstream through the Tisdale Bypass are often stranded in pools below Tisdale Weir and cannot navigate past the weir. Once constructed and operational, the project under either the South Notch Alternative or the Proposed Project would enhance connectivity in the Tisdale Bypass (Impact 3.4-11). The results would be beneficial to migrating fishes in the bypass, such as adult salmon and sturgeon.

In addition, both the South Notch Alternative and the Proposed Project would involve filling and excavation activities during construction. These activities would permanently reduce the acreage or function of wetlands and non-wetland waters of the United States and State (Impact 3.4-13). O&M activities for the South Notch Alternative would not result in any permanent fill or conversion of jurisdictional waters; however, the annual installation and removal of a bridge, and the increased sediment buildup from the southern notch location, would require more frequent sediment removal and would result in temporary impacts on jurisdictional waters. Implementing Mitigation Measures 3.4-7b and 3.4-13 as identified for the Proposed Project would reduce this impact of the South Notch Alternative to a less-than-significant level.

For these reasons, impacts of the South Notch Alternative on aquatic biological resources would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Biological Resources–Terrestrial

The South Notch Alternative would involve the same construction and O&M activities as the Proposed Project. Because construction and O&M activities would be the same, impacts of this alternative on terrestrial biological resources would also be similar to those of the Proposed Project.

Based on findings from biological resources surveys, no special-status plant species have the potential to be present in the project area. Like the Proposed Project, the South Notch Alternative would not affect special-status plant species (Impact 3.4-1). Impacts of the South Notch Alternative on valley elderberry longhorn beetle (Impact 3.4-2), giant garter snake (Impact 3.4-3), western pond turtle (Impact 3.4-4), bird species (Impact 3.4-5), and special-status bats (Impact 3.4-6) would be similar to those described for the Proposed Project:

- Construction work could affect the elderberry longhorn beetle and result in the loss of its habitat (elderberry shrubs) (Impact 3.4-2), both directly through vegetation trimming and removal and indirectly through soil compaction, root damage, and dust generation. O&M activities could indirectly affect elderberry shrubs through dust, root damage, and soil compaction. This impact would be potentially significant. Implementing Mitigation Measures 3.4-2a, 3.4-2b, and 3.4-2c as identified for the Proposed Project would reduce this impact to a less-than-significant level.
- Potential effects during both construction and O&M activities include:
 - Direct effects on the giant garter snake and loss of its habitat (Impact 3.4-3) outside the Tisdale Bypass through vehicle strikes. In addition, construction work outside the bypass could unintentionally collapse mammal burrows in which giant garter snakes could be taking refuge. Implementing Mitigation Measures 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, and 3.4-3e as identified for the Proposed Project would reduce this impact to a less-than-significant level.
 - Direct effects on the western pond turtle (Impact 3.4-4) through vehicle strikes. Implementing Mitigation Measures 3.4-4a, 3.4-4b, 3.4-4c, and 3.4-4d as identified for the Proposed Project would reduce this impact to a less-than-significant level.
 - Direct effects on nesting birds (Impact 3.4-5) from disturbance by noise and activity from machinery. In addition, construction work would include the removal of large trees where birds may be nesting. Implementing Mitigation Measures 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, and 3.4-5e as identified for the Proposed Project would reduce this impact to a less-than-significant level.
 - Direct effects on special-status bats (Impact 3.4-6) from disturbance by noise and activity from heavy machinery. In addition, construction work could include the removal of large trees where bats may be roosting. Implementing Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c as identified for the Proposed Project would reduce this impact to a less-than-significant level.

Construction activities for the South Notch Alternative, like those for the Proposed Project, could directly affect riparian habitat (Impact 3.4-12) because construction equipment could unintentionally introduce invasive weeds to the riparian forest. Implementing Mitigation

Measures 3.4-12a, 3.4-12b, and 3.4-12c as identified for the Proposed Project would reduce impacts on riparian habitat to a less-than-significant level.

Like the Proposed Project, the South Notch Alternative would not interfere with the movement of native resident or migratory terrestrial wildlife species (Impact 3.4-14) because terrestrial species could easily move to nearby unaffected habitat. Like the Proposed Project, implementation of the South Notch Alternative would comply with applicable adopted local policies or ordinances protecting biological resources, provided that they are consistent with DWR's internal environmental policies (Impact 3.4-15). Cumulative temporary and permanent loss of sensitive habitats and special-status species (Impact 3.4-16) could occur as a result of this alternative; however, as with the Proposed Project, implementing the mitigation measures listed above would reduce the contribution of this alternative to a less-than-significant level.

For these reasons, impacts of the South Notch Alternative on terrestrial biological resources would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Cultural and Tribal Cultural Resources

Like the Proposed Project, the South Notch Alternative would involve construction and ground-disturbing activities that may extend into undisturbed soil; such activities could unearth, expose, or disturb subsurface archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-1, 3.5-2, and 3.9-1). Because impacts on cultural and tribal cultural resources could occur, the South Notch Alternative could contribute to significant direct or indirect cumulative changes to archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-3, 3.5-4, and 3.9-2) through additional development in the region.

No substantial evidence exists that archaeological or tribal cultural resources are present in the project area. However, because construction activities would involve ground-disturbing activities, Mitigation Measures 3.5-1a, 3.5-1b, 3.5-1c, 3.5-2, 3.9-1a, 3.9-1b, and 3.9-1c as identified for the Proposed Project would be implemented for the South Notch Alternative. Implementing these mitigation measures would reduce these impacts to less-than-significant levels.

For these reasons, impacts of the South Notch Alternative on cultural and tribal cultural resources would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Energy

Like the Proposed Project, the South Notch Alternative would involve the construction of a single notch in Tisdale Weir, and this alternative would require similar construction equipment, truck trips for hauling materials, and commutes by construction workers to and from the project area. Construction of this alternative would be more complex and extensive than construction of the Proposed Project because the Tisdale Boat Launch Facility is located in front of and along the southern weir crest. Thus, this alternative could result in increased construction-related fuel

consumption. However, the corresponding fuel consumption would be temporary and localized and generally considered similar to fuel consumption for the Proposed Project.

O&M activities for the South Notch Alternative would be similar to those for the Proposed Project. These activities would require truck trips to Tisdale Weir, gate operation, operation of a control building, removal of debris and sediment from the energy dissipation and fish collection basin, erosion repair, and repair of damage to the weir and gate. The South Notch Alternative would also include the annual installation and removal of a bridge to access the notch, which could result in negligible increases in energy use compared to the Proposed Project.

For these reasons, energy impacts of the South Notch Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Geology and Soils

Similar to the Proposed Project, the site of the South Notch Alternative is located in Sutter County and not in an earthquake fault zone, and there are no known active faults in the project area or vicinity. Soils in the area have moderate to high potential for erosion and low shrink-swell potential. The site was previously disturbed during construction of the original Tisdale Weir and maintenance of the Tisdale Bypass. Like the Proposed Project, the South Notch Alternative would not be located on hillsides or unstable geologic units that would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

Construction activities for the South Notch Alternative, like those for the Proposed Project, would involve excavating native soil to a maximum depth of approximately 16 feet; however, the project area is not located in a paleontologically sensitive unit or known to contain fossils. Construction of the South Notch Alternative would be more complex and extensive than construction of the Proposed Project; the Tisdale Boat Launch Facility is located in front of and along the southern weir crest, and its access road would require extensive modification or relocation to accommodate maintenance access and a gate control building. O&M activities for this alternative would be similar to those for the Proposed Project, but would also include the annual installation and removal of a bridge.

The additional construction and O&M activities for the South Notch Alternative would not result in considerable changes to geology and soils or paleontological resources relative to those identified for the Proposed Project. Therefore, geology and soils impacts of the South Notch Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Hazards and Hazardous Materials

Unlike the Proposed Project, the South Notch Alternative would include the construction of a single notch located in the southern portion of Tisdale Weir. Construction of this alternative would be more complex and extensive than construction of the Proposed Project; the Tisdale Boat Launch Facility is located in front of and along the southern weir crest, and its access road would require extensive modification or relocation to accommodate maintenance access and a gate control building.

Under the South Notch Alternative, as under the Proposed Project, four staging areas would be established in the project area. Hazardous materials, equipment, and wastes would be isolated to the southernmost staging area, outside of in-water areas. In addition to the O&M activities for the Proposed Project, this alternative would include the annual installation and removal of a bridge. However, construction and O&M activities for this alternative would be considerably similar to those for the Proposed Project and would comply with laws and regulations governing the transportation, use, handling, and disposal of hazardous materials.

The project area for the South Notch Alternative is not located within an airport land use plan area or within one-quarter mile of a school, and it is not on a list of hazardous materials sites compiled under Government Code Section 65962.5 (the Cortese List). Further, because the project area is rural, with relatively low traffic volumes, and construction would be temporary, the South Notch Alternative—like the Proposed Project—would not interfere with an adopted emergency response or evacuation plan and would likely not expose people or structures to wildland fires.

For these reasons, impacts of the South Notch Alternative related to hazards and hazardous materials would be similar to those of the Proposed Project, and impacts would be less than significant.

Hydrology and Water Quality

Under the South Notch Alternative, a single notch would be installed along the southern portion of Tisdale Weir; the notch would have the same dimensions as the notch that would be installed for the Proposed Project and the gate would be operated in the same manner as under the Proposed Project.

Volume, peak flow, and total duration of flow through Tisdale Weir were modeled for existing conditions (without the notch), and a one-notch scenario, which would be the same as the South Notch Alternative and Proposed Project condition (**Table 5-5**). Under the South Notch Alternative and the Proposed Project, an average of 924,569 acre-feet of water would pass over the weir annually, compared to 838,412 acre-feet under existing conditions.

Like the Proposed Project, the South Notch Alternative would not change the flow of the Sacramento River. Flows in the river downstream of Tisdale Weir are expected to be similar to existing conditions (i.e., to change by 2.2 percent or less; Table 3.4-10) during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, which occur during the summer and early fall, both the South Notch Alternative and the Proposed Project would not affect flow conditions in the Sacramento River because the river's stage would remain below the base elevation of the notch.

The volume of sediment deposited in the bypass under the South Notch Alternative would be similar to that under the Proposed Project; an estimated 194,800 to 370,200 cubic yards of sediment would have deposited in the bypass during the 2007 to 2017 time frame under the South Notch Alternative and the Proposed Project, compared to approximately 181,200 to 344,400 cubic yards of sediment that would have deposited in the bypass under existing conditions.

**TABLE 5-5
FLOW CONDITIONS AT TISDALE WEIR—EXISTING (NO NOTCH CONDITION) AND WITH
ONE NOTCH (PROPOSED PROJECT CONDITION AND SOUTH NOTCH ALTERNATIVE CONDITION)**

Water Year Type¹	Average of Volume (acre-feet): Existing Condition	Average of Peak Flow (cfs): Existing Condition	Average of Total Flow Duration (days): Existing Condition	Average of Volume (acre-feet): One Notch	Average of Peak Flow (cfs): One Notch	Average of Total Flow Duration (days): One Notch
Wet²	2,030,303	22,083	83	2,196,891	22,298	140
Above Normal³	864,830	18,176	49	976,952	18,558	94
Below Normal⁴	346,392	13,914	21	401,219	14,357	50
Dry⁵	155,882	14,985	11	188,397	15,413	30
Critical⁶	115,877	10,837	9	143,985	11,108	23
2019 Wet (assumed)	1,648,157	22,498	76	1,772,855	22,712	121
Total	838,412	16,806	40	924,569	17,145	75

NOTES:

- 1 Includes water years 1997 through 2019.
- 2 Wet Water Years include 1997, 1998, 1999, 2006, 2011, and 2017.
- 3 Above Normal Water Years include 2000, 2003, and 2005.
- 4 Below Normal Water Years include 2004, 2010, 2012, 2016, and 2018.
- 5 Dry Water Years include 2001, 2002, 2007, 2009, and 2013.
- 6 Critical Water Years include 2008, 2014, and 2015.

SOURCE: Data compiled by Environmental Science Associates in 2020.

As under the Proposed Project, site preparation and construction activities for the South Notch Alternative would include excavation of soils and concrete, and other ground-disturbing activities that could cause the release of sediment and other pollutants that could substantially degrade receiving water quality (Impact 3.7-1).

Like the Proposed Project, the South Notch Alternative would require fish rescue and dewatering operations should water be present in the bypass at the start of construction. The alternative would require compliance with the requirements of the National Pollutant Discharge Elimination System Construction General Permit and General Order for Dewatering and Other Low Threat Discharges to Surface Waters Permit. However, construction could still result in the release of sediment and other pollutants that could substantially degrade receiving water quality. Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project in Impact 3.7-1 would reduce this construction-related impact to a less-than-significant level.

O&M activities for the South Notch Alternative would be similar to those for the Proposed Project, and would also involve the annual installation and removal of a bridge. As under the Proposed Project, operation under this alternative could:

- Result in the release of sediment that could substantially degrade receiving water quality (Impact 3.7-2).

- Change the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity (Impact 3.7-3).
- Alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion (Impact 3.7-4).
- Alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the Sacramento River Flood Control Project system, which could increase flood risk (Impact 3.7-5).

These impacts were determined to be less than significant for the Proposed Project. They would be similar for the South Notch Alternative.

Like the Proposed Project, this alternative could result in cumulatively considerable incremental contribution to a significant cumulative impact (Impacts 3.7-6 through 3.7-10) and would be reduced to a less-than-significant level by implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project in Impact 3.7-6.

For these reasons, impacts of the South Notch Alternative on hydrology and water quality would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Land Use

The South Notch Alternative would be implemented in the same area as the Proposed Project: the Tisdale Bypass, a flood control structure bounded by levees and agricultural land to the north and south.

Therefore, this alternative would result in land use impacts similar to those of the Proposed Project because the alternative would not physically divide an established community or conflict with any land use designations. Construction activities for the South Notch Alternative would be generally similar to those for the Proposed Project, although more extensive. O&M activities for this alternative would require the installation and removal of a bridge, in addition to the other O&M activities for the Proposed Project. However, this work would not conflict with existing land use designations.

For these reasons, as under the Proposed Project, no land use impact would occur under the South Notch Alternative.

Mineral Resources

The South Notch Alternative, like the Proposed Project, would be implemented in an area that does not contain known mineral resources of State or local importance. Construction and O&M of the South Notch Alternative would be more complex and extensive than construction and O&M of the Proposed Project. However, like the Proposed Project, the alternative would not result in the loss of availability of or loss of access to a known or locally important mineral resource. Therefore, as under the Proposed Project, no impact on mineral resources would occur under the South Notch Alternative.

Noise

Construction and O&M activities for the South Notch Alternative would be similar to those for the Proposed Project, although the activities would be slightly more extensive under this alternative. Both the Proposed Project and the South Notch Alternative would temporarily generate noise in and around the project area during construction and O&M activities; however, there are no noise-sensitive receptors in the vicinity of the project area. Therefore, noise impacts of the South Notch Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Population and Housing

Neither the Proposed Project nor the South Notch Alternative would result in the construction of new homes, businesses, road extensions, or similar infrastructure that would induce substantial unplanned population growth in the project area, or result in any displacement of housing. As under the Proposed Project, DWR Flood Maintenance Yard staff would carry out O&M activities for the South Notch Alternative, and such work would not induce substantial unplanned population growth. Therefore, as under the Proposed Project, no impact related to population and housing would occur under the South Notch Alternative.

Public Services

Like the Proposed Project, the South Notch Alternative would not result in the construction of new facilities or in an increase in the population that would increase the demand for police protection, fire protection, and community amenities (schools, parks, or libraries) that could result in the construction or need for new or physically altered government facilities. Therefore, as under the Proposed Project, no impact on public services would occur under the South Notch Alternative.

Transportation

Construction of the South Notch Alternative would be more complex and extensive than construction of the Proposed Project; the Tisdale Boat Launch Facility is located in front of and along the southern weir crest, and its access road would require extensive modification or relocation to accommodate maintenance access and a gate control building. Thus, this alternative would require slightly more daily truck trips to haul spoils to the storage area than the approximately 24 trips per day required by the Proposed Project for approximately 110 days. Additional construction workers may also be needed. However, as under the Proposed Project, this construction work would result in only a minimal temporary increase in traffic levels along local roadways, and would not worsen travel times on roads in the project vicinity.

Like the Proposed Project, the South Notch Alternative would require ongoing O&M activities that could temporarily increase traffic along local roadways. However, these activities also would not worsen travel times on roads in the project vicinity. Also like the Proposed Project, the South Notch Alternative would not conflict with a plan, ordinance, or policy addressing the circulation system, including transit, or designated bicycle and pedestrian facilities.

For these reasons, transportation impacts of the South Notch Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Utilities and Service Systems

Like the Proposed Project, the South Notch Alternative would not result in the construction of new facilities or in an increase in the population that would generate wastewater, nor would this alternative cause an increase in the volume of waste that would exceed the permitted capacity of applicable landfills serving the project area.

As under the Proposed Project, water supplies for construction under the South Notch Alternative would be provided by contractors that have contracted access to local water supplies for dust suppression. These needs would be temporary and minor, and no new or expanded entitlements would be required.

Like the Proposed Project, the South Notch Alternative would involve removing utility poles and filling the resulting holes in the Tisdale Bypass channel during the dry season. This work could have a significant impact on nesting birds or roosting bats, which is addressed in Section 3.4, *Biological Resources*. Implementing Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c as identified for the Proposed Project would reduce impacts on nesting birds or roosting bats to a less-than-significant level.

For these reasons, impacts of the South Notch Alternative on utilities and service systems would be similar to those of the Proposed Project, and impacts would be less than significant.

Wildfire

The project area is located in a Local Responsibility Area that is designated as a Moderate Fire Hazard Severity Zone. Like the Proposed Project, the South Notch Alternative would not include any residential structures or infrastructure that may exacerbate fire risk. Because the project area is rural, with relatively low traffic volumes, and construction and O&M activities under this alternative would be short-term, such activities would not impair an adopted emergency response or emergency evacuation plan. Therefore, wildfire impacts of the South Notch Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as Less Severe than Impacts of the Proposed Project

None of the impacts of the South Notch Alternative would be less severe than the corresponding impacts of the Proposed Project.

Impacts Identified as More Severe than Impacts of the Proposed Project

Air Quality

Construction of the South Notch Alternative would be more complex and extensive than construction of the Proposed Project; the Tisdale Boat Launch Facility access road would require extensive modification or relocation to accommodate maintenance access and a gate control building. These additional construction activities could result in slightly more severe air quality

impacts than would occur under the Proposed Project. Further, the South Notch Alternative would require the annual installation and removal of a bridge to access the southern notch, which could result in a slight increase in emissions during O&M activities.

Like the Proposed Project, the South Notch Alternative would not result in growth-inducing effects or in long-term increases in population or vehicle miles traveled, leading to increased emissions levels that would conflict with or obstruct implementation of an applicable air quality plan (Impact 3.3-1). Given this alternative's additional construction activities, the South Notch Alternative could emit more unmitigated oxides of nitrogen (NO_x) than estimated for the Proposed Project (for the concrete haul-in option, 165.5 pounds per day; or for the on-site batch plant option, 107.8 pounds NO_x per day) (Impact 3.3-2). Like the Proposed Project, this alternative would temporarily add to localized and regional cumulative air quality impacts (Impact 3.3-4). Implementing Mitigation Measures 3.3-2a, 3.3-2b, and 3.3-2c as identified for the Proposed Project would reduce emissions levels to below the Feather River Air Quality Management District thresholds and thus would reduce the impact of construction-related fugitive dust emissions to a less-than-significant level.

Also like the Proposed Project, this alternative would not expose sensitive receptors to substantial pollutant concentrations (Impact 3.3-3), because emissions generated by project construction would be temporary and no sensitive receptors are located in the immediate vicinity of the project site.

For these reasons, air quality impacts of the South Notch Alternative would be more severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Greenhouse Gas Emissions

Construction of the South Notch Alternative would be more complex and extensive than construction of the Proposed Project; the Tisdale Boat Launch Facility access road would require extensive modification or relocation to accommodate maintenance access and a gate control building. Given this alternative's additional construction activities, the South Notch Alternative could result in greater GHG emissions than estimated for the Proposed Project (for the on-site concrete batch plant option, approximately 1,434 metric tons [MT] of carbon dioxide equivalent [CO₂e]; or for the concrete haul-in option, 2,166 MT of CO₂e). However, even if the emissions generated by the South Notch Alternative were greater, when amortized over a 30-year period, these emissions would equal approximately 47.8 and 72.2 MT of CO₂e per year, respectively—substantially less than the significance threshold of 1,100 MT of CO₂e per year. Therefore, the South Notch Alternative would not generate GHG emissions that would have a significant impact on the environment (Impact 3.6-1); conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.6-2); or contribute considerably to a cumulative impact on GHG emissions (Impact 3.6-3).

For these reasons, GHG emissions impacts of the South Notch Alternative would be more severe than those of the Proposed Project, but impacts would be less than significant.

Recreation

The project area is located in the Sutter Bypass Wildlife Area. An existing parking lot west of Tisdale Weir provides access to the wildlife area and the Tisdale Boat Launch Facility. Construction of the South Notch Alternative, like construction of the Proposed Project, would result in the temporary closure of areas where construction activities would occur. However, construction of a single notch along the southern portion of Tisdale Weir under this alternative would be more complex and extensive than construction of a notch at the northern location under the Proposed Project because the Tisdale Boat Launch Facility is located in front of and along the southern weir crest. Under this alternative, the boat launch facility's access road would require extensive modification or relocation to accommodate maintenance access and a gate control building. Therefore, compared to the Proposed Project, the South Notch Alternative may result in increased temporary construction-related closures.

O&M activities for the South Notch Alternative, like those for the Proposed Project, could change the frequency and duration of inundation in the Sutter Bypass compared to current conditions. The notch would have the same dimensions as the notch for the Proposed Project and would be operated in the same manner. However, this alternative would not result in the physical deterioration or accelerated deterioration of nearby recreation areas (Impacts 3.8-1 and 3.8-3) or a permanent decrease in access to existing recreational facilities or opportunities (Impacts 3.8-2 and 3.8-4). These impacts were determined to be less than significant for the Proposed Project because construction and O&M activities would be short-term and temporary and would not result in substantial permanent decrease in access or the substantial deterioration of recreational facilities. Therefore, as described above, the South Notch Alternative may result in increased temporary construction-related closures compared to the Proposed Project.

For these reasons, recreation impacts of the South Notch Alternative would be more severe than those of the Proposed Project, and impacts would be less than significant.

Ability to Meet the Project Objectives

The South Notch Alternative would fully achieve only one of the two project objectives. With the South Notch Alternative, DWR would rehabilitate and reconstruct Tisdale Weir and construct the project site improvements as described for the Proposed Project in Chapter 2. Therefore, this alternative would meet the project's objective to structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.

The South Notch Alternative would also include fish passage facilities at the weir and an energy dissipation and fish collection basin. Therefore, this alternative would conceptually meet part of the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

However, as noted above, a notch in the southern section of the weir could result in larger and/or more frequent debris accumulation and could entrain additional debris into the Tisdale Bypass compared to the Proposed Project. These effects could ultimately restrict fish passage and

increase fish stranding. Debris loading by the south notch also would substantially increase the need for debris removal and increase maintenance crew members' exposure to potentially dangerous conditions, as compared to the northern notch location with the Proposed Project. It also would limit recreational river access during construction and operations.

As a result, this alternative would not fully achieve the project's objective to minimize fish stranding by improving fish passage through Tisdale Weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

5.5.3 North and South Notches Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Aesthetics

The visual character of the project area is the same for the North and South Notches Alternative as for the Proposed Project, defined by the Sacramento River, Tisdale Weir, and riparian vegetation along the Tisdale Bypass. Construction of the North and South Notches Alternative would be more complex and extensive than construction of the Proposed Project because this alternative would require two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel, and annual O&M activities would include installing and removing a bridge.

From an aesthetic standpoint, however, these construction and O&M activities are considered generally similar to the activities required for the Proposed Project. Like the Proposed Project, the North and South Notches Alternative would include permanent structures and would affect the visual characteristics of the project area temporarily during the short-term construction period and the annual removal of the bridge for O&M activities. Therefore, aesthetics impacts of the North and South Notches Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Biological Resources—Aquatic

Like the Proposed Project, the North and South Notches Alternative would involve the rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements. This alternative would require additional areas within the project footprint for the construction and O&M of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. Construction of the North and South Notches Alternative would be more complex and extensive, and O&M activities would require the annual installation and removal of a bridge. From an aquatic biological resources perspective, however, these activities would be generally similar to activities for the Proposed Project, and their impacts on aquatic biological resources would likely be similar.

The exception to this finding is that under the North and South Notches Alternative, large wood debris would continue to accumulate along the southern two-thirds of Tisdale Weir. Based on

field observations, a historical assessment, and mapping of large wood debris accumulated at Tisdale Weir, the largest accumulation is anticipated in the Tisdale Boat Launch Facility's parking lot (ESA, 2019b; Appendix B in DEIR Appendix J). This uneven pattern of debris deposition has been observed inducing a variation in flow depth across the weir crest, and potentially obstructing flow over a portion of the weir and stranding fish at the weir.

Like the Proposed Project, the North and South Notches Alternative would result in potentially significant impacts on western pond turtles and their habitat (Impact 3.4-4) through potential vehicle strikes. This impact would be reduced to a less-than-significant level by implementing Mitigation Measures 3.4-4a, 3.4-4b, 3.4-4c, and 3.4-4d as identified for the Proposed Project.

Construction activities for the North and South Notches Alternative, like those for the Proposed Project, could result in erosion or sedimentation into the Tisdale Bypass; disturb or remove riparian vegetation along aquatic habitat; permanently alter the riverbank; release hazardous materials or chemicals into aquatic habitat; create hydrostatic pressure waves and vibration; and increase the risks of predation of native fishes near and downstream of the construction footprint. As under the Proposed Project, these activities could disturb fish species and their habitat by:

- Altering water quality (Impact 3.4-7)
- Modifying aquatic habitat (Impact 3.4-8)
- Causing hydrostatic pressure waves, noise, and vibration (Impact 3.4-9)
- Increasing predation of native fishes (Impact 3.4-10)
- Affecting fish passage conditions (Impact 3.4-11)

Water quality impacts could increase the potential for eroded soils and hazardous materials to end up in the waterways (Impact 3.4-7). Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project would reduce this impact to a less-than-significant level.

As under the Proposed Project, construction work could affect fish if they are present in the Tisdale Bypass or the cofferdam area, and could disrupt their normal behavior if nighttime construction lighting spills into the Sacramento River (Impact 3.4-8). In addition, the facilities as designed under the North and South Notches Alternative may not perform as intended; or the debris that would accumulate if the notch were placed at the south end of the weir may cause fish to become stranded in the Tisdale Bypass during O&M activities. However, implementing Mitigation Measures 3.4-8a, 3.4-8b, and 3.4-8c as identified for the Proposed Project would reduce this impact to a less-than-significant level.

Like the Proposed Project, the North and South Notches Alternative could involve construction of temporary cofferdams, which would require installing sheet piles. Using pile drivers to install sheet piles could cause pressure waves, resulting in harmful effects on fish swimming nearby, including the potential to rupture their internal organs (Impact 3.4-9). To reduce this impact to a less-than-significant level, Mitigation Measure 3.4-9 as identified for the Proposed Project would be implemented to monitor noise levels and avoid or minimize the potential for injury or

mortality of listed fish species from the use of an impact hammer to drive piles. Implementing Mitigation Measure 3.4-9 would reduce this impact to a less-than-significant level.

As under the Proposed Project, indirect effects of project construction under the North and South Notches Alternative (increased turbidity, potential for hazardous materials spills, and increased underwater vibration and pressure waves) could increase predation risks for native fishes (Impact 3.4-10). However, these impacts likely would be temporary, with no population-level effects. Furthermore, O&M activities under this alternative are expected to reduce the predation loss of native fish species.

Under existing conditions, anadromous fish migrating upstream through the Tisdale Bypass are often stranded in pools below Tisdale Weir and cannot navigate past the weir. Once constructed and operational, the project under either the North and South Notches Alternative or the Proposed Project would enhance connectivity in the Tisdale Bypass (Impact 3.4-11). The results would be beneficial to migrating fishes in the bypass, such as adult salmon and sturgeon.

In addition, both the North and South Notches Alternative and the Proposed Project would involve filling and excavation activities during construction. These activities would permanently reduce the acreage or function of wetlands and non-wetland waters of the United States and State (Impact 3.4-13). O&M activities for the North and South Notches Alternative would not result in any permanent fill or conversion of jurisdictional waters; however, the annual installation and removal of a bridge, and the increased sediment buildup from the southern notch location, would require more frequent sediment removal and would result in temporary impacts on jurisdictional waters. Implementing Mitigation Measures 3.4-7b and 3.4-13 as identified for the Proposed Project would reduce this impact of the North and South Notches Alternative to a less-than-significant level.

For these reasons, impacts of the North and South Notches Alternative on aquatic biological resources would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Geology and Soils

Similar to the Proposed Project, the site of the North and South Notches Alternative is located in Sutter County and not in an earthquake fault zone, and there are no known active faults in the project area or vicinity. Soils in the area have moderate to high potential for erosion and low shrink-swell potential. The site was previously disturbed during construction of the original Tisdale Weir and maintenance of the Tisdale Bypass. Like the Proposed Project, the North and South Notches Alternative would not be located on hillsides or unstable geologic units that would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

Construction activities for the North and South Notches Alternative, like those for the Proposed Project, would involve excavating native soil to a maximum depth of approximately 16 feet; however, the project area is not located in a paleontologically sensitive unit or known to contain fossils. Construction of the North and South Notches Alternative would be more complex and extensive than construction of the Proposed Project; this alternative would require additional

areas within the project footprint for construction of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. O&M for this alternative would also involve the annual installation and removal of a bridge and maintenance activities near the boat launch facility.

The additional construction and O&M activities for the North and South Notches Alternative would not result in considerable changes to geology and soils or paleontological resources relative to those identified for the Proposed Project. Therefore, geology and soils impacts of the North and South Notches Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Hazards and Hazardous Materials

Unlike the Proposed Project, the North and South Notches Alternative would include the construction and O&M of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. Construction activities for this alternative would be similar to those for the Proposed Project, but on a greater scale, given the increased project area. These activities would also be more complex and extensive because the Tisdale Boat Launch Facility is located in front of and along the southern weir crest, and its access road would require extensive modification or relocation to accommodate maintenance access and a gate control building.

Under the North and South Notches Alternative, as under the Proposed Project, four staging areas would be established in the project area. Hazardous materials, equipment, and wastes would be isolated to the southernmost staging area, outside of in-water areas. In addition to the O&M activities for the Proposed Project, this alternative would include the annual installation and removal of a bridge and maintenance activities near the boat launch facility. However, construction and O&M activities for this alternative would be considerably similar to those for the Proposed Project and would comply with applicable laws and regulations governing the transportation, use, handling, and disposal of hazardous materials.

The project area for the North and South Notches Alternative is not located within an airport land use plan area or within one-quarter mile of a school, and it is not on a list of hazardous materials sites compiled under Government Code Section 65962.5 (the Cortese List). Further, because the project area is rural, with relatively low traffic volumes, and construction would be temporary, the North and South Notches Alternative—like the Proposed Project—would not interfere with an adopted emergency response or evacuation plan and would likely not expose people or structures to wildland fires.

For these reasons, impacts of the North and South Notches Alternative related to hazards and hazardous materials would be similar to those of the Proposed Project, and impacts would be less than significant.

Land Use

The North and South Notches Alternative would be implemented in the same area as the Proposed Project: the Tisdale Bypass, a flood control structure bounded by levees and agricultural land to the north and south.

Therefore, like the Proposed Project, this alternative would not physically divide an established community or conflict with any land use designations. Construction and O&M activities for this alternative would be similar to those of the Proposed Project, but on a greater scale, given the additional areas within the project footprint (two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel). However, this work would not conflict with existing land use designations.

For these reasons, as under the Proposed Project, no land use impact would occur under the North and South Notches Alternative.

Mineral Resources

The North and South Notches Alternative, like the Proposed Project, would be implemented in an area that does not contain known mineral resources of State or local importance. Construction and O&M of the North and South Notches Alternative would be more complex and extensive than construction and O&M of the Proposed Project. However, like the Proposed Project, the alternative would not result in the loss of availability of or loss of access to a known or locally important mineral resource. Therefore, as under the Proposed Project, no impact on mineral resources would occur under the North and South Notches Alternative.

Noise

Construction of the North and South Notches Alternative would be more complex and extensive than construction of the Proposed Project. Construction of this alternative would result in two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel; in addition, the Tisdale Boat Launch Facility access road would require extensive modification or relocation to accommodate maintenance access and a gate control building to the southern notch. O&M activities would also include the annual installation and removal of a bridge and maintenance activities near the boat launch facility. Both the Proposed Project and the North and South Notches Alternative would temporarily generate noise in and around the project area during construction and O&M activities; however, there are no noise-sensitive receptors in the vicinity of the project area. Noise impacts of the North and South Notches Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Population and Housing

Neither the Proposed Project nor the North and South Notches Alternative would result in the construction of new homes, businesses, road extensions, or similar infrastructure that would induce substantial unplanned population growth within the project area, or result in any displacement of housing. As under the Proposed Project, DWR Flood Maintenance Yard staff would carry out O&M activities for the North and South Notches Alternative, and such work

would not induce substantial unplanned population growth. Therefore, as under the Proposed Project, no impact related to population and housing would occur under the North and South Notches Alternative.

Public Services

Like the Proposed Project, the North and South Notches Alternative would not result in the construction of new facilities or in an increase in the population that would increase the demand for police protection, fire protection, and community amenities (schools, parks, or libraries) that could result in the construction or need for new or physically altered government facilities. Therefore, as under the Proposed Project, no impact on public services would occur under the North and South Notches Alternative.

Utilities and Service Systems

Like the Proposed Project, the North and South Notches Alternative would not result in the construction of new facilities or in an increase in the population that would generate wastewater, nor would this alternative cause an increase in the volume of waste that would exceed the permitted capacity of applicable landfills serving the project area.

As under the Proposed Project, water supplies for construction under the North and South Notches Alternative would be provided by contractors that have contracted access to local water supplies for dust suppression. These needs would be temporary and minor, and no new or expanded entitlements would be required.

Like the Proposed Project, the North and South Notches Alternative would involve removing utility poles and filling the resulting holes in the Tisdale Bypass channel during the dry season. This work could have a significant impact on nesting birds or roosting bats. Implementing Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c as identified for the Proposed Project would reduce impacts on nesting birds or roosting bats to a less-than-significant level.

For these reasons, impacts of the North and South Notches Alternative on utilities and service systems would be similar to those of the Proposed Project, and impacts would be less than significant.

Wildfire

The project area is located in a Local Responsibility Area that is designated as a Moderate Fire Hazard Severity Zone. Similar to the Proposed Project, the North and South Notches Alternative would not include any residential structures or infrastructure that may exacerbate fire risk. Construction and O&M activities under this alternative would not impair an adopted emergency response or emergency evacuation plan, given the rural nature of the project area, relatively low traffic volumes, and the short-term nature of construction and O&M activities. Therefore, wildfire impacts of the North and South Notches Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as Less Severe than Impacts of the Proposed Project

None of the impacts of the North and South Notches Alternative would be less severe than the corresponding impacts of the Proposed Project.

Impacts Identified as More Severe than Impacts of the Proposed Project

Air Quality

Construction of the North and South Notches Alternative would be more complex and extensive than construction of the Proposed Project. The two notches, two connection channels, two equipment pads, and bridge over the southern notch connection channel proposed under this alternative would require a greater scale of construction activities and increased project area. Further, O&M activities for the North and South Notches Alternative would require the annual installation and removal of a bridge and maintenance activities near the boat launch facility. These additional construction and O&M activities would result in more severe air quality impacts than would occur under the Proposed Project.

Like the Proposed Project, the North and South Notches Alternative would not result in growth-inducing effects or in long-term increases in population or vehicle miles traveled, leading to increased emissions levels that would conflict with or obstruct implementation of an applicable air quality plan (Impact 3.3-1). Given this alternative's additional construction activities, the North and South Notches Alternative would emit more unmitigated NO_x than estimated for the Proposed Project (for the concrete haul-in option, 165.5 pounds per day; or for the on-site batch plant option, 107.8 pounds per day) (Impact 3.3-2). Like the Proposed Project, this alternative would temporarily add to localized and regional cumulative air quality impacts (Impact 3.3-4). Implementing Mitigation Measures 3.3-2a, 3.3-2b, and 3.3-2c as identified for the Proposed Project would reduce emissions levels to below the Feather River Air Quality Management District thresholds and thus would reduce the impact of construction-related fugitive dust emissions to a less-than-significant level.

Also like the Proposed Project, this alternative would not expose sensitive receptors to substantial pollutant concentrations (Impact 3.3-3), because emissions generated by project construction would be temporary and no sensitive receptors are located in the immediate vicinity of the project site.

For these reasons, air quality impacts of the North and South Notches Alternative would be more severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Agriculture and Forestry Resources

Like the Proposed Project, the North and South Notches Alternative would not be located on farmland, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and no parcels on the site of the North and South Notches Alternative are in Williamson Act contracts (Impact 3.2-1). The North and South Notches Alternative project area is also not located on or near land zoned as forest land, timberland, or Timberland Protection.

Construction of the North and South Notches Alternative would occur on a larger footprint than the Proposed Project. This alternative would require construction and O&M activities for two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. The alternative would increase effects on downstream Sacramento River flows and the frequency, duration, and extent of inundation downstream of the project area in the Tisdale and Sutter Bypasses compared to the Proposed Project because two notches would operate. Compared to the Proposed Project, the North and South Notches Alternative would increase the likelihood of the conversion of downstream farmland and impacts on Williamson Act land (Impact 3.2-1). This alternative would also be more likely to contribute to cumulative impacts on agricultural resources by converting Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use, and more likely to conflict with a Williamson Act contract (Impact 3.3-2).

For these reasons, impacts of the North and South Notches Alternative would be more severe than the less-than-significant impacts of the Proposed Project on agriculture and forestry resources, but impacts would be less than significant.

Biological Resources—Terrestrial

The North and South Notches Alternative would involve the construction and maintenance of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. These activities would require additional areas within the project footprint and disturb a larger portion of the footprint than the Proposed Project. Because implementing this alternative would disturb more land, construction and O&M activities may result in more severe impacts on terrestrial biological resources than under the Proposed Project.

Based on findings from biological resources surveys, no special-status plant species have the potential to be present in the project area. Like the Proposed Project, the North and South Notches Alternative would not affect special-status plant species (Impact 3.4-1). Impacts of the North and South Notches Alternative on valley elderberry longhorn beetle (Impact 3.4-2), giant garter snake (Impact 3.4-3), western pond turtle (Impact 3.4-4), bird species (Impact 3.4-5), and special-status bats (Impact 3.4-6) may be more severe than those of the Proposed Project. Potential effects during construction and O&M activities include:

- Effects on elderberry longhorn beetle and loss of its habitat (Impact 3.4-2), including both direct or indirect effects through vegetation trimming and removal and indirect effects through soil compaction, root damage, and dust generation. These impacts would be potentially significant. Implementing Mitigation Measures 3.4-2a, 3.4-2b, and 3.4-2c as identified for the Proposed Project would reduce this impact to a less-than-significant level.
- Direct effects on the giant garter snake and loss of its habitat (Impact 3.4-3) outside the Tisdale Bypass through vehicle strikes. In addition, construction work outside the Tisdale Bypass could unintentionally collapse mammal burrows in which giant garter snakes could be taking refuge. Implementing Mitigation Measures 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, and 3.4-3e as identified for the Proposed Project would reduce this impact to a less-than-significant level.

- Direct effects on western pond turtle (Impact 3.4-4) through vehicle strikes. Implementing Mitigation Measures 3.4-4a, 3.4-4b, 3.4-4c, and 3.4-4d as identified for the Proposed Project would reduce this impact to a less-than-significant level.
- Direct effects on nesting birds (Impact 3.4-5) from disturbance by noise and activity from machinery. In addition, construction work would include the removal of large trees where birds may be nesting. Implementing Mitigation Measures 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, and 3.4-5e as identified for the Proposed Project would reduce this impact to a less-than-significant level.
- Direct effects on special-status bats (Impact 3.4-6) from disturbance by noise and activity from heavy machinery. In addition, construction work could include the removal of large trees where bats may be roosting. Implementing Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c as identified for the Proposed Project would reduce this impact to a less-than-significant level.

Construction activities for the North and South Notches Alternative could directly affect more riparian habitat than the Proposed Project (Impact 3.4-12) and could unintentionally introduce invasive weeds to the riparian forest. Implementing Mitigation Measures 3.4-12a, 3.4-12b, and 3.4-12c as identified for the Proposed Project would reduce these impacts on riparian habitat to a less-than-significant level.

Like the Proposed Project, the North and South Notches Alternative would not interfere with the movement of native resident or migratory terrestrial wildlife species (Impact 3.4-14) because terrestrial species could easily move to nearby unaffected habitat. Like the Proposed Project, implementation of the North and South Notches Alternative would comply with applicable adopted local policies or ordinances protecting biological resources, provided that they are consistent with DWR's internal environmental policies (Impact 3.4-15). Greater cumulative temporary and permanent loss of sensitive habitats and special-status species (Impact 3.4-16) could occur as a result of this alternative given that more land would be disturbed under this alternative; however, as with the Proposed Project, implementing the mitigation measures listed above would reduce the contribution of this alternative to a less-than-significant level.

Because the North and South Notches Alternative would require additional areas within the project footprint for construction and maintenance of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel, impacts on terrestrial biological resources could be more severe than those of the Proposed Project. Impacts of the North and South Notches Alternative would be less than significant with mitigation incorporated.

Cultural and Tribal Cultural Resources

Like the Proposed Project, the North and South Notches Alternative would involve construction and ground-disturbing activities that may extend into undisturbed soil; such activities could unearth, expose, or disturb subsurface archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-1, 3.5-2, and 3.9-1). These impacts could be more severe than those of the Proposed Project because the North and South Notches Alternative would require additional areas within the project footprint for construction and maintenance of two notches, two

connection channels, two equipment pads, and a bridge over the southern notch connection channel. With these additional activities, a greater portion of the project footprint would be disturbed, resulting in a greater potential for impacts on cultural and tribal cultural resources. Because impacts on cultural and tribal cultural resources could be significant, the North and South Notches Alternative could contribute to significant direct or indirect cumulative changes to archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-3, 3.5-4, and 3.9-2) through additional development in the region.

No substantial evidence exists that archaeological or tribal cultural resources are present in the project area. However, because construction activities would involve ground-disturbing activities, Mitigation Measures 3.5-1a, 3.5-1b, 3.5-1c, 3.5-2, 3.9-1a, 3.9-1b, and 3.9-1c as identified for the Proposed Project would be implemented for the South Notch Alternative. Implementing these mitigation measures would reduce these impacts to less-than-significant levels.

For these reasons, impacts of the North and South Notches Alternative on cultural and tribal cultural resources could be more severe than those of the Proposed Project, but impacts would be less than significant with mitigation incorporated.

Energy

Unlike the Proposed Project, the North and South Notches Alternative would result in the construction and O&M of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. This work would require more extensive modifications to or relocation of the Tisdale Boat Launch Facility's access road to accommodate maintenance access and a gate control building. Construction activities for both the North and South Notches Alternative and the Proposed Project would include the use of construction equipment, truck trips for hauling materials, and commutes by construction workers to and from the project area. Construction of this alternative would be more complex and extensive than construction of the Proposed Project, and corresponding fuel consumption would be greater, albeit temporary and localized. O&M activities for this alternative would be similar to those required for the Proposed Project. These activities would include truck trips to Tisdale Weir, gate operation, operation of a control building, removal of debris and sediment from the energy dissipation and fish collection basin, erosion repair, and repair of damage to the weir and gates. These activities could result in minimal increases in energy resources under the North and South Notches Alternative compared to the Proposed Project. This alternative would also include the annual installation and removal of a bridge to access the south notch, which could result in minimal increases in energy resources used compared to the Proposed Project.

For these reasons, energy impacts of the North and South Notches Alternative would be slightly more severe than those of the Proposed Project, but impacts would be less than significant.

Greenhouse Gas Emissions

The North and South Notches Alternative would involve constructing and maintaining two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection

channel. Construction of the North and South Notches Alternative would require a larger area within the project footprint than the Proposed Project, and extensive modifications to or relocation of the Tisdale Boat Launch Facility's access road. Also, the southern notch would require more complex and extensive construction than would be required for the Proposed Project. Given this alternative's additional construction activities, the North and South Notches Alternative would result in greater GHG emissions than estimated for the Proposed Project (for the on-site concrete batch plant option, approximately 1,434 MT of CO₂e; or for the concrete haul-in option, 2,166 MT of CO₂e). However, even if the emissions generated by the North and South Notches Alternative were greater, when amortized over a 30-year period, these emissions would equal approximately 47.8 and 72.2 MT of CO₂e per year, respectively—substantially less than the significance threshold of 1,100 MT of CO₂e per year. Therefore, the North and South Notches Alternative would not generate GHG emissions that would have a significant impact on the environment (Impact 3.6-1); conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.6-2); or contribute considerably to a cumulative impact on GHG emissions (Impact 3.6-3).

For these reasons, GHG impacts of the North and South Notches Alternative could be more severe than those of the Proposed Project, but impacts would be less than significant.

Hydrology and Water Quality

The North and South Notches Alternative would involve construction and maintenance of two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel.

Volume, peak flow, and total duration of flow through Tisdale Weir were modeled for existing conditions (without the notch), a one-notch scenario, which would be the same as the Proposed Project condition, and a two-notch scenario, which would be the same as the North and South Notches Alternative condition (**Table 5-6**). Under the North and South Notches Alternative, an average of 985,334 acre-feet of water would pass over the weir annually, compared to 924,569 acre-feet with the Proposed Project, and 838,412 acre-feet under existing conditions.

The North and South Notches Alternative would result in greater changes in the flow in the Sacramento River compared to the Proposed Project. Flows in the river downstream of Tisdale Weir are expected to be less than existing conditions (Table 3.4-10) under the North and South Notches Alternative during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, which occur during the summer and early fall, both the North and South Notches Alternative and the Proposed Project are not expected to significantly affect flow conditions in the Sacramento River because the river's stage would remain below the base elevation of the notch.

**TABLE 5-6
FLOW CONDITIONS AT TISDALE WEIR—EXISTING (NO NOTCH CONDITION), ONE NOTCH (PROPOSED PROJECT CONDITION), AND
TWO NOTCHES (NORTH AND SOUTH NOTCHES ALTERNATIVE CONDITION)**

Water Year Type¹	Average of Volume (acre-feet): Existing Condition	Average of Peak Flow (cfs): Existing Condition	Average of Total Flow Duration (days): Existing Condition	Average of Volume (acre-feet): One Notch	Average of Peak Flow (cfs): One Notch	Average of Total Flow Duration (days): One Notch	Average of Volume (acre-feet): Two Notches	Average of Peak Flow (cfs): Two Notches	Average of Total Flow Duration (days): Two Notches
Wet²	2,030,303	22,083	83	2,196,891	22,298	140	2,313,375	22,461	140
Above Normal³	864,830	18,176	49	976,952	18,558	94	1,061,163	18,873	94
Below Normal⁴	346,392	13,914	21	401,219	14,357	50	437,905	14,758	51
Dry⁵	155,882	14,985	11	188,397	15,413	30	210,063	15,810	30
Critical⁶	115,877	10,837	9	143,985	11,108	23	162,618	11,351	23
2019 Wet (assumed)	1,648,157	22,498	76	1,772,855	22,712	121	1,871,264	22,863	121
Total	838,412	16,806	40	924,569	17,145	75	985,334	17,441	75

NOTES:

- 1 Includes water years 1997 through 2019.
- 2 Wet Water Years include 1997, 1998, 1999, 2006, 2011, and 2017.
- 3 Above Normal Water Years include 2000, 2003, and 2005.
- 4 Below Normal Water Years include 2004, 2010, 2012, 2016, and 2018.
- 5 Dry Water Years include 2001, 2002, 2007, 2009, and 2013.
- 6 Critical Water Years include 2008, 2014, and 2015.

SOURCE: Data compiled by Environmental Science Associates in 2020.

Construction activities would be similar to those of the Proposed Project, but would occur on a greater scale, given the increased project area. Site preparation and construction activities for this alternative would include excavation of soils and concrete, and other ground-disturbing activities that could cause the release of sediment and other pollutants that could substantially degrade receiving water quality (Impact 3.7-1); this impact may be more severe than the Proposed Project, given the greater area of construction.

Also like the Proposed Project, the North and South Notches Alternative would require fish rescue and dewatering operations should water be present in the bypass at the start of construction. The alternative would require compliance with the requirements of the National Pollutant Discharge Elimination System Construction General Permit and General Order for Dewatering and Other Low Threat Discharges to Surface Waters Permit. However, construction could still result in the release of sediment and other pollutants that could substantially degrade receiving water quality. Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project in Impact 3.7-1 would reduce this construction-related impact to a less-than-significant level.

Because Tisdale Weir would have two notches under the North and South Notches Alternative, this alternative would cause greater sediment deposition in the bypass than the estimated 194,800 to 370,200 cubic yards of sediment that would have deposited in the bypass during the 2007 to 2017 time frame under the Proposed Project.

O&M activities for this alternative would be similar to those for the Proposed Project, but for two notches, and would also involve the annual installation and removal of a bridge and maintenance work near the boat launch facility. Thus, the North and South Notches Alternative could have a greater potential than the Proposed Project to:

- Result in the release of sediment that could substantially degrade receiving water quality (Impact 3.7-2).
- Change the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity (Impact 3.7-3).
- Alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion (Impact 3.7-4).
- Alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the Sacramento River Flood Control Project system, which could increase flood risk (Impact 3.7-5).

These impacts were determined to be less than significant for the Proposed Project; however, the North and South Notches Alternative would result in more severe impacts.

This alternative could result in a greater cumulatively considerable incremental contribution to a significant cumulative impact (Impacts 3.7-6 through 3.7-10) than the Proposed Project.

For these reasons, impacts of the North and South Notches Alternative on hydrology and water quality would be more severe than those of the Proposed Project, but impacts would be less than significant with mitigation incorporated.

Recreation

The project area is located in the Sutter Bypass Wildlife Area. An existing parking lot west of Tisdale Weir provides access to the wildlife area and the Tisdale Boat Launch Facility. Construction of the North and South Notches Alternative, like construction of the Proposed Project, would result in the temporary closure of areas where construction activities would occur. However, construction of this alternative, with notches along both the northern and southern portions of Tisdale Weir, would be more complex and extensive than construction only at the northern notch location under the Proposed Project; the Tisdale Boat Launch Facility is located in front of and along the southern weir crest. Under this alternative, the boat launch facility's access road would require extensive modification or relocation to accommodate maintenance access and a gate control building. Therefore, compared to the Proposed Project, the North and South Notches Alternative may result in increased temporary construction-related closures.

O&M activities for the North and South Notches Alternative would result in a greater frequency and duration of inundation in the Sutter Bypass than O&M for the Proposed Project. This alternative would involve operating two notches with the same dimensions as the single notch for the Proposed Project, so the alternative is more likely to cause a seasonal reduction in the amount of land available for recreation. However, the North and South Notches Alternative would not result in the physical deterioration or accelerated deterioration of nearby recreation areas (Impacts 3.8-1 and 3.8-3) or a permanent decrease in access to existing recreational facilities or opportunities (Impacts 3.8-2 and 3.8-4). These impacts were determined to be less than significant for the Proposed Project because construction and O&M activities would be short-term and temporary and would not result in substantial permanent decrease in access or the substantial deterioration of recreational facilities. Therefore, as described above, the North and South Notches Alternative may result in increased temporary construction-related closures compared to the Proposed Project.

For these reasons, recreation impacts of the North and South Notches Alternative would be more severe than those of the Proposed Project. However, as under the Proposed Project, impacts would be less than significant.

Transportation

Construction of the North and South Notches Alternative would be more complex and extensive than construction of the Proposed Project because it would include two notches, two connection channels, two equipment pads, and a bridge over the southern notch connection channel. Construction activities for this alternative would be similar to those for the Proposed Project, but would be completed on a greater scale given the increased project area. Thus, this alternative would require slightly more daily truck trips to haul spoils to the storage area than the

approximately 24 truck trips per day required by the Proposed Project for approximately 110 days. Additional construction workers may also be needed.

However, as under the Proposed Project, this construction work would result only in a minimal temporary increase in traffic levels along local roadways, and would not worsen travel times on roads in the project vicinity.

Like the Proposed Project, the North and South Notches Alternative would require ongoing O&M activities that could temporarily increase traffic along local roadways. However, these activities also would not worsen travel times on roads in the project vicinity. Also like the Proposed Project, this alternative would not conflict with a plan, ordinance, or policy addressing the circulation system, including transit, or designated bicycle and pedestrian facilities.

For these reasons, although the North and South Notches Alternative would have more severe transportation impacts than the Proposed Project, impacts would be less than significant.

Ability to Meet the Project Objectives

The North and South Notches Alternative would fully achieve only one of the two project objectives. With this alternative, DWR would rehabilitate and reconstruct Tisdale Weir and construct the project site improvements as described for the Proposed Project in Chapter 2. Therefore, this alternative would meet the project's objective to structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.

The North and South Notches Alternative would also include fish passage facilities at Tisdale Weir and an energy dissipation and fish passage basin. Therefore, this alternative would conceptually meet part of the project's objective to reduce fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

However, as noted above, a notch in the southern section of the weir could result in larger and/or more frequent accumulation of debris and could entrain additional debris into the Tisdale Bypass compared to the Proposed Project. These effects could ultimately restrict fish passage and increase fish stranding. Debris loading by the south notch and increased sediment deposition as a result of two notches also would substantially increase the need for debris and sediment removal and increase maintenance crew members' exposure to potentially dangerous conditions, as compared to the single northern notch location with the Proposed Project. It also would limit recreational river access during construction and operations.

As a result, this alternative would not fully achieve the project's objective to minimize fish stranding by improving fish passage through Tisdale Weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

5.5.4 North Notch with Modified Gate Operation Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Aesthetics

The visual character of the project area is the same for the North Notch with Modified Gate Operation Alternative as for the Proposed Project, defined by the Sacramento River, Tisdale Weir, and riparian vegetation along the Tisdale Bypass. This alternative would include the same construction and O&M activities as the Proposed Project. As under the Proposed Project, construction activities would be temporary and would not extend beyond two seasons.

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would include permanent structures. O&M activities under this alternative would be similar to existing activities and would not substantially change the character of the project vicinity relative to current conditions. Therefore, aesthetics impacts of the North Notch with Modified Gate Operation Alternative would be the same as those of the Proposed Project, and impacts would be less than significant.

Air Quality

Construction and O&M activities for the North Notch with Modified Gate Operation Alternative would be similar to those for the Proposed Project. Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not result in growth-inducing effects or in long-term increases in population or vehicle miles traveled, leading to increased emissions levels that would conflict with or obstruct implementation of an applicable air quality plan (Impact 3.3-1).

Also like the Proposed Project, this alternative could cause a cumulatively considerable net increase in construction-related criteria pollutant emissions by emitting 165.5 pounds per day of unmitigated NO_x (for the concrete haul-in option) or 107.8 pounds NO_x per day (for the on-site batch plant option) (Impact 3.3-2); and by temporarily adding to localized and regional cumulative air quality impacts (Impact 3.3-4). Implementing Mitigation Measures 3.3-2a, 3.3-2b, and 3.3-2c would reduce this impact to a less-than-significant level.

Like the Proposed Project, the alternative would not expose sensitive receptors to substantial pollutant concentrations (Impact 3.3-3), because emissions generated by project construction would be temporary and no sensitive receptors are located in the immediate vicinity of the project site.

For these reasons, impacts of the North Notch with Modified Gate Operation Alternative would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Biological Resources—Terrestrial

The North Notch with Modified Gate Operation Alternative would involve the same construction and O&M activities as the Proposed Project and would include the same project footprint.

Because construction and O&M activities would be the same, impacts of this alternative on terrestrial biological resources would also be similar to those of the Proposed Project.

Impacts of the North Notch with Modified Gate Operation Alternative related to the disturbance, mortality, or loss or modification of habitat of special-status terrestrial species (Impacts 3.4-1 through 3.4-6), loss or degradation of riparian forest (Impact 3.4-12), and interference with the movement of native resident or migratory terrestrial wildlife species (Impact 3.4-14) would be similar to those of the Proposed Project. As under the Proposed Project, implementing Mitigation Measures 3.4-2a, 3.4-2b, 3.4-2c, 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, 3.4-3e, 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, 3.4-5e, 3.4-6a, 3.4-6b, 3.4-6c, 3.4-12a, 3.4-12b, and 3.4-12c would reduce impacts on special-status terrestrial species and habitat to a less-than-significant level.

Like the Proposed Project, implementation of the North Notch with Modified Gate Operation Alternative would comply with applicable adopted local policies or ordinances protecting biological resources, provided that they are consistent with DWR's internal environmental policies (Impact 3.4-15). The North Notch with Modified Gate Operation Alternative could result in the cumulative temporary and permanent loss of sensitive habitats and special-status species (Impact 3.4-16); however, as under the Proposed Project, implementing the mitigation measures listed above would reduce the contribution of the alternative to a less-than-significant level. Therefore, impacts of this alternative on terrestrial biological resources would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Cultural and Tribal Cultural Resources

The North Notch with Modified Gate Operation Alternative would involve the same construction and ground-disturbing activities as the Proposed Project and would include the same project footprint. Such activities may extend into undisturbed soil and could unearth, expose, or disturb subsurface archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-1, 3.5-2, and 3.9-1). Because impacts on cultural and tribal cultural resources could occur, the North Notch with Modified Gate Operation Alternative could contribute to significant direct or indirect cumulative changes to archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-3, 3.5-4, and 3.9-2) through continued development in the region.

No substantial evidence exists that archaeological or tribal cultural resources are present in the project area. However, because construction activities would involve ground-disturbing activities, Mitigation Measures 3.5-1a, 3.5-1b, 3.5-1c, 3.5-2, 3.9-1a, 3.9-1b, and 3.9-1c as identified for the Proposed Project would be implemented for the North Notch with Modified Gate Operation Alternative. Implementing these mitigation measures would reduce these impacts to less than-significant levels.

For these reasons, impacts of the North Notch with Modified Gate Operation Alternative on cultural and tribal cultural resources would be similar to those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Energy

Construction and O&M activities for the North Notch with Modified Gate Operation Alternative would be similar to those for the Proposed Project. This alternative, like the Proposed Project, would involve construction of a single notch in the northern portion of Tisdale Weir, and would require the same construction equipment, truck trips for hauling materials, and commutes by construction workers to and from the project area.

O&M activities for the North Notch with Modified Gate Operation Alternative would be similar to those required for the Proposed Project. These activities would include truck trips to Tisdale Weir, gate operation, operation of a control building, removal of debris and sediment from the energy dissipation and fish collection basin, erosion repair, and repair of damage to the weir and gate.

Construction activities and corresponding fuel energy consumption for this alternative would be temporary and localized, and operational impacts on energy resources would be driven by limited maintenance activities. Therefore, energy impacts of the North Notch with Modified Gate Operation Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Geology and Soils

The North Notch with Modified Gate Operation Alternative would involve the same construction and O&M activities as the Proposed Project and would include the same project footprint. Under both scenarios, the project would be located in Sutter County and not within an earthquake fault zone, and there are no known active faults in the project area or vicinity. Soils in the area have moderate to high potential for erosion and low shrink-swell potential. The site was previously disturbed during construction of the original Tisdale Weir and maintenance of the Tisdale Bypass. Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not be located on hillsides or unstable geologic units that would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

Construction activities for the North Notch with Modified Gate Operation Alternative, like those for the Proposed Project, would involve excavating native soil to a maximum depth of approximately 16 feet; however, the project area is not located in a paleontologically sensitive unit or known to contain fossils. This alternative would include the same rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements as the Proposed Project.

For these reasons, geology and soils impacts of the North Notch with Modified Gate Operation Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Greenhouse Gas Emissions

Construction and O&M activities for the North Notch with Modified Gate Operation Alternative would be similar to those for the Proposed Project. This alternative, like the Proposed Project, would involve construction of a single notch located in the northern portion of Tisdale Weir, and

would require the same construction equipment, truck trips for hauling materials, and commutes by construction workers to and from the project area. As under the Proposed Project, these activities would emit approximately 1,434 MT of CO₂e (for the on-site concrete batch plant option) or 2,166 MT of CO₂e (for the concrete haul-in option). When amortized over a 30-year period, these emissions would equal approximately 47.8 and 72.2 MT of CO₂e per year, respectively—substantially less than the significance threshold of 1,100 MT of CO₂e per year. Therefore, the North Notch with Modified Gate Operation Alternative would not generate GHG emissions that would have a significant impact on the environment (Impact 3.6-1); conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.6-2); or contribute considerably to a cumulative impact on GHG emissions (Impact 3.6-3).

For these reasons, GHG emissions impacts of the North Notch with Modified Gate Operation Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Hazards and Hazardous Materials

The North Notch with Modified Gate Operation Alternative would involve the same construction and O&M activities as the Proposed Project. Thus, as under the Proposed Project, the potential would exist for routine use or an accidental spill during construction to inadvertently release hazardous materials, which could adversely affect construction workers, the public, and the environment.

Construction and O&M activities for the North Notch with Modified Gate Operation Alternative would comply with applicable laws and regulations governing the transportation, use, handling, and disposal of hazardous materials, like those applicable to O&M activities for the Proposed Project. The project area is not located within an airport land use plan area or within one-quarter mile of a school, and it is not on a list of hazardous materials sites compiled under Government Code Section 65962.5 (the Cortese List). Further, because the project area is rural, with relatively low traffic volumes, and construction would be temporary, the North Notch with Modified Gate Operation Alternative—like the Proposed Project—would not interfere with an adopted emergency response or evacuation plan and would likely not expose people or structures to wildland fires.

For these reasons, impacts of the North Notch with Modified Gate Operation Alternative related to hazards and hazardous materials would be the same as those of the Proposed Project, and impacts would be less than significant.

Land Use

The North Notch with Modified Gate Operation Alternative would have the same footprint as the Proposed Project and would include work in the Tisdale Bypass, a flood control structure bounded by levees and agricultural land to the north and south.

Therefore, like the Proposed Project, this alternative would not physically divide an established community. Construction and O&M activities would be similar to those for the Proposed Project and would not conflict with existing land use designations.

For these reasons, as under the Proposed Project, no land use impact would occur under the North Notch with Modified Gate Operation Alternative.

Mineral Resources

The North Notch with Modified Gate Operation Alternative, like the Proposed Project, would be implemented in an area that does not contain known mineral resources of State or local importance. Construction and O&M activities for this alternative would be similar to those for the Proposed Project. Therefore, like the Proposed Project, the alternative would not result in the loss of availability of or loss of access to a known or locally important mineral resource. As under the Proposed Project, no impact on mineral resources would occur under the North Notch with Modified Gate Operation Alternative.

Noise

The North Notch with Modified Gate Operation Alternative would involve the same construction and O&M activities as the Proposed Project, with the same rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements. Both the Proposed Project and the North Notch with Modified Gate Operation Alternative would temporarily generate noise in and around the project area during construction and O&M activities; however, there are no noise-sensitive receptors in the vicinity of the project area. Noise impacts of the North Notch with Modified Gate Operation Alternative would be the same as those of the Proposed Project, and impacts would be less than significant.

Population and Housing

The North Notch with Modified Gate Operation Alternative and the Proposed Project would involve the same construction activities and would not result in the construction of new homes, businesses, road extensions, or similar infrastructure that would induce substantial unplanned population growth in the project area, or result in any displacement of housing. As under the Proposed Project, DWR Flood Maintenance Yard staff members would carry out O&M activities for the North Notch Alternative, and such work would not induce substantial unplanned population growth. Therefore, as under the Proposed Project, no impact related to population and housing would occur under the North Notch with Modified Gate Operation Alternative.

Public Services

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not result in the construction of new facilities or in an increase in the population that would increase the demand for police protection, fire protection, and community amenities (schools, parks, or libraries) that could result in the construction or need for new or physically altered government facilities. Therefore, as under the Proposed Project, no impact on public services would occur under the North Notch with Modified Gate Operation Alternative.

Transportation

Construction and O&M activities for the North Notch with Modified Gate Operation Alternative would be the same as those for the Proposed Project. This alternative would result in the same

rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements as the Proposed Project. Thus, like the Proposed Project, the North Notch with Modified Gate Operation Alternative would require approximately 24 truck trips per day for approximately 110 days to haul spoils to the storage area and would involve 34 construction workers. These activities would result in a minimal temporary increase in traffic levels along local roadways and would not worsen travel times on roads in the project vicinity.

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would require ongoing O&M activities that could temporarily increase traffic along local roadways. However, these activities would not worsen travel times on roads in the project vicinity. Also like the Proposed Project, this alternative would not conflict with a plan, ordinance, or policy addressing the circulation system, including transit, or designated bicycle and pedestrian facilities.

For these reasons, transportation impacts of the North Notch with Modified Gate Operation Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Utilities and Service Systems

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not result in the construction of new facilities or in an increase in the population that would generate wastewater, nor would this alternative cause an increase in the volume of waste that would exceed the permitted capacity of applicable landfills serving the project area.

As under the Proposed Project, water supplies for construction under the North Notch with Modified Gate Operation Alternative would be provided by contractors that have contracted access to local water supplies for dust suppression. These needs would be temporary and minor, with no new or expanded entitlements would be required.

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would involve removing utility poles and filling the resulting holes in the Tisdale Bypass channel during the dry season. This work could have a significant impact on nesting birds or roosting bats, which is addressed in Section 3.4, *Biological Resources*. Implementing Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c would reduce impacts on nesting birds or roosting bats to a less-than-significant level.

For these reasons, impacts of the North Notch with Modified Gate Operation Alternative on utilities and service systems would be similar to those of the Proposed Project, and impacts would be less than significant.

Wildfire

The project area is located in a Local Responsibility Area that is designated as a Moderate Fire Hazard Severity Zone. Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not include any residential structures or infrastructure that may exacerbate fire risk. As under the Proposed Project, because the project area is rural, with relatively low traffic

volumes, and construction and O&M activities under this alternative would be short-term, such activities would not impair an adopted emergency response or emergency evacuation plan. Therefore, wildfire impacts of the North Notch with Modified Gate Operation Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as Less Severe than Impacts of the Proposed Project

Agriculture and Forestry Resources

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not be located on farmland, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and no parcels on the site of the North Notch with Modified Gate Operation Alternative are in Williamson Act contracts (Impact 3.2-1). The North Notch with Modified Gate Operation Alternative project area is also not located on or near land zoned as forest land, timberland, or Timberland Protection.

Construction and O&M activities for the North Notch with Modified Gate Operations Alternative would be similar to those for the Proposed Project. However, the modified gate operations would not cause any changes to downstream Sacramento River flows. Similarly, the frequency, duration, and extent of inundation downstream of the project area in the Tisdale and Sutter Bypasses would not change.

The North Notch with Modified Gate Operations Alternative is not anticipated to result in the conversion of downstream farmland or impacts on Williamson Act land (Impact 3.2-1), and potential impacts of this alternative on farmland would be less severe than those of the Proposed Project.

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would not contribute to cumulative impacts on agricultural resources by converting Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use, nor would this alternative conflict with a Williamson Act contract (Impact 3.3-2).

For these reasons, the North Notch with Modified Gate Operation Alternative would result in less severe impacts on agriculture and forestry resources than the Proposed Project, and impacts would be less than significant.

Hydrology and Water Quality

Gate operations under the North Notch with Modified Gate Operation Alternative would result in a frequency, duration, and extent of inundation downstream of the project area that would be similar to existing conditions.

Volume, peak flow, and total duration of flow through Tisdale Weir were modeled for existing conditions (without the notch), which would be similar to the North Notch with Modified Gate Operation Alternative condition, and a one-notch scenario, which would be the same as the Proposed Project condition (**Table 5-7**). Under the North Notch with Modified Gate Operation Alternative, an average of 838,412 acre-feet of water would pass over the weir annually, compared to 924,569 acre-feet with the Proposed Project.

**TABLE 5-7
FLOW CONDITIONS AT TISDALE WEIR—EXISTING (NORTH NOTCH WITH MODIFIED GATE OPERATION
ALTERNATIVE CONDITION) AND WITH ONE NOTCH (PROPOSED PROJECT CONDITION)**

Water Year Type ¹	Average of Volume (acre-feet): Existing Condition	Average of Peak Flow (cfs): Existing Condition	Average of Total Flow Duration (days): Existing Condition	Average of Volume (acre-feet): One Notch	Average of Peak Flow (cfs): One Notch	Average of Total Flow Duration (days): One Notch
Wet²	2,030,303	22,083	83	2,196,891	22,298	140
Above Normal³	864,830	18,176	49	976,952	18,558	94
Below Normal⁴	346,392	13,914	21	401,219	14,357	50
Dry⁵	155,882	14,985	11	188,397	15,413	30
Critical⁶	115,877	10,837	9	143,985	11,108	23
2019 Wet (assumed)	1,648,157	22,498	76	1,772,855	22,712	121
Total	838,412	16,806	40	924,569	17,145	75

NOTES:

- 1 Includes water years 1997 through 2019.
- 2 Wet Water Years include 1997, 1998, 1999, 2006, 2011, and 2017.
- 3 Above Normal Water Years include 2000, 2003, and 2005.
- 4 Below Normal Water Years include 2004, 2010, 2012, 2016, and 2018.
- 5 Dry Water Years include 2001, 2002, 2007, 2009, and 2013.
- 6 Critical Water Years include 2008, 2014, and 2015.

SOURCE: Data compiled by Environmental Science Associates in 2020.

Under the North Notch with Modified Gate Operation Alternative, as under the Proposed Project, sediment would be deposited along Tisdale Weir and the Tisdale Bypass as floodwaters travel through the bypass; however, less water would enter the bypass, given the modified gate operations. Thus, this alternative would result in less accumulation of sediment along the weir and bypass than the estimated 194,800 to 370,200 cubic yards of sediment that would have deposited in the bypass during the 2007 to 2017 time frame under the Proposed Project (Impacts 3.7-2, 3.7-3, 3.7-7, and 3.7-8).

As under the Proposed Project, construction of the North Notch with Modified Gate Operation Alternative would include excavation of soils and concrete, and other ground-disturbing activities that could cause the release of sediment and other pollutants that could substantially degrade receiving water quality (Impacts 3.7-1 and 3.7-6). This alternative could affect receiving water quality through the release of sediment and other pollutants. Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project in Impact 3.7-1 would reduce these impacts to a less-than-significant level.

This alternative would not alter the hydrology or hydraulics of the Tisdale Bypass (see Table 5-7) or the Sacramento River compared to existing conditions (Impacts 3.7-4, 3.7-5, 3.7-9, and 3.7-10). The Proposed Project would result in minor changes (2.2 percent or less; Table 3.4-10) in the Sacramento River during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, which occur during the summer and early fall, both the

North Notch with Modified Gate Operation Alternative and the Proposed Project would not affect flow conditions in the Sacramento River because the river's stage would remain below the base elevation of the notch.

For these reasons, impacts of the North Notch with Modified Gate Operation Alternative on hydrology and water quality would be less severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Recreation

The project area is located in the Sutter Bypass Wildlife Area. An existing parking lot west of Tisdale Weir provides access to the wildlife area and the Tisdale Boat Launch Facility. Construction of the North Notch with Modified Gate Operation Alternative, like construction of the Proposed Project, could result in the temporary closure of areas where construction activities would occur.

O&M activities for the North Notch with Modified Gate Operation Alternative would not change the frequency and duration of inundation in the Sutter Bypass compared to current conditions, so this alternative would not cause a minimal seasonal reduction in the amount of land available for recreation, like the Proposed Project. The alternative would not result in the physical deterioration or accelerated deterioration of nearby recreation areas (Impacts 3.8-1 and 3.8-3) or a permanent decrease in access to existing recreational facilities or opportunities (Impacts 3.8-2 and 3.8-4).

For these reasons, recreation impacts of the North Notch with Modified Gate Operation Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as More Severe than Impacts of the Proposed Project

Biological Resources—Aquatic

The North Notch with Modified Gate Operation Alternative would involve the same rehabilitation and reconstruction of Tisdale Weir, installation of fish passage facilities, and associated project site improvements as the Proposed Project. The construction-related impacts of this alternative would be similar to those of the Proposed Project. However, because the gate would be open much less of the time, the alternative would improve but not achieve the same level of benefits for fish, from increased fish passage and reduced fish stranding at the weir, compared to existing conditions and the Proposed Project.

As a result, the North Notch with Modified Gate Operation Alternative would provide fewer opportunities for fish passing through the Tisdale Bypass from the Sutter Bypass to return to the Sacramento River. Fish passage would be more limited. Therefore, impacts related to disturbance or mortality and loss of suitable habitat for special-status fish species (Impacts 3.4-8, 3.4-10, 3.4-11, and 3.4-16) would be more severe under the North Notch with Modified Gate Operation Alternative than under the Proposed Project. Mitigation would be needed to reduce the impacts of this alternative on fish passage conditions.

Like the Proposed Project, the North Notch with Modified Gate Operation Alternative would involve construction activities, so impacts on aquatic special-species and habitat from construction could occur (Impacts 3.4-4, 3.4-7, 3.4-8, 3.4-9, 3.4-13, and 3.4-16). Implementing mitigation measures as identified for the Proposed Project to minimize impacts on aquatic resources (Mitigation Measures 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, 3.4-9, 3.4-13, and 3.4-16) would reduce impacts to a less-than-significant level.

For these reasons, the North Notch with Modified Gate Operation Alternative would not fully improve fish passage through Tisdale Weir to the Sacramento River, and would have more severe impacts on aquatic biological resources than those of the Proposed Project, but impacts would be less than significant with mitigation incorporated.

Ability to Meet the Project Objectives

The North Notch with Modified Gate Operation Alternative would fully achieve only one of the two project alternatives. With this alternative, DWR would rehabilitate and reconstruct Tisdale Weir and construct the project site improvements as described for the Proposed Project in Chapter 2. Therefore, this alternative would meet the project's objective to structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.

The North Notch with Modified Gate Operation Alternative would also include fish passage facilities at the weir. In addition, it would include an energy dissipation and fish collection basin that would reduce fish stranding compared to current conditions, support fish passage, and improve operational flexibility for maintenance and, if necessary, fish rescues. Therefore, this alternative would meet the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River.

However, as noted above, the modified gate operation would limit fish passage and increase the risk of fish stranding as compared to the Proposed Project. Therefore, this alternative would not fully achieve the project's objective to minimize fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access.

5.5.5 Tisdale Weir Structural Improvements Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Hazards and Hazardous Materials

The Tisdale Weir Structural Improvements Alternative would include construction activities to rehabilitate and reconstruct Tisdale Weir; thus, as under the Proposed Project, the potential would exist for routine use or an accidental spill during construction to inadvertently release hazardous materials, which could adversely affect construction workers, the public, and the environment.

O&M activities under this alternative would be similar to existing activities and would require continued compliance with laws and regulations governing the transportation, use, handling, and disposal of hazardous materials, like those applicable to O&M activities for the Proposed Project. The project area is not located within an airport land use plan area or within one-quarter mile of a school, and it is not on a list of hazardous materials sites compiled under Government Code Section 65962.5 (the Cortese List). Further, because the project area is rural, with relatively low traffic volumes, and construction would be temporary, the Tisdale Weir Structural Improvements Alternative—like the Proposed Project—would not interfere with an adopted emergency response or evacuation plan and would likely not expose people or structures to wildland fires.

For these reasons, impacts of the Tisdale Weir Structural Improvements Alternative related to hazards and hazardous materials would be similar to those of the Proposed Project, and impacts would be less than significant.

Land Use

The Tisdale Weir Structural Improvements Alternative would be implemented in the same area as the Proposed Project: the Tisdale Bypass, a flood control structure bounded by levees and agricultural land to the north and south.

Therefore, like the Proposed Project, this alternative would not physically divide an established community or conflict with any land use designations. This alternative would have a smaller construction footprint than the Proposed Project; the disturbance area would be limited to within the bypass, and this alternative would use only two of the four staging areas proposed for the project. O&M activities would be the same as under existing conditions and would not conflict with existing land use designations.

For these reasons, as under the Proposed Project, no land use impact would occur under the Tisdale Weir Structural Improvements Alternative.

Mineral Resources

The Tisdale Weir Structural Improvements Alternative, like the Proposed Project, would be implemented in an area that does not contain known mineral resources of State or local importance. Construction work under this alternative, and O&M activities that would occur at the weir and within the Tisdale Bypass (as under current conditions), including removal of sediment and large wood debris, would not result in the loss of availability of or loss of access to known or locally important mineral resources. Therefore, as under the Proposed Project, no impact on mineral resources would occur under the Tisdale Weir Structural Improvements Alternative.

Population and Housing

Neither the Proposed Project nor the Tisdale Weir Structural Improvements Alternative would result in the construction of new homes, businesses, road extensions, or similar infrastructure that would induce substantial unplanned population growth in the project area, or result in any displacement of housing. O&M activities under this alternative would be similar to existing activities and would be carried out by existing DWR Flood Maintenance Yard staff; this work

would not induce substantial unplanned population growth. Therefore, as under the Proposed Project, no impact related to population and housing would occur under the Tisdale Weir Structural Improvements Alternative.

Public Services

Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not result in the construction of new facilities or in an increase in the population that would increase the demand for police protection, fire protection, and community amenities (schools, parks, or libraries) that could result in the construction or need for new or physically altered government facilities. Therefore, as under the Proposed Project, no impact on public services would occur under the Tisdale Weir Structural Improvements Alternative.

Wildfire

The project area is located in a Local Responsibility Area that is designated as a Moderate Fire Hazard Severity Zone. Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not include any residential structures or infrastructure that may exacerbate fire risk. O&M activities under this alternative would be similar to existing activities. Because the project area is rural, with relatively low traffic volumes, and construction and O&M activities would be short-term, such activities would not impair an adopted emergency response or emergency evacuation plan. Therefore, wildfire impacts of the Tisdale Weir Structural Improvements Alternative would be similar to those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as Less Severe than Impacts of the Proposed Project

Aesthetics

The visual character of the project area is the same for the Tisdale Weir Structural Improvements Alternative as for the Proposed Project, defined by the Sacramento River, Tisdale Weir, and riparian vegetation along the Tisdale Bypass. Construction of the Tisdale Weir Structural Improvements Alternative would occur at a reduced scale compared to the Proposed Project. This alternative would use only two of the four staging areas proposed for the project and would limit the disturbance area to work within the bypass, thereby reducing the need for construction equipment and materials, vehicles, and crews adjacent to the Sacramento River. In addition, unlike the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not include permanent structures. O&M activities under the Tisdale Weir Structural Improvements Alternative would be similar to existing activities and would not substantially change the character of the project vicinity relative to current conditions. Therefore, aesthetics impacts of the Tisdale Weir Structural Improvements Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Agriculture and Forestry Resources

Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not be located on farmland, including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and no parcels on the site of the Tisdale Weir Structural Improvements Alternative

are in Williamson Act contracts (Impact 3.2-1). The Tisdale Weir Structural Improvements Alternative project area is also not located on or near land zoned as forest land, timberland, or Timberland Protection.

The disturbance area for the Tisdale Weir Structural Improvements Alternative would be limited to the Tisdale Bypass, and only two of the four staging areas proposed for the project would be used. O&M activities would be similar to existing activities and are not anticipated to result in the conversion of downstream farmland or impacts on Williamson Act land (Impact 3.2-1).

The Tisdale Weir Structural Improvements Alternative would not include the installation of fish passage facilities. Therefore, there would be no changes in downstream Sacramento River flows or in the frequency, duration, and extent of inundation downstream of the project area in the Tisdale and Sutter Bypasses, and potential impacts of this alternative on farmland would be less than those of the Proposed Project. Like the Proposed Project, this alternative would not contribute to cumulative impacts on agricultural resources by converting Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to nonagricultural use, nor would it conflict with a Williamson Act contract (Impact 3.3-2).

For these reasons, impacts of the Tisdale Weir Structural Improvements Alternative on agriculture and forestry resources would be less severe than those of the Proposed Project, and impacts would be less than significant.

Air Quality

The Tisdale Weir Structural Improvements Alternative is less likely than the Proposed Project to result in growth-inducing effects or in long-term increases in population or vehicle miles traveled, leading to increased emissions levels that would conflict with or obstruct implementation of an applicable air quality plan (Impact 3.3-1). Because this alternative would involve fewer construction activities, fewer criteria air pollutants would be emitted than the Proposed Project's unmitigated NO_x emissions of 165.5 pounds per day (for the concrete haul-in option) or 107.8 pounds per day (for the on-site batch plant option) (Impact 3.3-2).

However, construction activities for this alternative could result in a cumulatively considerable net increase of criteria pollutants (Impact 3.3-2) or temporarily add to localized and regional cumulative air quality impacts (Impact 3.3-4). Implementing Mitigation Measures 3.3-1a, 3.3-1b, and 3.3-1c would reduce air quality impacts to less-than-significant levels.

Given the reduced scale of the Tisdale Weir Structural Improvements Alternative compared to the Proposed Project, this alternative would include fewer activities that could expose sensitive receptors to pollutant concentrations (Impact 3.3-3). This alternative would include ongoing O&M activities (grading to level and fill scour holes; hauling away excess sediment located near the weir, as necessary; and removing sediment and large wood debris) that would require the use of equipment that would emit pollutants; however, these activities would be the same as existing activities and would not result in new impacts.

Because the Tisdale Weir Structural Improvements Alternative would involve fewer construction activities, air quality impacts of this alternative would be less severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Biological Resources—Terrestrial

Unlike the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not include installation of fish passage facilities and associated project site improvements. As a result, this alternative would have a reduced scale compared to the Proposed Project; the disturbance area would be limited to work within the bypass, and only two of the four proposed staging areas would be used during construction.

Based on findings from the biological resources surveys, no special-status plant species have the potential to be present in the project area. Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not affect special-status plant species (Impact 3.4-1).

Because this alternative would involve reduced-scale construction work, construction impacts on valley elderberry longhorn beetle (Impact 3.4-2), giant garter snake (Impact 3.4-3), western pond turtle (Impact 3.4-4), bird species (Impact 3.4-5), and special-status bats (Impact 3.4-6) may be less severe than those of the Proposed Project. However, as discussed further below, impacts may still occur under the Tisdale Weir Structural Improvements Alternative, as under the Proposed Project:

- Construction work could affect elderberry shrubs directly through vegetation trimming and removal and indirectly through soil compaction, root damage, and dust generation (Impact 3.4-2). As under the Proposed Project, this impact would be potentially significant. Implementing Mitigation Measures 3.4-2a, 3.4-2b, and 3.4-2c would reduce this impact to a less-than-significant level.
- Construction activities could directly affect the giant garter snake outside the Tisdale Bypass through vehicle strikes, and construction staging outside the Tisdale Bypass could unintentionally collapse mammal burrows in which giant garter snake could be taking refuge. Implementing Mitigation Measures 3.4-3a, 3.4-3b, 3.4-3c, 3.4-3d, and 3.4-3e would reduce this impact to a less-than-significant level.
- Western pond turtle could be adversely affected by construction activities through vehicle strikes. Implementing Mitigation Measures 3.4-4a, 3.4-4b, 3.4-4c, and 3.4-4d would reduce this impact to a less-than-significant level.
- Nesting birds could be directly affected by construction noise and activity. Furthermore, construction work would include the removal of large trees where birds may be nesting. Implementing Mitigation Measures 3.4-5a, 3.4-5b, 3.4-5c, 3.4-5d, and 3.4-5e would reduce these impacts to a less-than-significant level.
- Special-status bats could be directly affected by construction noise and activity, and construction work could include the removal of large trees where bats may be roosting. Implementing Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c would reduce these impacts to a less-than-significant level.

Construction activities for the Tisdale Weir Structural Improvements Alternative could directly affect less riparian habitat (Impact 3.4-12) compared to the Proposed Project. Implementing

Mitigation Measures 3.4-12a, 3.4-12b, and 3.4-12c would reduce these impacts to a less-than-significant level.

Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not interfere with the movement of native resident or migratory terrestrial wildlife species (Impact 3.4-14) because terrestrial species could easily move to nearby unaffected habitat. Also like the Proposed Project, this alternative would comply with applicable adopted local policies or ordinances protecting biological resources, provided that they are consistent with DWR's internal environmental policies (Impact 3.4-15).

Given the reduced scale of the Tisdale Weir Structural Improvements Alternative compared to the Proposed Project, the potential for cumulative temporary and permanent loss of sensitive habitats and special-status species (Impact 3.4-16) is expected to be slightly less under this alternative. However, impacts may still occur, as under the Proposed Project, and the mitigation measures listed above would reduce the contribution of the alternative to a less-than-significant level.

For these reasons, impacts of the Tisdale Weir Structural Improvements Alternative on terrestrial biological resources would be less severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Cultural and Tribal Cultural Resources

Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would involve ground-disturbing activities that may extend into undisturbed soil; such activities could unearth, expose, or disturb subsurface archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-1, 3.5-2, and 3.9-1). Because the disturbance area for this alternative would be limited to work within the bypass, these impacts could be less severe than those of the Proposed Project. However, because ground-disturbing activities would occur under this alternative, impacts on cultural and tribal cultural resources could be significant. Such impacts could contribute to significant direct or indirect cumulative changes to archaeological resources, human remains, and tribal cultural resources (Impacts 3.5-3, 3.5-4, and 3.9-2) through additional development in the region.

No substantial evidence exists that archaeological or tribal cultural resources are present in the project area. However, given the ground-disturbing activities that would occur, Mitigation Measures 3.5-1a, 3.5-1b, 3.5-1c, 3.5-2, 3.9-1a, 3.9-1b, and 3.9-1c would be implemented. Implementing these mitigation measures would reduce these impacts to a less-than-significant level.

Therefore, impacts of the Tisdale Weir Structural Improvements Alternative on cultural and tribal cultural resources would be less severe than those of for the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Energy

As under the Proposed Project, construction activities for the Tisdale Weir Structural Improvements Alternative would consume fuel, although this alternative is expected to require

less fuel, given its reduced scale. Further, this alternative would include ongoing O&M activities that would be similar to existing O&M activities and activities that would be implemented by the Proposed Project. Unlike the Proposed Project, however, it would not include gate operation or a control building that would use energy. Energy impacts of the Tisdale Weir Structural Improvements Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Geology and Soils

Similar to the Proposed Project, the site of the Tisdale Weir Structural Improvements Alternative is located in Sutter County and not in an earthquake fault zone, and there are no known active faults in the project area or vicinity. Soils in the area have moderate to high potential for erosion and low shrink-swell potential. The site was previously disturbed during construction of the original Tisdale Weir and maintenance of the Tisdale Bypass.

This alternative would not involve excavating native soil for installation of fish passage facilities and associated project site improvements, and the project site is not located on any hillside or unstable geologic units; therefore, no erosion, on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse would occur. The Tisdale Weir Structural Improvements Alternative would not involve excavation activities that could disturb paleontological resources or geologically sensitive units. Therefore, geology and soils impacts of the Tisdale Weir Structural Improvements Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Greenhouse Gas Emissions

GHG emissions impacts of the Tisdale Weir Structural Improvements Alternative be similar to but less severe than those of the Proposed Project, given the reduced scale of this alternative compared to the Proposed Project. O&M activities for the Tisdale Weir Structural Improvements Alternative would be similar to existing conditions and would require the use of equipment. Estimated CO₂e emissions from the Proposed Project total approximately 1,434 MT for the on-site concrete batch plant option and 2,166 MT for the concrete haul-in option. When amortized over a 30-year period, these emissions equal approximately 47.8 and 72.2 MT of CO₂e per year, respectively—substantially less than the significance threshold of 1,100 MT of CO₂e per year. Because this alternative would require fewer construction and O&M activities than the Proposed Project, it would generate GHGs at a lower level than the Proposed Project, which is below the significance threshold. Therefore, the Tisdale Weir Structural Improvements Alternative would not generate GHG emissions that would have a significant impact on the environment (Impact 3.6-1); conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.6-2); or contribute considerably to a cumulative impact on GHG emissions (Impact 3.6-3).

For these reasons, GHG emissions impacts of the Tisdale Weir Structural Improvements Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Hydrology and Water Quality

Volume, peak flow, and total duration of flow through the Tisdale Weir were modeled for existing conditions (without the notch), which would be similar to the Tisdale Weir Structural Improvements Alternative, and a one-notch scenario, which would be the same as the Proposed Project condition (**Table 5-8**). Under the Tisdale Weir Structural Improvements Alternative, an average of 838,412 acre-feet of water would pass over the weir annually, compared to 924,569 acre-feet with the Proposed Project.

Under the Tisdale Weir Structural Improvements Alternative, deposits of sediment along Tisdale Weir and the Tisdale Bypass would continue as floodwaters travel through the bypass. However, less water would enter the bypass under this alternative because it would not include a notch in the weir for fish passage facilities. As a result, the Tisdale Weir Structural Improvements Alternative would result in less accumulation of sediment along the weir and bypass than the Proposed Project (Impacts 3.7-2, 3.7-3, 3.7-7, and 3.7-8). Approximately 181,200 to 344,400 cubic yards of sediment would have deposited in the bypass during the 2007 to 2017 time frame with the Tisdale Weir Structural Improvements Alternative (like existing conditions), compared to an estimated 194,800 to 370,200 cubic yards of sediment that would have deposited in the bypass under the Proposed Project.

TABLE 5-8
FLOW CONDITIONS AT TISDALE WEIR—EXISTING (TISDALE WEIR STRUCTURAL IMPROVEMENTS ALTERNATIVE CONDITION) AND WITH ONE NOTCH (PROPOSED PROJECT CONDITION)

Water Year Type ¹	Average of Volume (acre-feet): Existing Condition	Average of Peak Flow (cfs): Existing Condition	Average of Total Flow Duration (days): Existing Condition	Average of Volume (acre-feet): One Notch	Average of Peak Flow (cfs): One Notch	Average of Total Flow Duration (days): One Notch
Wet²	2,030,303	22,083	83	2,196,891	22,298	140
Above Normal³	864,830	18,176	49	976,952	18,558	94
Below Normal⁴	346,392	13,914	21	401,219	14,357	50
Dry⁵	155,882	14,985	11	188,397	15,413	30
Critical⁶	115,877	10,837	9	143,985	11,108	23
2019 Wet (assumed)	1,648,157	22,498	76	1,772,855	22,712	121
Total	838,412	16,806	40	924,569	17,145	75

NOTES:

- 1 Includes water years 1997 through 2019.
- 2 Wet Water Years include 1997, 1998, 1999, 2006, 2011, and 2017.
- 3 Above Normal Water Years include 2000, 2003, and 2005.
- 4 Below Normal Water Years include 2004, 2010, 2012, 2016, and 2018.
- 5 Dry Water Years include 2001, 2002, 2007, 2009, and 2013.
- 6 Critical Water Years include 2008, 2014, and 2015.

SOURCE: Data compiled by Environmental Science Associates in 2020.

As under the Proposed Project, activities under the alternative could cause the release of sediment and other pollutants that could substantially degrade receiving water quality (Impacts 3.7-1 and 3.7-6); however, impacts may be less severe given the reduced footprint and less construction

activities under the alternative. Implementing Mitigation Measures 3.4-7a, 3.4-7b, and 3.4-7c as identified for the Proposed Project in Impact 3.7-1 would reduce construction-related impacts on receiving water quality to a less-than-significant level.

The Tisdale Weir Structural Improvements Alternative would not alter the hydrology or hydraulics of the Tisdale Bypass (see Table 5-8) or the Sacramento River compared to existing conditions (Impacts 3.7-4, 3.7-5, 3.7-9, and 3.7-10). The Proposed Project would result in minor changes (2.2 percent or less; Table 3.4-10) in the Sacramento River during episodes of high flow when the operable gates are open. During conditions of moderate to low flows, which occur during the summer and early fall, both the Tisdale Weir Structural Improvements Alternative and the Proposed Project would not affect flow conditions in the Sacramento River.

For these reasons, impacts of the Tisdale Weir Structural Improvements Alternative on hydrology and water quality would be less severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Noise

The Tisdale Weir Structural Improvement Alternative would include construction activities that would temporarily generate noise at and around the project area. Given that the scope of the alternative is less than the Proposed Project because it would not include installation of the fish passage facilities and associated site improvements, it is anticipated that construction would be completed sooner and groundborne noise and vibration would be less compared to the Proposed Project. O&M activities would be similar to existing conditions and could create some groundborne noise and vibration, like the Proposed Project; however, there are no noise-sensitive receptors in the vicinity of the project area.

Because the Tisdale Weir Structural Improvements Alternative would result in less noise and vibration than the Proposed Project, the noise impacts of this alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Recreation

The project area is located in the Sutter Bypass Wildlife Area. An existing parking lot west of Tisdale Weir provides access to the wildlife area and the Tisdale Boat Launch Facility. Construction of the Tisdale Weir Structural Improvements Alternative, like construction of the Proposed Project, could result in the temporary closure of areas where construction activities would occur.

However, O&M activities would not change the frequency and duration of inundation in the Sutter Bypass because this alternative would not include construction of a notch in the weir. Thus, the Tisdale Weir Structural Improvements Alternative would not cause a minimal seasonal reduction in the amount of land available for recreation. The alternative also would not result in the physical deterioration or accelerated deterioration of nearby recreation areas (Impacts 3.8-1 and 3.8-3) or a permanent decrease in access to existing recreational facilities or opportunities (Impacts 3.8-2 and 3.8-4).

For these reasons, recreation impacts of the Tisdale Weir Structural Improvements Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Transportation

Construction activities under the Tisdale Weir Structural Improvements Alternative would be less than those of the Proposed Project because this alternative would not include installation of fish passage facilities and associated site project site improvements. Thus, this alternative would require fewer daily truck trips to haul spoils to the storage area than the approximately 24 truck trips per day required by the Proposed Project for approximately 110 days. The alternative would also require fewer construction workers than the 34 workers anticipated for the Proposed Project.

The reduced activity of this alternative compared to the Proposed Project would result in a minimal temporary increase in traffic levels along local roadways and would not worsen travel times on roads in the project vicinity. Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would require ongoing O&M activities that could temporarily increase traffic along local roadways. However, these O&M activities for the alternative would be similar to existing activities and would not worsen travel times on roads in the project vicinity. Like the Proposed Project, this alternative would not conflict with a plan, ordinance, or designated bicycle and pedestrian facilities.

For these reasons, transportation impacts of the Tisdale Weir Structural Improvements Alternative would be less severe than those of the Proposed Project, and impacts would be less than significant.

Utilities and Service Systems

Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not result in the construction of new facilities or an increase in the population that would generate wastewater, nor would this alternative cause an increase in the volume of waste that would exceed the permitted capacity of applicable landfills serving the project area.

As under the Proposed Project, water supplies for construction under the Tisdale Weir Structural Improvements Alternative would be provided by contractors that have contracted access to local water supplies for dust suppression. However, needs are anticipated to be less, given the reduced scale of this alternative relative to the Proposed Project.

Unlike the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not involve removing utility poles and filling the resulting holes in the bypass channel during the dry season. Thus, the alternative would not require implementation of Mitigation Measures 3.4-6a, 3.4-6b, and 3.4-6c, which is addressed in Section 3.4, *Biological Resources*, to reduce impacts on nesting birds or roosting bats to a less-than-significant level.

For these reasons, impacts of the Tisdale Weir Structural Improvements Alternative on utilities and service systems would be less severe than those of the Proposed Project, and impacts would be less than significant.

Impacts Identified as More Severe than Impacts of the Proposed Project

Biological Resources—Aquatic

Unlike the Proposed Project, the Tisdale Weir Structural Improvements Alternative would not include the installation of fish passage facilities and associated site improvements to benefit anadromous and other upmigrating fish that become stranded in the weir's existing energy dissipation basin, especially when flood flows recede and weir overtopping ends. Therefore, the impacts of this alternative related to disturbance or mortality and loss of suitable habitat for special-status fish species (Impacts 3.4-8, 3.4-10, 3.4-11, and 3.4-16) would be more severe than those of the Proposed Project, and mitigation would be needed to reduce impacts on fish passage conditions.

Like the Proposed Project, the Tisdale Weir Structural Improvements Alternative would involve construction activities, so impacts on aquatic special-species and habitat from construction could occur (Impacts 3.4-4, 3.4-7, 3.4-8, and 3.4-16). Implementing mitigation measures as identified for the Proposed Project to minimize impacts on aquatic resources (Mitigation Measures 3.4-4a, 3.4-4b, 3.4-4c, 3.4-4d, 3.4-7a, 3.4-7b, 3.4-7c, 3.4-8a, 3.4-8b, 3.4-8c, and 3.4-16) would reduce impacts.

This alternative would not generate any hydrostatic pressure waves and vibrations that would affect fish (Impact 3.4-9) and would result in less severe impacts on waters of the United States than under the Proposed Project (Impact 3.4-13 and Mitigation Measure 3.4-13).

The Tisdale Weir Structural Improvements Alternative would not reduce fish stranding at Tisdale Weir by improving fish passage through the weir to the Sacramento River. Therefore, long-term impacts of this alternative on aquatic biological resources would be more severe than those of the Proposed Project, and impacts would be less than significant with mitigation incorporated.

Ability to Meet the Project Objectives

The Tisdale Weir Structural Improvements Alternative would achieve only one of the two project objectives. With this alternative, DWR would rehabilitate and reconstruct Tisdale Weir and construct the project site improvements as described for the Proposed Project in Chapter 2. Therefore, this alternative would meet the project's objective to structurally rehabilitate Tisdale Weir to extend its design life by an additional 50 years.

The Tisdale Weir Structural Improvements Alternative would not include fish passage facilities at the weir. Therefore, this alternative would not meet the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River with minimal effects to facility maintenance and recreational access.

5.6 Environmentally Superior Alternative

CEQA requires identification of an environmentally superior alternative, which is the alternative that would have the least significant impacts on the environment. **Table 5-9** presents a comparison of impacts by resource topic addressed in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR for the Proposed Project and each alternative.

The Proposed Project would involve rehabilitation and reconstruction of the existing Tisdale Weir to address structural deficiencies; installation of fish passage facilities; and installation of associated improvements, including a control building for monitoring equipment and an access road.

The No Project Alternative would not meet either of the project objectives. It would result in less severe impacts on agricultural resources, hydrology and water quality, and recreation than those identified for the Proposed Project, given that the alternative would not include a notch in the bypass that would change flow through the weir compared to current conditions. Impacts on air quality, terrestrial biological resources, cultural and tribal cultural resources, and GHG emissions would also be less severe than those identified for the Proposed Project because the No Project Alternative would not include ground disturbance. Fish passage and fish stranding at Tisdale Weir would continue with the No Project Alternative, which would result in greater aquatic biological resources impacts (specifically on special-status fish) than those identified for the Proposed Project.

The South Notch Alternative and the North and South Notches Alternative would provide weir rehabilitation and reconstruction and project site improvements similar to those identified for the Proposed Project; as a result, these alternatives would meet the project's objective to structurally rehabilitate Tisdale Weir. The alternatives would also include fish passage facilities and would conceptually meet part of the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River with minimal effects on facility maintenance and recreational access. However, under both alternatives, the south notch location could result in larger and/or more frequent debris accumulation and entrain additional debris into the Tisdale Bypass compared to the Proposed Project. This ultimately could restrict fish passage, increase fish stranding and facility maintenance, and limit the ability to fully achieve the project objective. Both alternatives are more likely to result in damage to the notch or gate(s) or delays in conducting O&M activities because of the presence of debris. Both alternatives would result in more severe impacts on recreation compared to those identified for the Proposed Project given the limitations on recreational river access associated with the south notch location.

**TABLE 5-9
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES**

Resource Topic	Impact	Proposed Project	No Project Alternative	South Notch Alternative	North and South Notches Alternative	North Notch with Modified Gate Operation Alternative	Tisdale Weir Structural Improvements Alternative
3.2 Agricultural Resources	3.2-1: Implementation of the Proposed Project could convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract.	LS	LS-	LS	LS+	LS-	LS-
	3.2-2: Operation and maintenance of the Proposed Project could contribute to cumulative impacts on agricultural resources through the conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland to non-agricultural use, or conflict with a Williamson Act contract.	LS	LS-	LS	LS+	LS-	LS-
3.3 Air Quality	3.3-1: Implementation of the Proposed Project could conflict with or obstruct implementation of the applicable air quality plan.	LS	LS-	LS	LS	LS	LS-
	3.3-2: Construction of the Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard.	LSM	LS	LSM+	LSM+	LSM	LS
	3.3-3: Construction of the Proposed Project could expose sensitive receptors to substantial pollutant concentrations.	LS	LS-	LS	LS	LS	LS-
	3.3-4: Construction of the Proposed Project could temporarily add to localized and regional cumulative air quality impacts.	LSM	LS	LSM+	LSM+	LSM	LS
3.4 Biological Resources	3.4-1: Implementation of the Proposed Project could cause loss or modification of habitat for special-status plant species.	LS	LS	LS	LS	LS	LS
	3.4-2: Implementation of the Proposed Project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).	LSM	LS	LSM	LSM+	LSM	LSM-
	3.4-3: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for giant garter snake.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.4-4: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for western pond turtle.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.4-5: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable habitat for bird species.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.4-6: Implementation of the Proposed Project could cause disturbance or mortality of and loss of suitable roosting habitat for special-status bats.	LSM	LS	LSM	LSM+	LSM	LSM-

TABLE 5-9 (CONTINUED)
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic	Impact	Proposed Project	No Project Alternative	South Notch Alternative	North and South Notches Alternative	North Notch with Modified Gate Operation Alternative	Tisdale Weir Structural Improvements Alternative
3.4 Biological Resources (cont.)	3.4-7: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by causing changes in water quality.	LSM	LS	LSM	LSM	LSM	LSM
	3.4-8: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by modifying aquatic habitat.	LSM	LSM+	LSM	LSM	LSM+	LSM+
	3.4-9: Construction of the Proposed Project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.	LSM	LS	LSM	LSM	LSM	LS
	3.4-10: Implementation of the Proposed Project could increase the potential for predation on native fish from alterations in aquatic habitat structure.	LS	LS+	LS	LS	LS+	LS+
	3.4-11: Implementation of the Proposed Project could cause disturbance to fish species or their habitat by affecting fish passage conditions.	LS	LS+	LS	LS	LS+	LS+
	3.4-12: Construction of the Proposed Project could cause the loss or degradation of riparian forest.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.4-13: Construction of the Proposed Project could cause the loss or deterioration of wetlands and waters of the United States and State.	LSM	LS	LSM	LSM	LSM	LSM-
	3.4-14: Implementation of the Proposed Project could cause interference with the movement of native resident or migratory terrestrial wildlife species.	LS	LS-	LS	LS	LS	LS
	3.4-15: Implementation of the Proposed Project could conflict with provisions of local policies or ordinances protecting biological resources.	LS	LS-	LS	LS	LS	LS
	3.4-16: Implementation of the Proposed Project could contribute to cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.	LSM	LSM+	LSM	LSM+	LSM+	LSM+
3.5 Cultural Resources	3.5-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.5-2: Implementation of the Proposed Project could disturb human remains, including those interred outside of dedicated cemeteries.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.5-3: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5.	LSM	LS	LSM	LSM+	LSM	LSM-

TABLE 5-9 (CONTINUED)
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic	Impact	Proposed Project	No Project Alternative	South Notch Alternative	North and South Notches Alternative	North Notch with Modified Gate Operation Alternative	Tisdale Weir Structural Improvements Alternative
3.5 Cultural Resources (cont.)	3.5-4: Implementation of the Proposed Project could contribute to significant cumulative damage to unidentified human remains.	LSM	LS	LSM	LSM+	LSM	LSM-
3.6 Greenhouse Gas Emissions	3.6-1: Construction of the Proposed Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	LS	LS-	LS+	LS+	LS	LS-
	3.6-2: Construction of the Proposed Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LS	LS-	LS+	LS+	LS	LS-
	3.6-3: Construction of the Proposed Project could generate greenhouse gas emissions that could contribute considerably to a cumulative impact.	LS	LS-	LS+	LS+	LS	LS-
3.7 Hydrology and Water Quality	3.7-1: Construction of the Proposed Project would involve activities that could result in a release of sediment and other pollutants that could substantially degrade receiving water quality.	LSM	LS	LSM	LSM+	LSM-	LSM-
	3.7-2: Operation of the Proposed Project could result in a release of sediment that could substantially degrade receiving water quality.	LS	LS-	LS	LS+	LS-	LS-
	3.7-3: Operation of the Proposed Project could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk.	LS	LS-	LS	LS+	LS-	LS-
	3.7-4: Operation of the Proposed Project could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion.	LS	LS-	LS	LS+	LS-	LS-
	3.7-5: Operation of the Proposed Project could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk.	LS	LS-	LS	LS+	LS-	LS-
	3.7-6: Construction of the Proposed Project in combination with other projects being constructed in the project area could result in the release of sediment and other pollutants that could cumulatively degrade receiving water quality.	LSM	LS	LSM	LSM+	LSM-	LSM-
	3.7-7: Operation of the Proposed Project in combination with the operation of other projects in the project area has the potential to release sediment that could cumulatively degrade receiving water quality.	LS	LS-	LS	LS+	LS-	LS-

TABLE 5-9 (CONTINUED)
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic	Impact	Proposed Project	No Project Alternative	South Notch Alternative	North and South Notches Alternative	North Notch with Modified Gate Operation Alternative	Tisdale Weir Structural Improvements Alternative
3.7 Hydrology and Water Quality (cont.)	3.7-8: Operation of the Proposed Project in combination with other projects in the project area could result in a change to the amount of sediment deposited in the Tisdale Bypass and the Sacramento River, which could alter drainage patterns and reduce flood conveyance capacity in a manner that could increase flood risk.	LS	LS-	LS	LS+	LS-	LS-
	3.7-9: Operation of the Proposed Project in combination with other projects in the project area could alter the hydraulics of the Tisdale Bypass, which could result in substantial erosion	LS	LS-	LS	LS+	LS-	LS-
	3.7-10: Operation of the Proposed Project in combination with other projects in the project area could alter the hydrology and hydraulics of the Sacramento River in a manner that could adversely affect the operation of the SRFCP system, resulting in an increase in flood risk.	LS	LS-	LS	LS+	LS-	LS-
3.8 Recreation	3.8-1: Implementation of the Proposed Project could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	LS-	LS+	LS+	LS-	LS-
	3.8-2: Implementation of the Proposed Project could potentially result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.	LS	LS-	LS+	LS+	LS-	LS-
	3.8-3: Implementation of the Proposed Project in conjunction with potential past, present, and future development in the surrounding region could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	LS-	LS+	LS+	LS-	LS-
	3.8-4: Operation and maintenance of the Proposed Project in conjunction with potential past, present, and future development in the surrounding region could result in permanent displacement of existing recreational facilities or a substantial permanent decrease in access to existing recreational facilities or opportunities.	LS	LS-	LS+	LS+	LS-	LS-
3.9 Tribal Cultural Resources	3.9-1: Implementation of the Proposed Project could cause a substantial adverse change in the significance of a tribal cultural resource, as defined in PRC Section 21074.	LSM	LS	LSM	LSM+	LSM	LSM-
	3.9-2: Implementation of the Proposed Project could contribute to significant direct or indirect cumulative changes in the significance of a tribal cultural resource, as defined in PRC Section 21074.	LSM	LS	LSM	LSM+	LSM	LSM-

NOTES: LS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact is less severe than under the Proposed Project; + = Impact is more severe than under the Proposed Project.

SOURCE: Data compiled by Environmental Science Associates in 2020.

The South Notch Alternative and the North and South Notches Alternative also would have more severe impacts on air quality and GHG emissions than those identified for the Proposed Project given the increased project area and complexity of construction associated with the alternatives. The South Notch Alternative would result similar impacts on agricultural resources, biological resources, cultural and tribal cultural resources, and hydrology and water quality compared to the Proposed Project. The North and South Notches Alternative would result in greater impacts on agricultural resources, terrestrial biological resources, cultural and tribal cultural resources, and hydrology and water quality, given that construction activities would be on a greater scale than the Proposed Project and would include operation of two notches that would result in greater flow changes compared to the Proposed Project.

The North Notch with Modified Gate Operation Alternative would fully achieve only one of the two project objectives. The modified gate operation would result in more limited fish passage and increased risk of fish stranding than the Proposed Project, thus limiting the ability of this alternative to meet the project's objectives relative to the Proposed Project. The alternative would result in less severe impacts on agricultural resources, hydrology and water quality, and recreation than those identified for the Proposed Project, given that the alternative would include modified gate operations that would result in similar frequency, duration, and extent of inundation downstream of the project area compared to existing conditions. Impacts on air quality, terrestrial biological resources, cultural and tribal cultural resources, and GHG emissions would be similar to those identified for the Proposed Project because the North Notch with Modified Gate Operation Alternative would include the same project footprint and similar construction and O&M activities. This alternative would provide fewer opportunities for fish passing through the Tisdale Bypass from the Sutter Bypass to return to the Sacramento River and would result in more limited fish passage, which would result in greater aquatic biological resources impacts (specifically on special-status fish) than those identified for the Proposed Project.

The Tisdale Weir Structural Improvements Alternative would only meet the project's objective to structurally rehabilitate Tisdale Weir. It would not meet the project's objective to reduce fish stranding at the weir by improving fish passage through the weir to the Sacramento River by improving fish passage through Tisdale Weir to the Sacramento River with minimal effects on facility maintenance and recreational access. It would result in less severe impacts on agricultural resources, hydrology and water quality, and recreation than those identified for the Proposed Project, given that the alternative would not include a notch in the bypass. Impacts on air quality, terrestrial biological resources, cultural and tribal cultural resources, and GHG emissions would also be less severe than those identified for the Proposed Project because the Tisdale Weir Structural Improvements Alternative would include less construction and a smaller project footprint than the Proposed Project. Fish passage and fish stranding at the weir would continue with the Tisdale Weir Structural Improvements Alternative, which would result in greater aquatic biological resources impacts (specifically on special-status fish) than the Proposed Project.

None of the alternatives would fully achieve the project objectives. Although the No Project Alternative, North Notch with Modified Gate Operation Alternative, and the Tisdale Weir

Structural Improvements Alternative would result in a reduction in the severity of some environmental impacts, each of the alternatives would result in at least one more severe impact than those identified for the Proposed Project. Therefore, the Proposed Project is identified as the environmentally superior alternative.

CHAPTER 6

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California Department of Fish and Wildlife

Central Valley Flood Protection Board

CHAPTER 7

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Chapter 6: List of Preparers

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