Draft

WEST FALSE RIVER DROUGHT SALINITY BARRIER PROJECT

Environmental Impact Report

State Clearinghouse No. 2022020528

Prepared for
California Department of Water Resources

July 2022

Prepared by

ICF ESA

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Acronyms and Other Abbreviations

Acronym or Abbreviation	Definition
°C	degrees Celsius
°F	degrees Fahrenheit
μg/L	micrograms per liter
1995 Bay-Delta Plan	*Water Quality Control Plan for the San Francisco Bay/ Sacramento–San Joaquin Delta Estuary*
AB	Assembly Bill
ADT	Average Daily Traffic
BAAQMD	Bay Area Air Quality Management District
basin plan	water quality control plan
Basin Plan	*The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin*
Bay Area	San Francisco Bay Area
BP	years Before Present
C-APE	California Environmental Quality Act Area of Potential Effects
CAAQS	California ambient air quality standards
California Register	California Register of Historical Resources
California State Parks	California Department of Parks and Recreation
CAP	climate action plan
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide

Acronym or Abbreviation	Definition
CO_2e	carbon dioxide equivalent
Construction General Permit	General Permit for Storm Water Discharges Associated with Construction Activities, Order No. 2009-009-DWQ
CRPR	California Rare Plant Rank
CSLC	California State Lands Commission
CVFPB	Central Valley Flood Protection Board
CVP	Central Valley Project
CWA	Clean Water Act
D-1641	Water Right Decision 1641
dBA	A-weighted decibels
DEIR	draft environmental impact report
Delta	Sacramento–San Joaquin Delta
Discharge Procedures	*State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*
DO	dissolved oxygen
DPM	diesel particulate matter
DPS	distinct population segment
DSM2	Delta Simulation Model II
DWR	California Department of Water Resources
EC	electrical conductivity
EDB	emergency drought barrier
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESA	Environmental Science Associates
ESU	evolutionarily significant unit
FEIR	final environmental impact report
FNU	Formazin nephelometric units
GGERP	Greenhouse Gas Emissions Reduction Plan
GHG	greenhouse gas
HAB	harmful algal bloom
IPCC	Intergovernmental Panel on Climate Change
MBTA	Migratory Bird Treaty Act

Acronym or Abbreviation	Definition
mm	millimeters
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
mS/cm	milliSiemens per centimeter
MT	metric tons
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	notice of preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
OPR	Governor's Office of Planning and Research
PM	particulate matter
$PM_{2.5}$	particulate matter 2.5 microns or less in diameter
PM_{10}	particulate matter 10 microns or less in diameter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PRC	California Public Resources Code
project site	the approximately 2.93-acre footprint for the proposed drought salinity barrier
proposed project	West False River Drought Salinity Barrier Project
RCP	representative concentration pathway
ROG	reactive organic gases
RWQCB	regional water quality control board
SB	Senate Bill
SCHISM	Semi-implicit Cross-scale Hydroscience Integrated System Model
SFBAAB	San Francisco Bay Area Air Basin
SIP	state implementation plan
SJVAB	San Joaquin Valley Air Basin

Acronym or Abbreviation	Definition
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SRA	State Recreation Area
State CEQA Guidelines	*Guidelines for Implementing the California Environmental Quality Act*
State Water Board	State Water Resources Control Board
SVAB	Sacramento Valley Air Basin
SWP	State Water Project
TAC	toxic air contaminant
TCDD	2,3,7,8-Tetrachlorodibenzo-p-Dioxin
TCR	tribal cultural resource
TMDL	total maximum daily load
UAIC	United Auburn Indian Community of the Auburn Rancheria
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
YDWN	Yocha Dehe Wintun Nation
YSAQMD	Yolo Solano Air Quality Management District

EXECUTIVE SUMMARY

ES.1 Introduction

The California Department of Water Resources (DWR) proposes to the install the West False River Drought Salinity Barrier Project (proposed project). During drought conditions, water stored in upstream reservoirs may be insufficient to repel salinity moving upstream from San Francisco Bay. Without the protection of the drought salinity barrier in West False River, saltwater intrusions could affect more than 27 million Californians who rely on the Sacramento–San Joaquin Delta (Delta) for at least a portion of their water supply; could render Delta water unusable for agricultural needs; and could reduce the value of habitat for aquatic species.

DWR installed emergency drought barriers in West False River in 2015 and 2021–2022 in response to drought conditions to protect water quality in the interior Delta. Installation of a drought salinity barrier in West False River has been shown to be an effective tool for reducing the intrusion of saltwater into the Central and South Delta based on these previous installations (see Section 1.2, "Project Background," in Chapter 1; California Department of Water Resources 2019).

ES.2 Project Objectives

The primary objectives of the proposed project are:

- Install a drought salinity barrier to protect water quality in the Central and South Delta, based on need demonstrated by drought conditions and low upstream reservoir storage.
- Install a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the period from 2023 to 2032.
- Minimize the impacts of salinity intrusion on the beneficial uses of interior Delta water during persistent drought conditions through the installation of a drought salinity barrier in the Central or South Delta.

The West False River drought salinity barrier location is in the Central Delta in West False River, which is a main channel to the west that connects to Franks Tract, the central hub of the Delta. By hydraulically blocking the West False River corridor, the barrier protects against the intrusion of saltwater from San Francisco Bay into Franks Tract. This prevents the fresh water from other channels including the Mokelumne River and Old River flowing into Franks Tract from other directions from mixing with the more saline water that otherwise would flow through West False River during flood tides. Without the barrier in place at this critical location, the saltier water carried through West False River would gradually contaminate the water in Franks Tract and the interior Delta with salts, a condition that cannot be reversed during drought conditions, and thus would affect the beneficial uses of water. The importance of the West False River location is explained in Chapter 1, Section 1.2.3. Given the cyclical nature of drought, the need to install a drought salinity barrier in West False River is anticipated over the next 10 years.

The proposed project would help protect the beneficial uses of water in the Delta during drought periods, including the beneficial uses described in Water Right Decision 1641. Table 3.5-1 in Draft Environmental Impact Report (DEIR) Section 3.5, "Hydrology and Water Quality," summarizes the beneficial uses designated for the Delta in *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin (Basin Plan)* (Central Valley Regional Water Quality Control Board 2019).

ES.3 Summary of the Proposed Project

With the proposed project, a temporary drought salinity barrier would be installed in West False River up to two times between 2023 and 2032, including consecutive years, if drought conditions occur, for a period of up to 20 months. The drought salinity barrier would be constructed only if DWR, in cooperation with other State and federal agencies, determines that drought conditions have reduced water storage in State Water Project and Central Valley Project facilities to critical levels, such that projected Delta outflow would be insufficient to control increased salinity intrusion into the Delta, thereby worsening water quality and threatening the drinking and irrigation water supply.

The approximately 3.12-acre footprint for the proposed project is located on West False River approximately 0.4 mile east of its confluence with the San Joaquin River, in Contra Costa County, California, between Jersey and Bradford islands. The approximately 800-foot-long barrier would be trapezoid-shaped, with an approximately 200-foot-wide (2.75-acre) base (in water) tapering to an approximately 12-foot-wide top (above water), set perpendicular to the channel. The barrier would consist of approximately 84,000 cubic yards of well-graded 18-inch-minus embankment rock extending from the Jersey Island levee on the south side to the Bradford Island levee on the north side.

In the years when the barrier is installed, DWR would construct the barrier no sooner than April 1 and remove the barrier by November 30 of the subsequent year or the same year, when DWR determines the barrier is no longer needed based on hydrologic conditions. Depending on drought conditions, if the barrier is left in a subsequent year, a notch may be constructed in the middle portion of the barrier in January after the installation year to allow for fish passage and vessel navigation through West False River and the notch would be refilled as early as the first week of April.

DWR would also install three water quality monitoring stations in Woodward Cut (one monitoring station) and Railroad Cut (two monitoring stations) with the next installation of the drought salinity barrier. The stations would be left in place after removal of the drought salinity barrier.

ES.4 Alternatives to the Proposed Project

The following alternatives are evaluated in this DEIR:

- **No Project Alternative.** Under the No Project Alternative, DWR would not install a temporary drought salinity barrier, made of rock, in West False River (at the same location as the 2015 and 2021–2022 emergency drought barrier installations) no sooner than April 1 and remove it by November 30 of either the same year or the subsequent year.

- **Barge-Mounted Operable Barrier Alternative.** Under the Barge-Mounted Operable Barrier Alternative, DWR would install a barge-mounted operable barrier, consisting of butterfly gates on top of two commercially available cargo barges, in West False River. Based on a barge length of 250 feet, two barges would be installed to regulate flows. The converted barges would be floated to the site and ballasted at the prepared site on the river bottom. Before installation of the barge-mounted gate system, the channel bottom would be dredged to remove unstable material, and a gravel sub-base foundation would be installed to provide a uniform foundation. Depending on the hydrodynamic forces associated with head differences across the gate when it is operational, piles might be needed to support the barges and prevent them from sliding or overturning. After installation of the barges, a rock embankment would be placed in the remaining portions of the river channel (approximately 400 feet of the channel's total width of approximately 900 feet). The gates would be operated to manage flows to reduce seawater intrusion. When open, the gates would provide a navigational opening to accommodate normal traffic by commercial and large public vessels that is typical in the Delta, and would provide fish passage.

- **Single-Tube Inflatable Rubber Dam Alternative.** Under the Single-Tube Inflatable Rubber Dam Alternative, DWR would install a single-tube inflatable rubber dam, consisting of cylindrical rubber fabric filled with water, in West False River. The tube would be bolted into a rock foundation on the riverbed and levee. The lower portion of the barrier would be rock, as under the proposed project (approximately 800 feet spanning the Jersey Island levee on the south side to the Bradford Island levee on the north side). Instead of using the top layer of rock like the proposed project, the single-tube inflatable rubber dam proposed by this alternative would be installed on top of a rock base that would be constructed underwater up to an elevation high enough to utilize the largest single-tube rubber dam.

ES.5 Potential Areas of Controversy and Concern

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, DWR issued a notice of preparation (NOP) of an EIR (State Clearinghouse #2022020528). DWR provided copies of the NOP to federal, State, and local agencies through the State Clearinghouse and published the NOP in the *Contra Costa Times* and *Sacramento Bee* on February 23, 2022. The NOP was published on February 23, 2022, and was circulated for 30 days ending on March 25, 2022. The NOP described the project location, the project objectives, and the proposed project, and summarized environmental topics to be considered in the DEIR. The NOP is included in **Appendix A** of this DEIR.

A virtual public scoping meeting was held on March 9, 2022, to educate the public about the project and to provide a forum for the public to make verbal and written comments on the proposed scope and content of the DEIR. Seven written comment letters were submitted in response to the NOP (see **Appendix A**). A transcript of the comments received at the scoping meeting is also included in Appendix A.

ES.6 Draft Environmental Impact Report

DWR provided public notice of availability of the DEIR as required by Section 15087 of the State CEQA Guidelines. Written notice was sent to the last known names and addresses of all individuals and organizations who had previously requested such notice, including the seven parties who submitted written comments in response to the NOP (Appendix A). A public notice of availability was placed in two newspapers with regional circulation—the *Contra Costa Times* and *Sacramento Bee*—announcing the availability of the EIR and the opportunity to submit comments. The public notice was also distributed to the Alameda, Contra Costa, Sacramento, and San Joaquin county clerk's offices and to State, federal, and local agencies.

A virtual public meeting will be held on Wednesday, July 27, 2022, at 6 p.m., to receive input from agencies and the public on the DEIR. Registration in advance of the meeting is available at the following link:

https://us02web.zoom.us/webinar/register/WN_iKuyb6EfT7-OMvRyf6JTLQ

The 45-day public review period for this DEIR will be Thursday, July 7, 2022 through Monday, August 22, 2022. During the public comment period, written comments should be mailed or emailed to:

California Department of Water Resources
Division of Operations and Maintenance
Robert Trang, Manager
WPPM Delta Planning Section
1516 9th Street, 2nd Floor
Sacramento, CA 95814

Email address: wfrdsb_ceqa@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.

The DEIR is available for review online on the following websites:

DWR (under the "DWR Activities" tab):

https://water.ca.gov/Water-Basics/Drought

California State Clearinghouse CEQAnet Web Portal (search by project name or State Clearinghouse #2022020528):

https://ceqanet.opr.ca.gov/

A copy of the DEIR is also available for review during normal business hours at the following locations:

California Department of Water Resources
Division of Operations and Maintenance, WPPM Delta Planning Section
1516 9th Street, 2nd Floor
Sacramento, CA 95814

Sacramento Central Public Library
828 I Street
Sacramento, CA 95814

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. Commenters who wish DWR to withhold their names and/or addresses must state this prominently at the beginning of their comment letters or emails.

ES.7 Summary of Impacts

Table ES-1 presents a summary of the impacts and mitigation measures identified for the proposed project and the alternatives evaluated in this DEIR. 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 6, "Alternatives." The level of significance for each impact was determined using thresholds 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-1 presents the following information:

- The environmental impact.
- The level of significance before mitigation measures for the proposed project and the alternatives.
- Recommended mitigation measures for the proposed project and the alternatives.
- The level of significance after mitigation for the proposed project and the alternatives.

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TABLE ES-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.2 Air Quality	**3.2-1:** Implementation of the proposed project could conflict with or obstruct implementation of the applicable air quality plan.	S	NI	S-	S-	**Mitigation Measure AQ-1: Implement Bay Area Air Quality Management District (BAAQMD) Fugitive Dust Control Measures during Construction. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** The California Department of Water Resources (DWR) construction contractor shall implement the following applicable basic and enhanced control measures recommended by BAAQMD to reduce generation of fugitive dust during all construction activities: • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. • All haul trucks transporting soil, sand, or other loose material off-site shall be covered. • All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping shall be prohibited. • All vehicle speeds on unpaved roads shall be limited to 15 miles per hour. • Idling times shall be minimized, either by shutting equipment off when not in use or by reducing the maximum idling time to five minutes (as required by California Code of Regulations Title 13, Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling). Clear signage shall be provided for construction workers at all access points. • All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. All equipment shall be checked by a certified visible emissions evaluator. • A publicly visible sign shall be posted at the project site with the name and telephone number of the person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number also shall be visibly posted for compliance with applicable regulations. • All construction equipment, diesel trucks, and generators shall be equipped with emissions control technology certified by the California Air Resources Board (CARB) as the Best Available Control Technology for emission reductions of oxides of nitrogen (NO_X) and particulate matter (PM) at the time of construction. • All contractors shall be required to use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines. **Mitigation Measure AQ-2: Use Verified Diesel Emissions Control Strategies. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** DWR and/or its contractors shall provide a plan for approval by BAAQMD demonstrating that all heavy-duty off-road equipment used for construction activities is equipped with the most effective Verified Diesel Emissions Control Strategies available for the engine type at the time. In this case, the best available Verified Diesel Emissions Control Strategies would be implementation of Tier 4F engines as certified by CARB and the U.S. Environmental Protection Agency (EPA). The equipment shall be properly maintained and tuned in accordance with manufacturers' specifications. Compliance with these requirements will be verified through the submittal to BAAQMD of an equipment inventory and certification plan. **Mitigation Measure AQ-3: Meet Tugboat and Derrick Barge Engine Requirements. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** DWR and/or its contractors shall provide a plan for approval by BAAQMD demonstrating that all tugboat operations for any aspect of the project will meet or exceed Tier 3 emissions standards, as certified by CARB and EPA. The equipment shall be properly maintained and tuned in accordance with manufacturers' specifications. Compliance with these requirements will be verified through the submittal to BAAQMD of an equipment inventory and certification plan. Similarly, DWR and/or its contractors shall provide a plan for approval by BAAQMD demonstrating that all derrick barge equipment will be equipped with a 2015 or newer main engine, a 2018 or newer hoist, and a 2018 or newer generator. The equipment shall be properly maintained and tuned in accordance with manufacturers' specifications. Compliance with these requirements will be verified through the submittal to BAAQMD of an equipment inventory and certification plan.	LSM	NI	LSM-	LSM-

S—Significant; PS—Potentially significant; LTS—Less than significant; LSM—Less than significant after application of feasible mitigation measure(s); - = Impact would be less severe than under the proposed project; + = Impact would be more severe than under the proposed project.

TABLE ES-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.2 Air Quality (cont.)	3.2-1 (cont.)					**Mitigation Measure AQ-4: Offset Mitigated NO_X Emissions. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** DWR and/or its contractor shall monitor construction activities throughout installation and removal of the drought salinity barrier and notching. Data shall be collected on construction activities and equipment and the level of implementation of mitigation measures, mitigated emissions from construction activities shall be calculated, and this information shall be reported to BAAQMD. The terms and specifics of construction monitoring and reporting shall be determined in consultation with BAAQMD. Construction emissions data shall include but not be limited to the following sources: off-road construction equipment, tugboats/barges and work boats, on-road trucks, and construction worker commute vehicles. After completion of the proposed project (i.e., removal of the barrier), the final construction emissions shall be evaluated to calculate the total offset mitigation fee based on actual construction activities. DWR shall work in coordination with BAAQMD to assess the specific mechanisms associated with construction monitoring, emissions calculations, and payment logistics. DWR shall use a verifiable program to offset the proposed project's mitigated NO_X emissions that exceed the significance threshold, as determined through the construction monitoring program described above. DWR may achieve the required offset through any combination of the following measures: • Implement offset emissions and programs available within Contra Costa County and the San Francisco Bay Area Air Basin (SFBAAB). • Submit payment to BAAQMD, on a per-ton-of-NO_X-emissions basis. The price of NO_X emission offsets shall be determined at the completion of the construction monitoring program and emission estimates determined by that program.				
	3.2-2: Implementation 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.	S	NI	S-	S-	**Mitigation Measure AQ-1: Implement BAAQMD Fugitive Dust Control Measures during Construction. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.2-1.) **Mitigation Measure AQ-2: Use Verified Diesel Emissions Control Strategies. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.2-1.) **Mitigation Measure AQ-3: Meet Tugboat and Derrick Barge Engine Requirements. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.2-1.) **Mitigation Measure AQ-4: Offset Mitigated NO_X Emissions. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.2-1.)	LSM	NI	LTM-	LTM-
	3.2-3: Implementation of the proposed project could generate greenhouse gas 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 greenhouse gases.	LTS	NI	LTS-	LTS-	None required.	LTS	NI	LTS-	LTS-
3.3 Biological Resources	**3.3-1:** Implementation of the proposed project could cause loss of special-status plant species.	PS	NI	PS	PS	**Mitigation Measure BIO-1: Avoid, Minimize, and Mitigate Impacts on Special-Status Plants. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** A qualified botanist shall conduct a botanical survey within the project area and immediate vicinity before barrier installation, following the survey guidelines established by the California Native Plant Society and California Department of Fish and Wildlife (CDFW) to the extent feasible, given the timing of barrier installation. If special-status plants are identified, they shall be flagged and avoided if feasible. If Mason's lilaeopsis is identified within the project area and impacts cannot be avoided, the California Department of Water Resources (DWR) shall obtain a California Endangered Species Act (CESA) Section 2081 incidental take permit. Issuance of an incidental take permit by CDFW would require that DWR implement species-specific avoidance and minimization measures and fully mitigate adverse project impacts, which may include purchasing credits from a mitigation bank, preparing and executing a relocation plan, or restoring suitable habitat for the species.	LSM	NI	LSM	LSM

S—Significant; PS—Potentially significant; LTS—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-1 (continued)
Summary of Impacts and Mitigation Measures

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.3 Biological Resources (cont.)	3.3-1 (cont.)					If special-status plant species other than Mason's lilaeopsis are identified within the project area and impacts cannot be avoided, a qualified biologist shall assess the feasibility of salvaging and transplanting individual affected plants or seeds. If transplanting is not feasible, restoration of the affected site to preexisting conditions following project completion would allow for recolonization of the habitat.				
	3.3-2: Implementation of the proposed project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).	PS	NI	PS	PS	**Mitigation Measure BIO-2: Conduct Focused Preconstruction Surveys for Elderberry Shrubs. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** Focused preconstruction surveys for elderberry shrubs shall be conducted before work occurs within the project area. A minimum 165-foot buffer shall be established and maintained around elderberry plants that contain stems measuring 1 inch or greater in diameter at ground level, if any are observed within or in the vicinity of the project area, in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)* (U.S. Fish and Wildlife Service 2017a). If feasible, a fenced or flagged avoidance area shall be established before the start of construction to protect all elderberry shrubs with stems 1 inch or greater at ground level located adjacent to the construction site or rock stockpile or off-loading areas to prevent encroachment by construction workers and vehicles. If maintaining 165-foot protective buffers around all elderberry shrubs with a stem greater than 1 inch in diameter at ground level is infeasible, DWR shall consult with the U.S. Fish and Wildlife Service (USFWS) to determine whether specific site conditions warrant a reduced buffer or whether the work will result in take. DWR shall then obtain take authorization, implement minimization measures, and mitigate impacts in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)* (U.S. Fish and Wildlife Service 2017a). Minimization measures may include but are not limited to maintaining the presence of a qualified biological monitor during all construction activities within 165 feet of the elderberry shrub, and refraining from the use of herbicides within the dripline of the shrub.	LSM	NI	LSM	LSM
	3.3-3: Implementation of the proposed project could cause disturbance or mortality of and loss of reptiles including giant garter snake and western pond turtle.	PS	NI	PS	PS	**Mitigation Measure BIO-3: Conduct Pre-activity Surveys and Construction Monitoring for Giant Garter Snake and Western Pond Turtle. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** The following measures shall be implemented for giant garter snake and western pond turtle in the vicinity of the drought salinity barrier site, the Weber off-loading and stockpile sites, and the locations of the proposed water quality monitoring stations: • Pre-activity surveys for giant garter snake and potential refugia (i.e., burrows, soil cracks) shall be conducted by a USFWS-approved biologist within 72 hours before ground disturbance within the drought salinity barrier site, the Weber off-loading and stockpile sites, and the locations of the water quality monitoring stations. The biologist shall also survey along the access route. The pre-activity surveys shall include concurrent surveying for western pond turtle. • A biological monitor shall be present during all daytime project activities occurring at West False River, with the following exception. The presence of a full-time monitor is not required when rock is being placed in or removed from the middle of West False River and when no project activities are occurring along the banks of the drought salinity barrier. • Exclusion fencing shall be installed, as feasible, along the edge of the construction and staging footprint at the barrier site and at the Weber off-loading and stockpile sites to prevent any giant garter snakes and western pond turtles from entering the work area. A biological monitor shall be present during installation of the fencing. • Clearing of vegetation shall be limited to the minimum area necessary for barrier installation. • Speed limits along access roads shall be limited to 15 miles per hour. Speed limits overland shall be limited to 5 miles per hour. Drivers shall look for snakes and turtles on the roadways and overland areas. • If giant garter snake is observed in the work area, the qualified biologist shall stop all work until the snake is out of the immediate work area. The snake shall be allowed to leave on its own, and the biologist shall remain in the area until the biologist deems his or her presence no longer necessary to ensure that the snake will not be harmed. If authorized by USFWS and CDFW, the biologist shall relocate the giant garter snake to a designated location along West False River, downstream of construction activities. The relocation plan shall be submitted to USFWS and CDFW before the start of the project. Any snakes to be relocated shall be moved according to the relocation plan.	LSM	NI	LSM	LSM

S—Significant; PS—Potentially significant; LTS—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-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.3 Biological Resources (cont.)	3.3-3 (cont.)					• If a western pond turtle is observed in the work area, the biologist shall halt work to allow the turtle to leave on its own accord, or to relocate the turtle outside of the construction footprint, but within suitable habitat. • All giant garter snake observations shall be reported to USFWS via email and/or telephone within one working day. • All observations of giant garter snakes and western pond turtles shall be recorded in the California Natural Diversity Database (CNDDB). • Any equipment remaining on site overnight shall be stored in designated staging areas. Equipment parked overnight or for more than one hour on warm days shall be inspected before operation to ensure that no giant garter snakes have found shelter under the equipment. • After removal of the drought salinity barrier, any debris associated with the construction activities shall be removed and all temporarily disturbed areas shall be restored to pre-project conditions. • Pre- and post-construction photo documentation shall be submitted to USFWS once the site is restored to preexisting conditions after removal of the barrier.				
	3.3-4: Implementation of the proposed project could cause disturbance or mortality of nesting birds or loss of known nest trees for Swainson's hawk.	PS	NI	PS	PS	**Mitigation Measure BIO-4: Conduct Focused Surveys for Active Nests of Migratory Birds and Raptors. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** Focused surveys for active nests of migratory birds and raptors, including white-tailed kite and red-tailed hawk, shall be conducted by a qualified biologist within a 500-foot buffer around the drought salinity barrier site and the water quality monitoring stations. Surveys shall be conducted within 10 days before the start of project activities that are to occur during the nesting season (February 15–August 31). If an active migratory bird or raptor nest is found near the construction footprint, the biologist shall develop appropriate measures, including but not limited to implementing a protective buffer or minimizing certain work activities in the vicinity, to avoid disturbance of the nest until it is no longer active. **Mitigation Measure BIO-5: Conduct Preconstruction Swainson's Hawk Surveys. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** A qualified biologist shall conduct preconstruction Swainson's hawk surveys following the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) or other current protocols. The Swainson's Hawk Technical Advisory Committee recommends conducting three surveys within the two recommended windows immediately before the start of construction activities, excluding Period IV. (Period IV nest monitoring is recommended only if a nest is found in Period III.) The survey periods are as follows: • *Period I:* January through March. • *Period II:* March 20 through April 5. • *Period III:* April 5 through April 20. • *Period IV:* April 21 through June 10. • *Period V:* June 10 through July 30. Therefore, if construction is anticipated to begin April 1, the biologist shall conduct preconstruction surveys during Period I. Even though the April 1 start date occurs within Period II, the biologist shall conduct surveys during the early part of Period II, to ensure that surveys are completed during both survey periods. Surveys shall be conducted within 0.5 mile of the barrier site, where access is permitted. Results of the preconstruction surveys shall be provided to CDFW within 48 hours of the final survey. All active Swainson's hawk nests within 0.25 mile of the barrier site (the area in which adverse effects are anticipated to occur) shall be monitored during construction activities. Monitoring requirements shall generally be based on the proximity of construction activities to the nest site, as described below. These requirements may be adjusted based on observed behavior patterns and on the response of the nesting pair and/or their young to construction activities. Potential adjustments shall be evaluated on a case-by-case basis and in consultation with CDFW. • Where a Swainson's hawk nest occurs within 150 meters (approximately 492 feet) of construction, a biological monitor shall monitor the nesting pair during all construction hours to ensure that the hawks are exhibiting normal nesting behavior.	LSM	NI	LSM	LSM

S—Significant; PS—Potentially significant; LTS—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-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.3 Biological Resources (cont.)	3.3-4 (cont.)					• Where a Swainson's hawk nest occurs within 150–800 meters (approximately 492–2,625 feet) of construction, a biological monitor shall observe the nest one day per week for a minimum of 3 hours to ensure that the hawks are exhibiting normal nesting behavior and to check the status of the nest. If personnel must approach closer than 25 meters (approximately 80 feet) from an active nest tree for more than 15 minutes while adults are brooding, the nesting adults shall be monitored for signs of stressed behavior. If stressed behavior is observed, personnel shall leave until the behavior normalizes. If personnel must approach closer than 50 meters (approximately 165 feet) for more than 1 hour, the same requirement applies. All personnel outside vehicles shall be restricted to a distance greater than 100 meters (approximately 330 feet) from the nest tree unless construction activities require them to be closer, and the personnel shall remain out of the line of sight of the nest during work breaks. If a biological monitor determines that a nesting Swainson's hawk is significantly disturbed by project activities, to the point that nest abandonment is likely, the biological monitor shall have the authority to immediately stop project activity and work shall cease until the threat has subsided. If an active nest is present within 0.5 mile of the barrier site during barrier construction and project activities result in nest failure, DWR shall provide mitigation to compensate for this potential impact. The circumstances under which compensation will be provided will depend on local conditions, such as distance from the nest to the barrier site, baseline human activity levels in the vicinity of the nest, and observed behavior of the nesting pair, and shall be determined in consultation with CDFW. If a nest is abandoned and the nestlings do not survive, DWR shall provide compensation for this loss. The appropriate amount and nature of the compensation shall be determined in consultation with and approved by CDFW, based on the specific circumstances of the impact, and all mitigation shall be implemented in accordance with the incidental take permit issued for the project. Potential compensation measures may include permanently protecting and managing habitat for Swainson's hawk at a mitigation bank, contributing to a Swainson's hawk conservation fund, or promoting the long-term conservation of the species through other feasible means. **Mitigation Measure BIO-6: Conduct a Burrowing Owl Habitat Assessment. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** A qualified biologist shall conduct an assessment of burrowing owl habitat suitability at the barrier site and (if applicable) the Rio Vista and Weber off-loading and stockpile sites. The assessment shall evaluate the area subject to direct impact, as well as adjacent areas within 150–500 meters (approximately 490–1,640 feet), where access is not prohibited due to private property, depending on the potential extent of the indirect impact. Based on the habitat assessment, one of these measures would be applicable: • If suitable habitat, but no sign of burrowing owl presence, is observed during the habitat assessment, surveys and reporting shall be conducted in accordance with Appendix D of CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Wildlife 2012). At a minimum, an initial take avoidance survey shall be conducted no less than 14 days before stockpiling activities begin and a second survey shall be conducted within 24 hours before activities begin. • If a sign of burrowing owl presence is observed during the habitat assessment, the full survey protocol shall be implemented, to the extent feasible, depending on the timing of project implementation and stockpiling activities. The full survey protocol involves conducting four surveys during the breeding season and four surveys during the nonbreeding season, and conducting three or more daytime survey visits at least 3 weeks apart during the peak of breeding season from April 15 to July 15. If any occupied burrows are observed, DWR shall develop and implement avoidance and minimization measures, including but not limited to establishing protective buffers, minimizing the use of certain equipment, and incorporating the presence of a full-time monitor during work activities, in consultation with CDFW. CFDW guidance for buffer distances for burrowing owl, which vary depending on time of year and level of disturbance, are presented in Table 3.3-3. Reduced buffers for burrowing owl may be implemented if recommended by the monitoring biologist, based on the nature of the activity, and if approved by CDFW.				

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TABLE ES-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

<table>
<tr><th>Section</th><th>Impact</th><th>Significance Before Mitigation: Proposed Project</th><th>Significance Before Mitigation: No Project Alternative</th><th>Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative</th><th>Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative</th><th>Mitigation Measure</th><th>Significance After Mitigation: Proposed Project</th><th>Significance After Mitigation: No Project Alternative</th><th>Significance After Mitigation: Barge-Mounted Operable Barrier</th><th>Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative</th></tr>
<tr><td>3.3 Biological Resources (cont.)</td><td>3.3-4 (cont.)</td><td></td><td></td><td></td><td></td><td>
TABLE 3.3-3
RECOMMENDED RESTRICTED ACTIVITY DATES AND SETBACK DISTANCES BY LEVEL OF DISTURBANCE FOR BURROWING OWLS
<table>
<tr><th rowspan="2">Time of Year</th><th colspan="3">Distance of Disturbance from Occupied Burrows (feet)</th></tr>
<tr><th>Low Disturbance</th><th>Medium Disturbance</th><th>High Disturbance</th></tr>
<tr><td>April 1 to August 15</td><td>600</td><td>1,500</td><td>1,500</td></tr>
<tr><td>August 16 to October 15</td><td>600</td><td>600</td><td>1,500</td></tr>
<tr><td>October 16 to March 31</td><td>150</td><td>300</td><td>1,500</td></tr>
</table>
NOTES:
Low = Presence of maintenance staff on foot or in vehicles conducting work with light equipment (maintenance trucks, all-terrain vehicles).
Medium = Heavy equipment use with moderate noise levels (approximately 50–75 A-weighted decibels [dBA]).
High = Heavy equipment with high noise levels (more than 75 dBA).
SOURCE: California Department of Fish and Wildlife 2012

A qualified biologist shall monitor the occupied burrows before and during stockpiling activities to inform the development of and confirm the effectiveness of these measures. If it is determined, in consultation with CDFW, that passive exclusion of owls from the stockpile area is an appropriate means of minimizing direct impacts, such exclusion shall be conducted in accordance with an exclusion and relocation plan developed by DWR in coordination with and approved by CDFW.

Burrows occupied during the breeding season (February 1–August 31) shall be provided a protective buffer until a qualified biologist verifies through noninvasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. The size of the buffer shall depend on the distance from the nest to the project footprint, type and intensity of disturbance, presence of visual buffers, and other variables that could affect the susceptibility of the owls to disturbance.
</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>3.3-5: Implementation of the proposed project could cause disturbance or mortality of roosting special-status bats.</td><td>PS</td><td>NI</td><td>PS</td><td>PS</td><td>
Mitigation Measure BIO-7: Conduct Preconstruction Bat Surveys. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)

Within 24 hours of construction, a qualified biologist shall conduct a preconstruction survey for special-status bats at the drought salinity barrier site and the Rio Vista and Weber off-loading and stockpile sites. If no special-status bats are observed roosting, the qualified biologist shall provide a report to DWR for its records, and no additional measures are recommended.

If bats are found in the area where construction-related activities are to occur, a minimum 100-foot avoidance buffer shall be established around the roost/maternity area until it is no longer occupied, as determined by a qualified biologist. High-visibility fencing shall be installed around the buffer and shall remain in place until the area is no longer occupied by the bats. If maternity roosts are found, they shall be avoided until the offspring are able to fly. If avoidance is infeasible, additional mitigation shall be developed in consultation with CDFW.

If construction activities must occur within the avoidance buffer, CDFW shall be consulted before the start of construction to determine appropriate avoidance and minimization measures. At minimum, a qualified biologist shall monitor the work at regular intervals as determined by CDFW. The qualified biologist shall be empowered to stop activities that, in the biologist’s opinion, threaten to cause unanticipated and/or unpermitted adverse effects on special-status bats.
</td><td>LSM</td><td>NI</td><td>LSM</td><td>LSM</td></tr>
</table>

S—Significant; PS—Potentially significant; LTS—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-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.3 Biological Resources (cont.)	**3.3-6:** Implementation of the proposed project could cause disturbance to fish species or their habitat by causing changes in water quality.	S	NI	S	S	**Mitigation Measure BIO-8: Conduct Turbidity Detection and Reduction Activities During In-Water Work. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** DWR shall monitor turbidity levels in West False River during in-water activities, including placement of rock fill material and any major maintenance. Monitoring shall be conducted by measuring upstream and downstream of the disturbance area to ensure compliance with *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin* (Basin Plan) (Central Valley Regional Water Quality Control Board 2019). For Sacramento–San Joaquin Delta (Delta) waters, the general objectives for turbidity apply, except during periods of stormwater runoff; turbidity of Delta waters shall not exceed 50 nephelometric turbidity units (NTU). Exceptions to the Delta-specific objectives are considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity exceeding the limits can be tolerated will be defined for the operation and prescribed in a discharge permit. DWR contractors shall slow or adjust work to ensure that turbidity levels do not exceed those conditions described in the Clean Water Act (CWA) Section 401 water quality certification issued by the State Water Resources Control Board. If slowing or adjusting work to lower turbidity levels is not practical or if thresholds cannot be met, DWR shall consult with the State Water Resources Control Board and permitting agencies to determine the most appropriate measures, including but not limited to altering construction methods while continuing turbidity monitoring, through use of physical in-water best management practices, or temporarily stopping work to minimize turbidity impacts to the maximum extent feasible. **Mitigation Measure BIO-9: Prepare and Implement a Water Quality Monitoring Plan. (Proposed Project, Barge-Mounted Operable Barrier Alternative and Single-Tube Inflatable Rubber Dam Alternative)** DWR shall develop and implement a water quality monitoring plan to assess the effects of the proposed project on flow and water quality throughout the Delta. Monitoring data shall be provided by strategically placed stations within the project area installed during the 2015 Emergency Drought Barrier (EDB) project and the three additional stations that would be installed as part of the drought salinity barrier project. DWR may also use data from other existing and recently upgraded stations throughout the Delta. DWR shall monitor flow, stage, water velocity, water temperature, specific conductance, turbidity, chlorophyll, nutrients, bromide, organic carbon, pH, and dissolved oxygen. The water quality monitoring plan shall outline the methodology for producing the following elements: • Water quality data from new monitoring sites and augmentation of existing sites. • Monthly water quality summaries. • A final report on project effects on water quality. **Mitigation Measure BIO-10: Remove Invasive Aquatic Vegetation. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** The spread of invasive aquatic weeds is an issue throughout the Delta, regardless of the presence or absence of the West False River drought salinity barrier. While the barrier is in place, DWR shall coordinate with the Aquatic Invasive Plant Control Program of the California Department of Parks and Recreation, Division of Boating and Waterways, for the control of invasive aquatic weeds near the barrier that are covered by the control program. DWR shall coordinate with the Division of Boating and Waterways on removal strategies for covered invasive aquatic weeds as necessary to ensure that the barrier does not exacerbate the spread of invasive aquatic vegetation.	LSM	NI	LSM	LSM
	3.3-7: Implementation of the proposed project could cause disturbance to fish species or their habitat by modifying aquatic habitat.	S	NI	S	S	**Mitigation Measure BIO-11: Mitigate the Loss of Designated Critical Habitat. (Proposed Project, Barge-Mounted Operable Barrier Alternative and Single-Tube Inflatable Rubber Dam Alternative)** After removal of the barrier, DWR shall provide compensatory mitigation through a mitigation bank approved by USFWS and CDFW at a 1:1 ratio for impacts on shallow-water habitat associated with the barrier rock.	LSM	NI	LSM	LSM
	3.3-8: Construction of the proposed project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS

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TABLE ES-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.3 Biological Resources (cont.)	**3.3-9:** Implementation of the proposed project could increase the potential for predation on native fish from alterations in aquatic habitat structure.	S	NI	S	S	**Mitigation Measure BIO-10: Remove Invasive Aquatic Vegetation. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.3-6.) **Mitigation Measure BIO-11: Mitigate the Loss of Designated Critical Habitat. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.3-7.)	LSM	NI	LSM	LSM
	3.3-10: Implementation of the proposed project could cause disturbance to fish species or their habitat by affecting fish passage conditions.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS
	3.3-11: Construction of the proposed project could cause the temporary loss or deterioration of wetlands and waters of the United States and State.	PS	NI	PS	PS	**Mitigation Measures: Implement Mitigation Measures BIO-2, BIO-3, and BIO-4 and the protective environmental measures identified in Chapter 2, "Project Description." (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impacts 3.3-2, 3.3-3, and 3.3-4 for the mitigation measures; see Section 2.2 of Chapter 2 for the protective environmental measures.)	LSM	NI	LSM	LSM
	3.3-12: Implementation of the proposed project could contribute to a cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.	PS	NI	PS	PS	**Mitigation Measures: Implement Mitigation Measures BIO-1 through BIO-11. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impacts 3.3-1 through 3.3-9.)	LSM	NI	LSM	LSM
3.4 Cultural Resources	**3.4-1:** 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.	PS	NI	PS	PS	**Mitigation Measure CUL-1: Conduct Preconstruction Cultural Resources Awareness and Sensitivity Training. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** Before project construction, a qualified archaeologist—defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology and has expertise in California archaeology—shall develop a cultural resources awareness and sensitivity training program for all construction and field workers involved in the project's ground-disturbing activities. The qualified archaeologist shall develop this program in coordination with culturally affiliated California Native American Tribes. The program shall include a presentation that covers, at a 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 Measures CUL-2 and CUL-3) and human remains (see Mitigation Measure CUL-4). Written materials associated with the program shall be provided to project personnel as appropriate. Personnel working in areas of project ground-disturbing activities shall receive the training before working in these areas. **Mitigation Measure CUL-2: Implement Unanticipated-Discovery Protocol for Native American or Historic-Era Archaeological Resources. (Proposed Project, Barge-Mounted Operable Barrier Alternative and Single-Tube Inflatable Rubber Dam Alternative)** If Native American or historic-era archaeological resources are encountered during project construction or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. The California Department of Water Resources (DWR) and its qualified archaeologist—defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology and has expertise in California archaeology—shall be informed of the discovery immediately. The qualified archaeologist shall inspect the discovery. Native American archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-era materials might include building or structure footings and walls, and deposits of metal, glass, and/or ceramic refuse. If the qualified archaeologist determines that the resource is or is potentially Native American in origin, culturally affiliated California Native American Tribes shall be contacted to assess the find and determine whether it is potentially a tribal cultural resource (TCR); in cases where an archaeological resource is Native American in origin, the specific mitigation for the resource relies on future consultation with culturally affiliated California Native American Tribes. If DWR determines, based on recommendations from the qualified archaeologist—and from culturally affiliated California Native American Tribes, if the resource is Native American—that the resource may qualify as a historical resource or unique archaeological resource (as defined in *Guidelines for Implementing the California Environmental Quality Act* [State CEQA Guidelines] Section 15064.5) or a TCR	LSM	NI	LSM	LSM

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TABLE ES-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.4 Cultural Resources (cont.)	3.4-1 (cont.)					(as defined in California Public Resources Code [PRC] Section 21074), the resource shall be avoided if feasible. “Avoidance” means that no activities associated with the project that may affect cultural resources shall occur within the boundaries of the resource or any defined buffer zones. DWR shall determine whether avoidance is feasible considering factors such as the nature of the find, project design, costs, and other considerations. If avoidance is not feasible, DWR shall consult with its qualified archaeologist, culturally affiliated California Native American Tribes (if the resource is Native American), 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; DWR shall prepare a treatment plan to document the treatment measures and their implementation methods. Treatment measures shall address the specific attribute(s) that qualify the discovery as an historical resource or unique archaeological resource. Treatment for most resources would consist of (but would not necessarily be limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be affected by the project. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and state repositories, libraries, and interested professionals. 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) authored by a qualified archaeologist, to be filed with the California Historical Resources Information System (CHRIS). Project 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. If, during project implementation, DWR determines that portions of the project area may be sensitive for archaeological resources or TCRs, DWR may authorize construction monitoring of these locations by an archaeologist and tribal monitor. Any monitoring by a tribal monitor shall be completed under agreements between DWR and culturally affiliated California Native American Tribes. **Mitigation Measure CUL-3: Implement Unanticipated-Discovery Protocol for Submerged Cultural Resources. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** If a shipwreck, and associated artifacts, or other cultural resource on or in the tide and submerged lands of California is encountered during project development or operation, Mitigation Measure CUL-2 shall be implemented, in addition to the following measures: • DWR shall initiate consultation with California State Lands Commission (CSLC) 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 shall be presumed to be archaeologically or historically significant. • If the find is a maritime archaeological resource, the qualified archaeologist assessing the find shall have expertise in maritime archaeology. • DWR shall consult with the CSLC 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. Treatment measures would typically consist of (but would not necessarily be limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be affected by the project. DWR shall prepare a treatment plan to document the treatment measures and their implementation methods. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and State repositories, libraries, and interested professionals. 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) authored by a qualified archaeologist, to be filed with the CHRIS. Project 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. • DWR shall submit to the CSLC 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.				

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TABLE ES-1 (CONTINUED)
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3.4 Cultural Resources (cont.)	**3.4-2:** Implementation of the proposed project could disturb human remains, including those interred outside of dedicated cemeteries.	PS	NI	PS	PS	**Mitigation Measure CUL-4: Implement Unanticipated-Discovery Protocol for Human Remains. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** If human remains are uncovered during project construction, all work shall immediately halt within 100 feet of the find and the appropriate county's 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 Native American Heritage Commission (NAHC), in accordance with California Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. Per PRC Section 5097.98, DWR shall ensure that the immediate vicinity of the location of the Native American human remains is not damaged or disturbed by further development activity until DWR has discussed and conferred with the most likely descendant regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.	LSM	NI	LSM	LSM
	3.4-3: 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.	PS	NI	PS	PS	**Implement Mitigation Measures CUL-1, CUL-2, and CUL-3. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)**	LSM	NI	LSM	LSM
	3.4-4: Implementation of the proposed project could contribute to significant cumulative damage to unidentified human remains.	PS	NI	PS	PS	**Implement Mitigation Measure CUL-4. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)**	LSM	NI	LSM	LSM
3.5 Hydrology and Water Quality	**3.5-1:** Implementation of the proposed project could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	PS	PS+	PS	PS+	**Protective Environmental Measure 2.5.1: Prepare and Implement a Water Quality Control Plan. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 2.5, "Protective Environmental Measures.") **Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.3, "Biological Resources.") **Mitigation Measure BIO-9: Prepare and Implement a Water Quality Monitoring Program. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.3, "Biological Resources.")	LSM	LSM+	LSM	LSM+
	3.5-2: Implementation of the proposed project could 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.	S	NI	S	S	**Mitigation Measure HYDRO-1: Monitor Water Velocity near Existing Levees and the Stability of Levees, and Monitor Scour in the Vicinity of the Barrier with the Notch in Place. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** DWR shall monitor tidal velocities in Fisherman's Cut and the Franks Tract levees while the West False River drought salinity barrier is in place (under all three installation scenarios). Under Installation Scenario 2, DWR shall regularly conduct bathymetric surveys to monitor for potential scour at the riverbed, collect inclinometer measurements on Bradford Island to ensure there is no observed movement of the adjacent levee, and monitor velocity measurements around the barrier while the notch is in place. Corrective measures, such as early filling of the notch, shall be immediately implemented if the stability of the barrier or levees may be compromised by the scour. **Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.3, "Biological Resources.")	LSM	NI	LSM	LSM
	3.5-3: Implementation of the proposed project could 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 impede or redirect flood flows.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS

S—Significant; PS—Potentially significant; LTS—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-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.5 Hydrology and Water Quality (cont.)	**3.5-4:** Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.	PS	NI	PS	PS+	**Protective Environmental Measure 2.5.1: Prepare and Implement a Water Quality Control Plan. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 2.5, "Protective Environmental Measures.") **Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.3, "Biological Resources.") **Mitigation Measure BIO-9: Prepare and Implement a Water Quality Monitoring Program. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.3, "Biological Resources.")	LSM	NI	LSM	LSM+
	3.5-5: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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.	PS	NI	PS	PS	**Mitigation Measure HYDRO-1: Monitor Water Velocity near Existing Levees and the Stability of Levees, and Monitor Scour in the Vicinity of the Barrier with the Notch in Place. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Impact 3.5-2.) **Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.3, "Biological Resources.")	LSM	NI	LSM	LSM
	3.5-6: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 impede or redirect flood flows.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS
3.6 Recreation	**3.6-1:** 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.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS
	3.6-2: Implementation of the proposed project could include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS
	3.6-3: 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.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS

S—Significant; PS—Potentially significant; LTS—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-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Section	Impact	Significance Before Mitigation: Proposed Project	Significance Before Mitigation: No Project Alternative	Significance Before Mitigation: Barge-Mounted Operable Barrier Alternative	Significance Before Mitigation: Single-Tube Inflatable Rubber Dam Alternative	Mitigation Measure	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.6 Recreation (cont.)	**3.6-4:** Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	LTS	NI	LTS	LTS	None required.	LTS	NI	LTS	LTS
3.7 Tribal Cultural Resources	**3.7-1:** 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.	PS	NI	PS	PS	**Mitigation Measure CUL-1: Conduct Preconstruction Cultural Resources Awareness and Sensitivity Training. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.4, "Cultural Resources.") **Mitigation Measure CUL-2: Implement Unanticipated-Discovery Protocol for Native American or Historic-Era Archaeological Resources. (Proposed Project, Barge-Mounted Operable Barrier Alternative and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.4, "Cultural Resources.") **Mitigation Measure CUL-3: Implement Unanticipated-Discovery Protocol for Submerged Cultural Resources. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.4, "Cultural Resources.") **Mitigation Measure CUL-4: Implement Unanticipated-Discovery Protocol for Human Remains. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)** (See Section 3.4, "Cultural Resources.")	LTS	NI	LTS	LTS
	3.7-2: 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.	PS	NI	PS	PS	**Implement Mitigation Measures CUL-1 to CUL-4. (Proposed Project, Barge-Mounted Operable Barrier Alternative, and Single-Tube Inflatable Rubber Dam Alternative)**	LTS	NI	LTS	LTS

SOURCE: Data compiled by ICF/ESA in 2022

S—Significant; PS—Potentially significant; LTS—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

1.1 Purpose of the Environmental Impact Report

The California Department of Water Resources (DWR), as lead agency under the California Environmental Quality Act (CEQA), has prepared this draft environmental impact report (DEIR) for the West False River Drought Salinity Barrier Project (proposed project). The purpose of this document is to inform decision-makers and the public of the potential environmental impacts of installing the temporary West False River drought salinity barrier and water quality monitoring stations. This DEIR has been prepared in conformance with CEQA (California Public Resources Code 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 impacts of constructing the proposed project. Construction would involve installing, removing, and potentially notching the West False River drought salinity barrier when drought conditions necessitate barrier installation, and installing a total of three new water quality monitoring stations in Woodward Cut and Railroad Cut in San Joaquin County concurrently with the first installation of the barrier. No operational features are associated with the proposed drought salinity barrier; it is designed to be fully functional once installed.

This DEIR also identifies feasible mitigation measures and alternatives that would avoid or lessen identified adverse environmental impacts or reduce the identified impacts to a less-than-significant level.

1.2 Project Background

Waters from the Sacramento and San Joaquin rivers join to create the Sacramento–San Joaquin Delta (Delta), an inland or inverted river delta. The Delta encompasses an area of approximately 1,000 square miles of tidal wetlands, sloughs, and islands, through which waters flow before reaching San Francisco Bay and, eventually, the Pacific Ocean (MacVean et al. 2018; The Bay Institute 2003). Section 3.5, "Hydrology and Water Quality," in Chapter 3 of this DEIR provides additional information about the Delta's setting. Figure 3.5-1 depicts the Delta and the locations of the proposed project relative to San Francisco Bay.

The Delta is a complex system that provides numerous pathways for tidally influenced, higher salinity seawater to flow inland. The outflow of fresh water from upstream surface waters reduces salinity intrusion from tides and prevents seawater from entering the interior Delta. This mixing of upstream freshwater and tidal seawater creates water quality conditions that are critical to regionally important plant and wildlife species and affects a resource used by people throughout California.

DWR and the U.S. Bureau of Reclamation operate, maintain, and manage the State Water Project (SWP) and the Central Valley Project (CVP), respectively. Both projects are water storage and delivery systems designed to store water and distribute it to urban and agricultural water suppliers throughout California. Through the SWP and CVP, previously stored water is released into the Delta, where it is re-diverted along with natural flows for export within California through water conveyance facilities. Water Right Decision 1641 (revised by the State Water Resources Control Board [State Water Board] in 2000) covers the requirements applicable to the SWP's and CVP's water right permits and licenses, including water quality objectives. Water quality is managed to protect beneficial uses in the Delta, such as municipal and domestic water supply, irrigation and stock watering, fish and wildlife habitat, habitat for migration of aquatic species, recreation, and navigation. See Section 3.5, "Hydrology and Water Quality," for more information about the project area's regulatory setting.

As part of its management role, DWR plays a vital part in evaluating potential impacts on Delta water quality driven by changes in precipitation, temperature, and ocean levels, and in determining options for alleviating those impacts. The diversions that result from SWP and CVP operations redistribute the flow of water by decreasing river flows to San Francisco Bay. As a result, tidal flows may be able to propagate further through the system (Szlemp 2020). During severe drought conditions when reservoirs are low, there is insufficient water storage, potentially accelerating tidal flows and allowing water salinity to intrude upstream (Fleenor and Bombardelli 2013).

1.2.1 2015 Emergency Drought Salinity Barrier

California's four-year drought of 2012–2015 was one of the worst droughts in California's recorded history. Sufficient reservoir storage levels and subsequent downstream water releases are critical to maintaining the Delta's beneficial uses, which in turn allow the SWP and CVP to operate under normal conditions and capacity. Given the persistent drought conditions, reduced storage levels made it unlikely that reservoir releases could be replenished by runoff from upstream resources through snowmelt and precipitation. This scenario exacerbated regional drought conditions in the Delta and further affected SWP and CVP operations. The 2014 SWP and CVP Drought Operations Plan and Operational Forecast for April 1, 2014, through November 15, 2014, called for DWR to assess the need for barriers in the future should dry conditions persist.

As a result of the severe drought conditions, the amount of fresh water flowing through the Delta during summer 2015 would have been insufficient to adequately counter the tidal flow of Pacific Ocean saltwater into the Delta, had DWR not taken appropriate measures. These measures included construction of the emergency drought barrier (EDB) in West False River in May 2015 to protect water quality in the interior Delta.

Installation of the EDB was authorized under Executive Order B-29-15, Directive to Streamline Government Response (April 1, 2015), and under environmental authorizations from the U.S. Army Corps of Engineers (USACE) (SPK-2014-00187), the State Water Board (water quality certification), and the California Department of Fish and Wildlife (CDFW) (2081-2014-026-03 and 1600-2014-0111-R3).

To prevent further salinity intrusion into the Delta, DWR planned, designed, constructed, and monitored the 2015 EDB project in consultation with federal and State water and wildlife agencies. The trapezoid-shaped barrier, which consisted of 92,500 cubic yards of aggregate rock, spanned West False River from Jersey Island to Bradford Island in Contra Costa County for approximately five months (May to October 2015). In accordance with the emergency authorization under Section 404 of the Clean Water Act, DWR removed the EDB by November 15, 2015.

Along with installation of the EDB, DWR developed and operated a network of water quality monitoring stations to evaluate any adverse water quality effects attributable to the EDB project, as required by the project's water quality certification. Ten new flow-rate and water quality monitoring stations were installed to augment 11 existing water quality monitoring stations.

After the EDB was removed, DWR prepared an efficacy report for the 2015 EDB project (California Department of Water Resources 2019). The efficacy report described the EDB's observed ability to reduce saltwater intrusion into the Central Delta at West False River during summer 2015; provided an analysis of the measured and modeled flow, velocity, and water quality patterns associated with the EDB; described mitigation actions and general actions taken to plan, design, construct, and monitor the EDB; and documented lessons learned from the 2015 installation.

As stated in the efficacy report, the 2015 EDB was found to protect water quality for users that rely on diversions from the Central and South Delta. Based on DWR's assessment, the EDB helped to keep high-salinity water out of the Central and South Delta, thereby providing a protective measure for the state's freshwater supplies.

1.2.2 2021–2022 Emergency Drought Salinity Barrier

Since 2020, California has experienced consecutive dry years, with warming temperatures and reduced runoff and precipitation. The 2021 wet season in the northern Sierra Nevada was one of the driest wet periods on record, and snow surveys conducted in 2021 found Sierra snowpack to be well below average. Reduced runoff from rain and snowpack led to reduced reservoir storage in 2021 that was well below normal levels. With reduced inflow expected through the summer, these reduced storage levels were expected to continue into the fall.

In response to California's worsening drought conditions, the EDB was installed during June 2021 at the same location in West False River as the 2015 EDB. Placing embankment rock took 20 days; barrier construction began on June 3 and was completed on June 23, 2021. Because regional drought conditions were forecast to continue through the remainder of 2021, and because of the low reservoir storage levels, DWR updated the EDB deployment plan to accommodate a delay in the barrier's removal, from fall 2021 until a future date when the barrier is determined to be no longer needed. Full removal is expected by November 30, 2022. Further, to facilitate fish and boat passage from January 2022 to March 2022, DWR installed a temporary 400-foot-wide, 12-foot-deep notch in the barrier in January 2022, which was backfilled in April 2022. Data collected by DWR indicate that the notch caused extensive scouring to the West False River streambed on the western side of the barrier, along the northern edge of the notch (discussed further in Section 3.5, "Hydrology and Water Quality"). DWR prepared a draft effectiveness report for the 2021–2022 EDB project (California Department of Water Resources 2022), which documents construction and environmental compliance, assesses effectiveness and impacts, and summarizes lessons learned from the 2021–2022 installation.

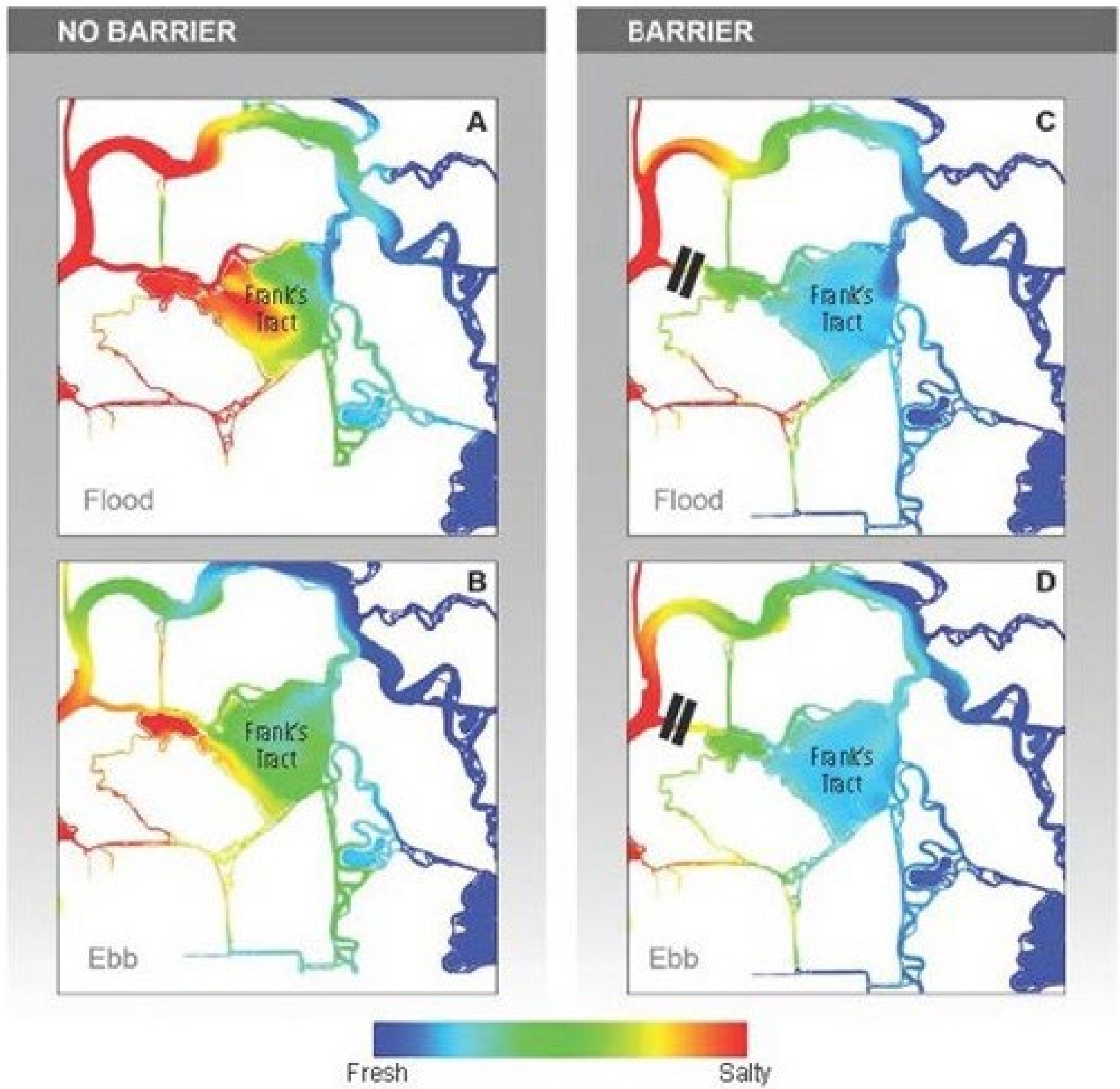
The State of Emergency Proclamation issued by Governor Gavin Newsom on May 10, 2021, authorized the use of barriers to help prevent salinity intrusion into the interior Delta. The environmental authorizations from USACE (SPK-2014-00187), the State Water Board (water quality certification), and CDFW (2081-2021-041-03 and EPIMS-CCA-19852-R3) authorized the installation and removal of the EDB.

1.2.3 Importance of the West False River Location

The Delta receives seawater from San Francisco Bay and fresh water from upstream resources, including, most notably, the Sacramento and San Joaquin rivers. During years of at least average precipitation, Delta outflows are sufficient to prevent higher salinity water from San Francisco Bay from migrating eastward into the Delta with each tidal pulse. However, during drought conditions, higher salinity water can intrude into the Central Delta. Controlling these salinity intrusions is complex because numerous flow pathways exist within Delta channels. Therefore, it is critical to place a potential drought salinity barrier in West False River where it would be most effective at blocking saltwater intrusions.

The West False River location is well suited to help prevent saltwater from entering Franks Tract, a flooded former agricultural island connected to several channels, predominantly from the San Joaquin River and West False River (see Figure 2-1 in Chapter 2, Section 2.1, "Project Location"). Franks Tract has significant water quality effects in the Central Delta, particularly in dry years when salinity could intrude because of a lack of freshwater flows. Thus, a barrier at West False River would protect existing water quality by shifting the main pathway for tidal flow into the Central Delta through Old River northeast of Franks Tract, where flow tends to be lower in salinity than in either False River or Franks Tract.

In **Figure 1-1,** Panel A (No Barrier), higher salinity water (shown in red) can be seen entering Franks Tract from False River. Water quality is influenced by the San Joaquin River at Jersey Point. In Figure 1-1, Panel B (No Barrier), the return flow from Franks Tract is fresher (shown in blue): The salty water will have mixed with fresher water and the ebb flow is drawn radially from a broader area, so it includes more of the ambient water in Franks Tract. Even if the volume of flow is the same in both directions, the asymmetry between a salty flood and a fresher ebb adds up and causes salinity intrusion into the Delta.



Source: California Department of Water Resources 2019.

Figure 1-1
Conceptual Illustration of Salinity near Franks Tract (center) on Flood and Ebb Tide for No Barrier and a West False River Barrier, Based on the Bay-Delta Model for a Low New Delta Outflow Index Forecast

In 2009 and 2014, DWR evaluated temporary EDBs at strategic locations—West False River, Sutter Slough, and Steamboat Slough—for their potential to minimize saltwater intrusion into the Delta, and thus to help conserve limited freshwater resources in upstream reservoirs (California Department of Water Resources 2019). DWR ultimately identified False River west of Franks Tract (as shown in Figure 2-1 in DEIR Chapter 2) as the optimal location where a barrier would change tidal flow and salt movement in the Delta. This was the placement location for the 2015 and 2021–2022 EDBs. With a barrier in place, the main pathway for tidal flow into the Central Delta is through Old River at its mouth on the San Joaquin River just northeast of Franks Tract. Because this location is upstream of False River and is more influenced by the Mokelumne River and Delta Cross Channel, it tends to be lower in salinity than either False River or Franks Tract.

Saltwater transport and mixing may still occur from Old River, but Old River is smaller and exerts a freshening effect on the Central Delta. Ultimately, a barrier in West False River allows Franks Tract to remain fresher during both flood and ebb flows (Figure 1-1, Panels C and D) relative to the situation without a barrier (Figure 1-1, Panels A and B).

As shown by the data collected from the two previous EDB installations in West False River, installing a temporary drought salinity barrier in West False River is an effective solution for protecting the Delta's beneficial uses, when drought conditions warrant it (California Department of Water Resources 2019). It is reasonable to assume and prudent to forecast that future drought conditions will likely require similar measures to manage salinity levels in the Central and South Delta. Although the timing and severity of drought conditions are uncertain, DWR is planning for the proposed project ahead of a pending drought scenario. This will provide an effective tool toward maintaining water quality in the Delta for both natural resources and Central and South Delta diverters, while supporting water supply reliability.

1.3 Environmental Review Process

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, results and conclusions presented, and the document's adequacy to meet CEQA's substantive requirements. The following sections describe the steps in the environmental review process for the proposed project.

1.3.1 Notice of Preparation

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, DWR issued a notice of preparation (NOP) of an EIR (State Clearinghouse #2022020528). DWR provided copies of the NOP to federal, State, and local agencies through the State Clearinghouse and published the NOP in the *Contra Costa Times* and *Sacramento Bee* on February 23, 2022. The NOP was circulated for 30 days ending on March 25, 2022. The NOP described the project location, the project objectives, and the proposed project, and summarized environmental topics to be considered in the DEIR. The NOP is included in **Appendix A** of this DEIR.

1.3.2 Initial Study Environmental Checklist

A copy of the Initial Study Environmental Checklist was prepared for the proposed project before publication of the DEIR, to identify resource topics for which the proposed project would result in either no impact or a less-than-significant impact, as well as the project's potentially significant impacts (discussed in Section 1.4, "Scope of this Environmental Impact Report"). The Initial Study Environmental Checklist is included as **Appendix B**.

The proposed project was determined to result in either no impact or a less-than-significant impact relative to the following resource topics evaluated in the Initial Study Environmental Checklist; therefore, this DEIR does not evaluate these topics further. The Initial Study Environmental Checklist in Appendix B provides the analysis of these topics.

- **Aesthetics:** The proposed project is not located near any State- or county-designated scenic highways. The project site is not located on a prominent hillside or a major or minor ridgeline. The site is located within West False River, a locally designated scenic waterway; however, given the short-term, temporary nature of project-related construction activities and the limited number of viewers, the proposed project would not substantially damage scenic resources. Additionally, after removal of the barrier, existing visual quality would be returned. Therefore, the proposed project is consistent with the Delta's existing visual character, which includes levees and channels, and it would have a less-than-significant impact on scenic vistas, State scenic highways, and the existing visual character or quality of public views of the site and its surroundings. The proposed project would involve some nighttime activity during construction activities. This temporary nighttime lighting would cease upon completion of the associated construction activities. The project would not introduce new sources of glare. Therefore, the proposed project would have a less-than-significant impact on daytime or nighttime views in the area.

- **Agriculture and Forestry Resources:** The project site is zoned as General Agricultural and Heavy Agricultural, and the proposed project would not convert the project site to nonagricultural use. Therefore, the proposed project is consistent with the project site's land use and zoning designations. The project site is not located on or near lands under active Williamson Act contracts. The site does not contain forestland, and the project would not convert any forestland to nonforest use. Therefore, the proposed project would have a less-than-significant impact on agriculture and forestry resources.

- **Energy:** Construction activities and corresponding fuel energy consumption associated with the proposed project would be temporary and localized. In addition, the project has no unusual characteristics that would cause equipment or haul vehicles to be less energy efficient than equipment and haul vehicles used at other similar construction sites elsewhere in the state. Once construction is complete, equipment and energy use would be minimal and would occur only during routine maintenance activities while the barrier is in place. Thus, the project would not result in wasteful, inefficient, or unnecessary use of energy. The proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency or impede progress toward achieving goals and targets. Impacts would be less than significant.

- **Geology and Soils:** The proposed project is not located within an Alquist-Priolo Earthquake Fault Zone, and no active or potentially active faults or landslides have been mapped on the project site. However, the project is located within the Montezuma Hills Fault Zone and near large active fault systems. The barrier has been designed and engineered for stability, and any structural changes to the barrier or movement of rock resulting from seismic activity would be limited to the waterway. No septic tanks are proposed, and no paleontological resources have been identified in the project vicinity. Therefore, the proposed project would have a less-than-significant impact on geology and soils.

- **Hazards and Hazardous Materials:** The proposed project's activities would not require extensive or ongoing use of acutely hazardous materials or substances, and a water quality control plan would be implemented as part of the contract specifications. The plan would include site-specific best management practices to minimize the potential for a spill of hazardous, toxic, or petroleum substances at the project site during construction and barrier presence. Additionally, no schools exist or are proposed within 0.25 mile of the project site. Searches of the Cortese List and the California Department of Toxic Substances Control's online EnviroStor database identified four sites within 2 miles of the proposed off-loading and stockpile sites; however, these areas are already used and their use for the proposed project is not anticipated to result in a potential for hazardous contamination. These searches did not identify any sites with potential hazardous contamination within approximately 2 miles of the project site or the three proposed water quality monitoring stations. The project site is not located within 2 miles of a public airport. The proposed project could affect emergency response times because the barrier would block passage through West False River; however, given the temporary nature of the proposed project and the availability of alternate routes, this impact would be less than significant. The project site does not have a California Department of Forestry and Fire Protection designation of Very High Fire Hazard Severity Zone. No features of the proposed project would add to the fire danger in the project vicinity. Therefore, impacts related to hazards and hazardous materials would be less than significant.

- **Land Use and Planning:** One rural residence is located near the project site and the site is not part of a formally or informally established community. Residences on Bradford Island would remain accessible by ferry while the drought salinity barrier is in place. Land adjacent to the project site is designated by Contra Costa County as Delta Recreation and Resources and Public and Semi-Public and zoned primarily for agricultural use. No project activities would directly occur on lands subject to these land use designations or zoning. As part of the contract specifications, DWR would install navigation buoys, lights, and signage to advise boaters of the presence of the drought salinity barrier and maintain navigation along both waterways as part of the proposed project. Therefore, the proposed project would not cause a significant environmental impact caused by a conflict with land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and impacts related to land use and planning would be less than significant.

- **Mineral Resources:** The project site does not contain mineral resources and is not located in an area identified in the *Contra Costa County General Plan 2005–2020* as containing mineral resources. Therefore, no impact would occur.

- **Noise:** Construction of the proposed project may temporarily generate noise and ground vibration at varying levels, depending on the equipment used and the activities occurring. Construction activities would take place 1,800 feet or more from the nearest receptors. No public airports are located within 2 miles of the project site. Therefore, the proposed project would have a less-than-significant noise impact.

- **Population and Housing:** The proposed project would not directly or indirectly induce substantial unplanned population growth or displace housing or people, necessitating the construction of replacement housing elsewhere. Therefore, the proposed project would have a less-than-significant impact on population and housing.

- **Public Services:** The proposed project would not result in the construction of new housing, businesses, or other development that would generate new residents in the project area who could require additional fire or police services, nor would the project result in the need for new governmental facilities or altered government facilities. Therefore, no impact would occur.

- **Transportation:** Most materials and construction equipment would be brought to the project site by barge, and most construction work would take place in the water; transporting materials and heavy equipment for construction would require a minimal number of truck trips. Trucks hauling materials to the site would travel along local roadways and roadway traffic would return to existing conditions after completion of the proposed project. Additionally, upon the completion of project construction, the proposed project would not generate any new trips, except for occasional maintenance similar to that conducted under existing conditions. The proposed project would not result in any change to the geometric design features of roadways in the project vicinity or introduce incompatible uses and would not require any road closures. Therefore, the proposed project would have a less-than-significant impact on transportation.

- **Utilities and Service Systems:** The proposed project would not create a need to construct new or modified utilities and service systems. In addition, implementing the project would not result in the construction or expansion of a water or wastewater treatment facility, and would not generate wastewater. The minimal amount of water required for construction activities would be supplied by water trucks and obtained at an existing municipal source. The project would generate minimal amounts of solid waste during construction, and would not generate any solid waste during maintenance. Therefore, the proposed project would have a less-than-significant impact on utilities and service systems.

- **Wildfire:** The proposed project would not require any road closures, and existing roads would continue to provide adequate emergency access to the project site and project area. The project would temporarily block passage through West False River; however, boats could detour around the barrier using alternative routes. The proposed project would not impair an adopted emergency plan or emergency evacuation plan. Project construction would require the presence of some vehicles and heavy equipment that could spark and ignite flammable vegetation. However, the risk of construction igniting a fire would be low because construction activities would occur primarily within the river; the construction footprint on land is anticipated to be approximately 0.37 acre and would be used only for staging purposes. Because the drought salinity barrier would be in the river and the proposed project would not involve the construction of buildings or residences, the project would not exacerbate wildfire risks or affect runoff and drainage. Therefore, impacts would be less than significant.

1.3.3 Draft Environmental Impact Report

DWR provided public notice of the availability of the DEIR as required by Section 15087 of the State CEQA Guidelines. Written notice was sent to the last known names and addresses of all individuals and organizations who had previously requested such notice, including the seven parties who submitted written comments in response to the NOP (Appendix A). A public notice of availability was placed in two newspapers with regional circulation—the *Contra Costa Times* and *Sacramento Bee*—announcing the availability of the EIR and the opportunity to submit comments. The public notice was also distributed to the Alameda, Contra Costa, Sacramento, and San Joaquin county clerk's offices and to State, federal, and local agencies.

A virtual public meeting will be held on Wednesday, July 27, 2022, at 6 p.m., to receive input from agencies and the public on the DEIR. Registration in advance of the meeting is required and is available at the following link:

https://us02web.zoom.us/webinar/register/WN_iKuyb6EfT7-OMvRyf6JTLQ

The 45-day public review period for this DEIR will be Thursday, July 7, 2022 through Monday, August 22, 2022. During the public comment period, written comments may be mailed or emailed to:

California Department of Water Resources
Division of Operations and Maintenance
Robert Trang, Manager
WPPM Delta Planning Section
1516 9th Street, 2nd Floor
Sacramento, CA 95814
Email address: wfrdsb_ceqa@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.

The DEIR is available for review online on the following websites:

DWR (under the "DWR Activities" tab):

https://water.ca.gov/Water-Basics/Drought

California State Clearinghouse CEQAnet Web Portal (search by project name or State Clearinghouse #2022020528):

https://ceqanet.opr.ca.gov/

A copy of the DEIR is also available for review during normal business hours at the following locations:

California Department of Water Resources
Division of Operations and Maintenance, WPPM Delta Planning Section
1516 9th Street, 2nd Floor
Sacramento, CA 95814

Sacramento Public Library, Central Branch
828 I Street
Sacramento, CA 95814

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

1.3.4 Final Environmental Impact Report

After the public comment period, responses to comments that have been received on environmental issues will be prepared. Consistent with State CEQA Guidelines Section 15088(b), commenting agencies will be provided a minimum of 10 days to review the proposed responses to their comments before any action is taken on the final EIR (FEIR) or the proposed project. The FEIR will be considered for certification and approval by DWR.

1.4 Scope of This Environmental Impact Report

The NOP (Appendix A) and Initial Study Environmental Checklist (Appendix B) identified potentially significant impacts with the proposed project. As identified in the NOP and Initial Study Environmental Checklist, and based on a review of the NOP comment letters received (Appendix A), DWR has determined that this DEIR will address the following resource topics:

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

The topic of Climate Change and Resiliency is also covered in this DEIR, consistent with recommendations in DWR's Climate Action Plan (California Department of Water Resources 2018).

1.5 Organization of the Draft Environmental Impact Report

This DEIR is organized as follows:

- The **Executive Summary** summarizes the project description and alternatives analyzed in the DEIR, 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, and presents background information about the proposed project.
- **Chapter 2, "Project Description,"** presents an overview of the proposed project and outlines the project objectives and project need.
- **Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures,"** describes the existing environmental setting and discusses the environmental impacts of the proposed project.
- **Chapter 4, "Climate Change and Resiliency,"** discusses the proposed project's adaptability and resilience related to climate change.
- **Chapter 5, "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 6, "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 7, "List of Preparers,"** identifies the DEIR's authors and consultants, and the agencies or individuals consulted during preparation of the DEIR.
- **Chapter 8, "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 Location

The approximately 3.12-acre footprint for the proposed project (referred to in this draft environmental impact report [DEIR] as the “project site”) is located on West False River approximately 0.4 mile east of its confluence with the San Joaquin River, in Contra Costa County, California, between Jersey and Bradford islands. This location is approximately 4.8 miles northeast of the city of Oakley. **Figure 2-1** shows the project site and vicinity and **Figure 2-2** shows an aerial photograph of the project site.

The banks at the project site are existing rock-lined levees. Approximately 2.75 acres of the approximately 3.12-acre project site are situated in West False River (below the ordinary high-water mark), where embankment rock would be placed. The remaining approximately 0.37 acre of the project footprint, which would be used for staging purposes and placement of rock on the levee bank, is situated on the Jersey Island levee (above the ordinary high-water mark).

Embankment rock used to construct the drought salinity barrier may be sourced from a commercially operated rock quarry in San Rafael, from the California Department of Water Resources’ (DWR’s) Rio Vista stockpile in Solano County, or from the Weber stockpile in San Joaquin County. The West False River Drought Salinity Barrier Project (proposed project) may use multiple stockpile sites and off-loading sites.[1] A total of three new water quality monitoring stations would also be installed, in Woodward Cut and Railroad Cut in San Joaquin County. **Figure 2-3** shows the locations of these project features relative to the project site.

2.2 Project Objectives

The primary objectives of the proposed project are as follows:

- Install a drought salinity barrier to protect water quality in the Central and South Sacramento–San Joaquin Delta (Delta), based on need demonstrated by drought conditions and low upstream reservoir storage.
- Install a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the period from 2023 to 2032.
- Minimize the impacts of salinity intrusion on the beneficial uses of interior Delta water during persistent drought conditions through the installation of a drought salinity barrier in the Central or South Delta.

1 The Rio Vista off-loading site is not owned or operated by DWR.

Figure 2-1
Project Location

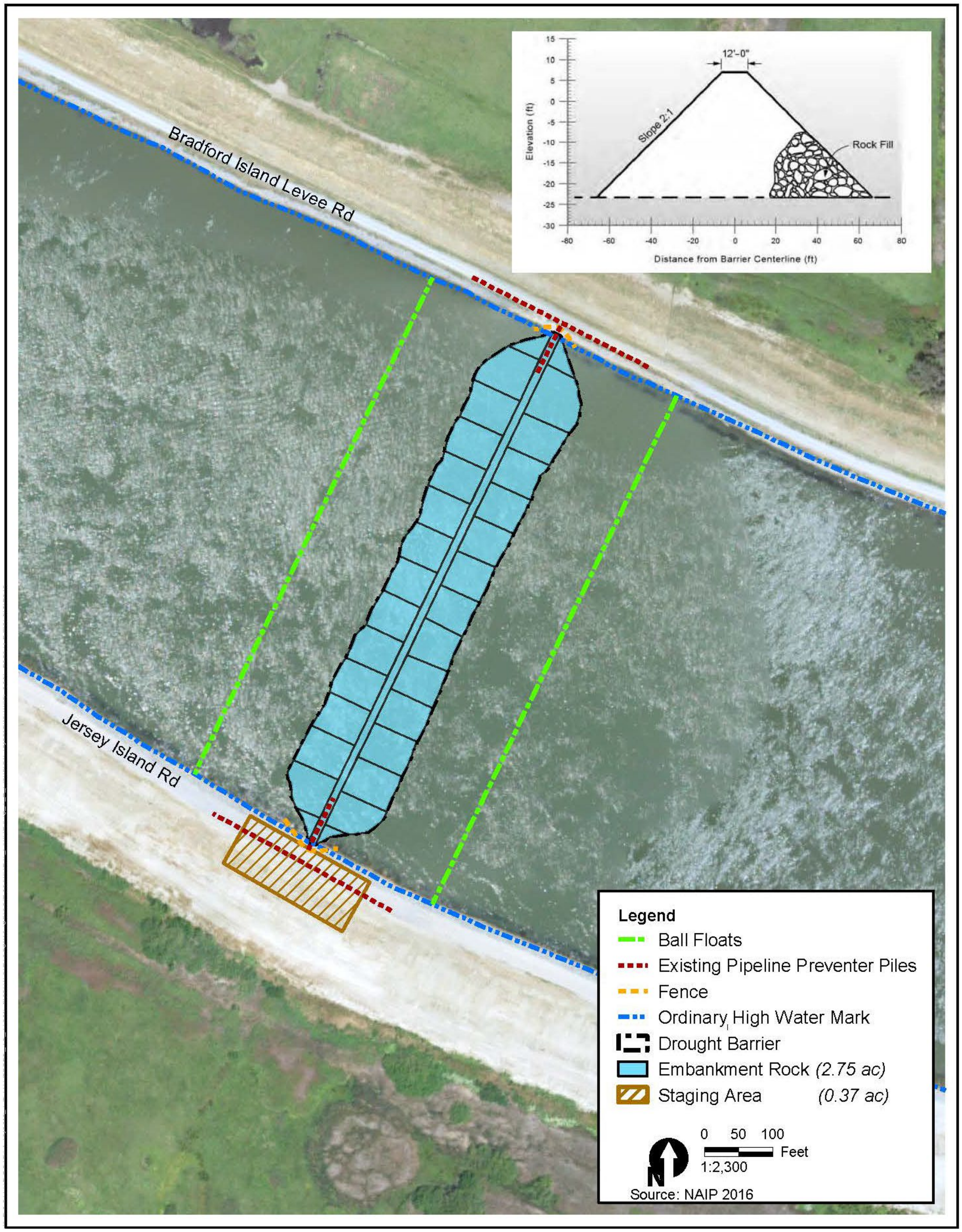


Figure 2-2
Aerial View of the Project Site and Project Design (without the Notch)

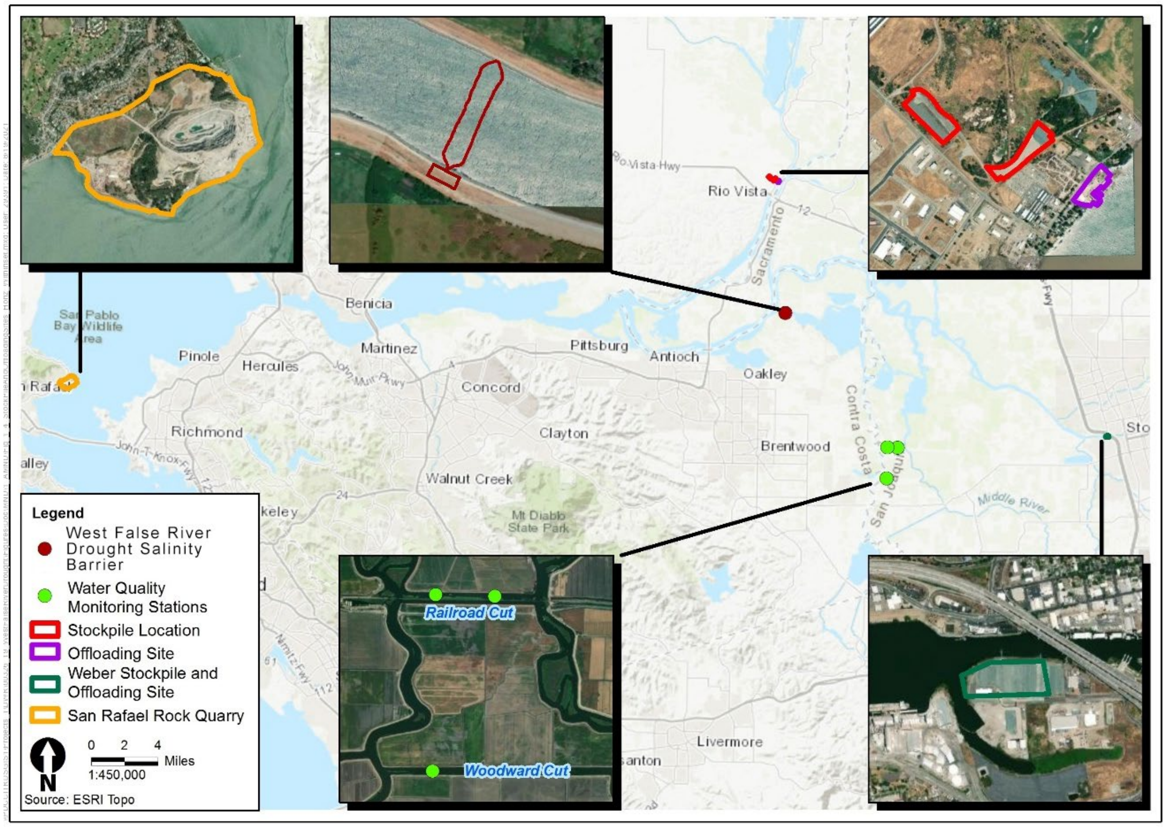


Figure 2-3
Project Features

Installing a drought salinity barrier in West False River has been shown to be an effective tool for reducing the intrusion of saltwater into the Central and South Delta based on previous installations (see Section 1.2, "Project Background," in Chapter 1; California Department of Water Resources 2019). The West False River drought salinity barrier location is in the Central Delta in West False River, which is a main channel to the west that connects to Franks Tract, the central hub of the Delta. By hydraulically blocking the West False River corridor, the barrier protects against the intrusion of saltwater from San Francisco Bay into Franks Tract. This prevents the fresh water from other channels including the Mokelumne River and Old River flowing into Franks Tract from other directions from mixing with the more saline water that otherwise would flow through West False River during flood tides. Without the barrier in place at this critical location, the saltier water carried through West False River would gradually contaminate the water in Franks Tract and the interior Delta with salts, a condition that cannot be reversed during drought conditions, and thus would affect the beneficial uses of water. The importance of the West False River location is explained in Chapter 1, Section 1.2.3. Given the cyclical nature of drought, the need to install a drought salinity barrier in West False River is anticipated two times (with up to two 2-year installations) over the next 10 years.

The proposed project would help protect the beneficial uses of water in the Delta during drought periods, including the beneficial uses described in Water Right Decision 1641 (D-1641). Table 3.5-1 in DEIR Section 3.5, "Hydrology and Water Quality," summarizes the beneficial uses designated for the Delta in *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin* (Basin Plan) (May 2018). During drought conditions, water stored in upstream reservoirs may be insufficient to repel salinity moving upstream from San Francisco Bay. Without the protection of the drought salinity barrier in West False River, saltwater intrusions could affect more than 27 million Californians who rely on the Delta for at least a portion of their water supply; could render Delta water unusable for agricultural needs; and could reduce the value of habitat for aquatic species. The need for water delivery protection, water quality protection, and aquatic habitat protection to protect the beneficial uses of Delta water during drought periods is described below.

2.2.1 Water Delivery Protection

Salinity intrusion into the interior Delta would cause portions of the Delta to exceed water quality objectives. High salinity levels (with associated bromide levels) would compromise the use of Delta water for municipal and irrigation water supplies, reducing the amount of water available for downstream delivery to communities that rely on this water source. Protecting water delivery is critical for people who live in the Delta and in Contra Costa, Alameda, and Santa Clara counties, and for the 27 million people who rely on the State Water Project (SWP) and Central Valley Project (CVP) for water supplies. Reduced water deliveries would pose a hardship for communities without alternative water supplies, including Contra Costa Water District, which serves approximately 500,000 people and is almost entirely dependent on the Delta for its water supply (Contra Costa Water District 2016), and agricultural water users that may lack access to alternative water supplies. Installing the drought salinity barrier would help to protect water quality in the Central Delta.

2.2.2 Water Quality Protection

Degradation of water quality caused by an increase in salinity would negatively affect the beneficial uses summarized in Section 1.2, “Project Background,” in Chapter 1, and in Section 3.5, “Hydrology and Water Quality,” in Chapter 3. The results of water quality modeling analyses (described in the Efficacy Report for the 2015 Emergency Drought Barrier [EDB] Project [California Department of Water Resources 2019]) show that after the intrusion of higher salinity water into the interior Delta, the water would likely persist for an extended period until typical wet-weather patterns generate sufficient winter and spring freshwater river flows to displace it. Installing a drought salinity barrier in West False River would help block higher salinity waters from entering the interior Delta, thus maintaining water quality objectives while reducing demand on reservoir releases.

Modeling of salinity intrusion using variable barrier installation dates demonstrates that the greatest water quality benefits would be gained if the West False River barrier were installed when Delta water quality is adequate for beneficial uses, typically in the spring (April or May). However, lesser benefits may still be gained from installing the drought salinity barrier later in the year, because the barrier can only protect water quality, not improve it. Installing the barrier before conditions become too degraded is important.

2.2.3 Aquatic Habitat Protection

Increased salinity levels have the potential to adversely affect the sensitive aquatic resources that live in and migrate through the Delta. Greater salinity in the Delta could cause exceedances of the water quality objectives for beneficial uses described in the Basin Plan related to sensitive aquatic resources (e.g., fish, wildlife, wetlands, and vegetation; see DEIR Section 3.5, "Hydrology and Water Quality"). To meet the water quality objectives, some of the already limited water supplies stored in upstream reservoirs would have to be released. Releasing this stored water could negatively affect aquatic habitat by reducing the availability of water to meet other objectives. For example, if coldwater resources in reservoirs were depleted, flows in late spring and summer would be insufficient to protect salmon eggs incubating in the gravels, as well as rearing habitat for juvenile salmon below Keswick, Oroville, and other dams.

Constructing a drought salinity barrier in West False River would conserve coldwater pools in upstream reservoirs. The barrier would protect natural resource values after installation because less water would need to be released from the reservoirs earlier in the year to maintain water quality. For example, various water quality objectives related to electrical conductivity exist for protection of fish and wildlife beneficial uses in the Delta. With greater preservation of reservoir storage, more water could become available to meet these objectives.

2.3 Potential Barrier Installation Factors

A variety of factors that can affect water quality and degrade beneficial uses in the Delta during a drought may influence a decision to install a drought salinity barrier. **Table 2-1** identifies the factors—labeled as "drought factors"—that DWR would considered in any decision to plan installation of the drought salinity barrier, along with the "sub-factor" triggers related to each factor. In general, two or more drought factors are likely to occur before preparations to construct are triggered. Because the environmental conditions potentially contributing to an upcoming drought scenario may be highly variable, using numerical data triggers to define the drought for planning purposes may be impracticable. Defining physical triggers is also difficult given the system's complexity and the vast combinations of conditions that could necessitate installing the drought salinity barrier.

The drought salinity barrier would be constructed only if DWR, in cooperation with other State and federal agencies, determines that drought conditions have reduced water storage in SWP and CVP facilities to critical levels, such that projected Delta outflow would be insufficient to control increased salinity in the Delta, thereby worsening water quality and threatening the drinking and irrigation water supply. CVP and SWP operations would continue in accordance with all applicable rules and regulatory requirements, in coordination with relevant State and federal regulatory agencies. Should the barrier need to be installed more than two times over the next 10 years as described in this EIR, an additional CEQA compliance document would be prepared (and permits would be obtained for the additional installation). If only minor additions or changes would be needed to make the EIR adequate, this additional CEQA compliance could involve preparing a supplement to this EIR consistent with Section 15163 of the State CEQA Guidelines or an addendum consistent with Section 15164 of the State CEQA Guidelines; or, if major revisions of the EIR are needed, a subsequent EIR could be prepared consistent with Section 15162 of the State CEQA Guidelines.

TABLE 2-1
FACTORS POTENTIALLY TRIGGERING THE DECISION TO INSTALL A DROUGHT SALINITY BARRIER

Drought Factor	Sub-factor Trigger
Forecasted Multi-year Consecutive Drought Conditions (2+ Years)	Below-average runoff.
	Below-average rainfall.
	Below-average snowpack.
	Water year type that is or is expected to be Dry or Critical in the Sacramento and San Joaquin valleys, as published in DWR Bulletin 120.
Drop in Northern California Reservoir Storage Levels	Water levels below historical average during the current water year (i.e., October 1 – March 30).
	Projections indicating insufficient storage to protect water quality and meet health and safety and other critical water supply needs.
D-1641 Water Quality Objectives at Risk	Inability to release sufficient water to maintain Delta water quality with the standards mandated by D-1641.[1]
Drought Modeling and Monitoring Results Triggering Actions	Drought contingency planning efforts initiated based on results.
	Regular meetings with representatives from DWR, the U.S. Bureau of Reclamation, the State Water Board, and the fisheries agencies initiated based on results.

NOTES: D-1641 = Water Right Decision 1641; Delta = Sacramento–San Joaquin Delta; DF = Drought Factor; DWR = California Department of Water Resources; State Water Board = State Water Resources Control Board

1 There may be sufficient reservoir water to meet the Delta water quality standards mandated by D-1641 but draining the reservoirs would jeopardize the ability to make health and safety deliveries or have water for environmental purposes later in the year.

SOURCE: Data provided by DWR in 2021

2.4 Description of the Proposed Project

The proposed project consists of installing a temporary drought salinity barrier made of rock in West False River, at the same location where the 2015 and 2021–2022 EDBs were installed. The barrier would be installed no sooner than April 1 and removed by November 30 of the subsequent year. Alternatively, removal may occur by November 30 of the same year if DWR determines that the barrier is no longer needed based on hydrologic conditions (see Table 2-1). DWR would generally make a decision before September 15 (i.e., the start of barrier removal activities) regarding whether the barrier should remain in place for a subsequent year. Potential indicators that would necessitate leaving the barrier in for a subsequent year may include the following:

- Water levels in principal reservoirs across the state, including Shasta and Oroville, continue to drop and remain below the historical average.
- Model forecasting shows difficulty meeting D-1641 water quality standards from upstream reservoir releases for the upcoming fall.

The barrier may be installed up to two times over 10 years, including consecutive years, if a drought occurs during the 2023–2032 period and drought conditions and low upstream reservoir storage indicate that a barrier in West False River would be an effective tool to reduce saltwater intrusion into the Delta. The proposed project calls for up to two consecutive barrier installations over 10 years primarily because the project's potential effects on the physical environment after 10 years are speculative, and because some drought response—including the need to install a barrier—is anticipated within the next 10 years, given the cyclical nature of drought.

Also addressed in this DEIR is the possible placement of a notch in the middle portion of the barrier in early January of the second year of installation. The notch would be refilled as early as the first week of April to allow fish passage and vessel navigation through West False River. Potential indicators that no notch should be constructed may include the following:

- Scouring of the channel bottom is occurring, which could eventually lead to safety concerns related to undercutting of the barrier or the adjacent levees.
- An evaluation of collected data indicates that special-status aquatic species are not using West False River as a migratory pathway.
- The results from the DWR 2021–2022 predation study (still preliminary at the time this DEIR was drafted) show an increase in predation rates post-notching.
- The potential exists to lose control of Delta water quality with a notch in place.

Therefore, the proposed project analyzed in this DEIR includes the three potential installation scenarios listed in **Table 2-2**.

TABLE 2-2
PROPOSED PROJECT INSTALLATION SCENARIOS

Proposed Project[1]	Drought Salinity Barrier Installation Date	Drought Salinity Barrier Removal Date	Total Length of Time Drought Salinity Barrier in Place	Notch Placed in Middle Portion of Barrier from Early January through Early April?	Determination on Type of Installation Scenario
Installation Scenario 1	April 1	November 30 of the subsequent year	20 months	No	Barrier left in place for 20 months based on continuing Dry/Critical water year conditions.[2] See the preceding list of potential indicators that no notch should be constructed.
Installation Scenario 2	April 1	November 30 of the subsequent year	20 months	Yes	Barrier left in place for 20 months based on continuing Dry/Critical water year conditions.[2]
Installation Scenario 3	April 1	November 30 of the same year	8 months	No	Barrier removed within the same year based on hydrologic conditions.[2]

NOTES:
1 The proposed project includes any one of the installation scenarios, with the barrier installed up to two times over 10 years, including consecutive years, if a drought occurs during the 2023–2032 period and drought conditions and low upstream reservoir storage indicate that a barrier in West False River would be an effective tool for reducing saltwater intrusion into the Delta.
2 See Section 2.3, "Potential Barrier Installation Factors."

SOURCE: Data provided by DWR in 2022

With the first installation of the drought salinity barrier, a total of three new water quality monitoring stations would be installed, in Woodward Cut and Railroad Cut in San Joaquin County. These water quality monitoring stations would expand on the existing network of monitoring stations that were installed in 2015 with the EDB project to evaluate any adverse water quality effects attributable to the drought salinity barrier.

2.4.1 Barrier Installation (Applicable to Installation Scenarios 1, 2, and 3)

Barrier Design

The proposed project, which is the preferred alternative in this DEIR, includes installation of an approximately 800-foot-long barrier. The barrier would be trapezoid-shaped, with an approximately 200-foot-wide (2.75-acre) base in the water tapering to an approximately 12-foot-wide top above the water level, set perpendicular to the channel (see inset drawing of Figure 2-2). The top of the barrier would be at an elevation of 7 feet North American Vertical Datum of 1988 (NAVD88) across the entire crest. From the crest, the barrier would slope down to the riverbed at a rate of 2 horizontal units to 1 vertical unit (2H:1V). As shown in Figure 2-2, the barrier would consist of approximately 84,000 cubic yards of well-graded 18-inch-minus embankment rock extending from the Jersey Island levee on the south side to the Bradford Island levee on the north side.

In preparation for the potential installation of the barrier, DWR engineers would conduct a design review and would adjust the design if needed based on experiences from prior installations.

Barrier Installation Schedule

Because the proposed drought salinity barrier would be installed in response to specific conditions (outlined in Section 2.3, “Potential Barrier Installation Factors”), the installation schedule would be determined based on hydrologic conditions, and the barrier would be installed only when drought conditions necessitate its installation. The potential schedules are described below and the impacts of the various schedules are fully described in Chapter 3, “Environmental Setting, Impacts, and Mitigation Measures.” The hydrologic conditions would be determined using known conditions in the Central Valley watershed to date, which are updated monthly, and future hydrologic conditions forecast in a conservative manner.

At the beginning of each new water year, there is significant uncertainty regarding the hydrologic conditions that will exist several months in the future. For October and November, projected runoff is based entirely on historical hydrology, as no snowpack data are available yet. In December and January, inflow forecasts may include snow pillow information and precipitation as well as historical hydrology. For February through May, estimates of runoff volume are based on observed inflow to date and current snowpack measurements made at the end of each preceding month, projections through September, and historical hydrology for the next water year. These forecasts represent the uncertainty inherent in making runoff predictions, including unknown future weather conditions, the various prediction methodologies, and the spatial coverage of the data network in each basin.

Once the need for the proposed project has been established, DWR would actively engage with the resource agencies: the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and State Water Resources Control Board (State Water Board). Proactive outreach would be conducted in a given year at least 30 days before construction is to begin. Conversely, engagement activities would be curtailed if hydrologic conditions were to improve and the potential need for a barrier installation were to become less likely than forecasted earlier in the water year.

Construction activities at the barrier location would begin no sooner than April 1 and would continue for up to 45 working days. Transit to and from stockpile locations and mobilization may occur before April 1. Construction activities may be conducted on a 24-hour basis as needed.

Barrier Construction Methodology

First, DWR contractors would mobilize their equipment and crew, and would establish a staging area adjacent to Jersey Island Road (i.e., on the left bank) and erect exclusion fencing. The staging area would be used primarily for parking, equipment staging, portable toilets, and a job trailer. Next, the contractors would transport the rock to West False River via barges from DWR's Weber or Rio Vista stockpile site, or from a commercially operated quarry, such as in San Rafael.

DWR contractors would begin placing rock into West False River using a dump scow or barge-mounted crane, or both, equipped with clamshells, dragline buckets, and/or excavators on floats or material barges. Rock would be placed first near the levees; rock placement would then progress toward the center of the river in a uniform manner to prevent levee scour. Because of the depth of the water, the contractors would be able to use the dump scow for only a limited duration. They would use a barge-mounted crane to place concrete and steel anchor blocks (approximately 9 square feet each) for the warning signs and buoy lines.

DWR contractors may install fencing on the levees near the rock placed for the barrier (shown in Figure 2-2) to prevent trespassing, and may install structures (e.g., bird spikes) to impede ground squirrel movement. They would also install float lines, signs, and warning buoys on both sides of the drought salinity barrier.

For in-water construction activities occurring during non-daylight hours, contractors would use light plants, situated on the levees and/or barges, as needed. Lighting would be directed downward toward construction activities to the extent practical. Rock placement on the levee slope would occur only during daylight hours.

After installation activities are complete, DWR contractors would demobilize from the site and regrade the staging area and dirt access road to preconstruction conditions. **Table 2-3** identifies the types of construction equipment that would likely be used for barrier installation under the proposed project. The actual equipment used would depend on the contractor selected and the availability of equipment.

Installation of the drought salinity barrier would require a construction crew of approximately 21 people.

TABLE 2-3
CONSTRUCTION EQUIPMENT TO BE USED FOR ROCK PLACEMENT AT THE DROUGHT SALINITY BARRIER SITE

Type of Equipment
Dump scows (2)
Radial stackers (2)
CAT 345 excavator
Derrick barge (1)
Tugboats (3)
Water truck (2,000-gallon)
Loaders (8)

NOTE: Construction equipment may vary based on site conditions and contractor selection.

SOURCE: Data provided by DWR in 2021

Provisions for Navigation and Fish Movement with the Proposed Project

Vessel traffic through West False River would be blocked at the project site with installation of the drought salinity barrier. However, alternative routes are available via the Lower San Joaquin River and the Stockton Deep Water Ship Channel in the San Joaquin River for navigation between Antioch and locations in the eastern Delta, or via Fisherman's Cut or False River for navigation to South Delta destinations. DWR would install signs on each side of the drought salinity barrier and float lines with orange ball floats across the width of the channel to deter boaters from approaching the barrier structure. Solar-powered warning buoys with flashing lights would be installed on the barrier crest to prevent nighttime accidents. DWR would also post signs at upstream and downstream entrances to the waterway or other key locations, informing boaters of the restricted access. Navigation signage would comply with the requirements set forth by the U.S. Aids to Navigation System and the California Waterway Marker System, as appropriate.

DWR would coordinate with U.S. Coast Guard District 11 and the California Department of Parks and Recreation, Division of Boating and Waterways, regarding procedures for safe vessel passage. DWR or the contractor would post a notice to mariners, which would include information on the location, date, and duration of channel closure.

The drought salinity barrier would not be designed to allow fish passage. While the drought salinity barrier is in place, fish may move through the adjacent San Joaquin River and other channels such as Fisherman's Cut, False River, and Dutch Slough.

Operations and Maintenance with the Proposed Project

No operational features are associated with the proposed drought salinity barrier; it is designed to be fully functional once installed. Because the drought salinity barrier would be in place only temporarily, maintenance would be minimal or nonexistent. However, DWR would inspect the barrier weekly and would inform the permitting agencies (CDFW, USACE, and USFWS, and NMFS through USACE) should any major maintenance activities be required. DWR would maintain the navigational aids (e.g., signage, lights, buoy lines) while the drought salinity barrier is in place.

2.4.2 Notch in the Drought Salinity Barrier (Applicable to Installation Scenario 2)

DWR may construct a notch (or partial opening) in the middle portion of the drought salinity barrier if it is left in place for two consecutive years.[2] The notch would be 400 feet wide and would have an invert at -12 feet NAVD88 with a 3:1 slope (**Figure 2-4**). The partial opening is designed to allow fish passage and boat navigation through West False River between January and March while maintaining the ability to reestablish the barrier expediently, hence protecting the beneficial uses summarized in Section 1.2, "Project Background," in DEIR Chapter 1.

Notching Schedule

The drought salinity barrier would remain in place until the beginning of January, when the contractor would begin removing embankment rock from the center of the barrier. This coincides with the time when higher flows through the system are expected and the need for protection by the barrier is not as critical. Notching of the barrier would take one to two weeks.

If drought conditions persist through the spring, DWR would potentially re-close the barrier as early as the first week of April, reversing the barrier modification back to the original design for complete closure of the barrier in place until the fall, and the embankment rock would be removed in November. If hydrologic conditions improve and DWR determines that the barrier is no longer needed, then after a meeting to confer with the permitting agencies, the barrier may be removed before November 30 to minimize any potential effects.

Notching Construction Methodology

Barrier modification activities for the notch, beginning in January of the year after the barrier is installed, may require DWR contractors to use multiple barges with excavators, cranes, and work boats. DWR contractors would strategically place the material scow adjacent to the barrier to excavate the rock. Barge-mounted cranes with clamshell or dragline buckets and/or excavators would excavate the rock and place it on an available barge. Rock removal would begin at the center of the channel and work toward the levees. Excavation would occur from the top of the barrier down to approximately 12 feet deep, and 200 feet outward in either direction from the channel centerline, for a total modification width of 400 feet.

[2] Note that even if the drought salinity barrier is left in place for two consecutive years, a notch may not be constructed, as indicated for Installation Scenario 1 in Table 2-2. Potential indicators that no notch should be constructed are identified in Section 2.4.

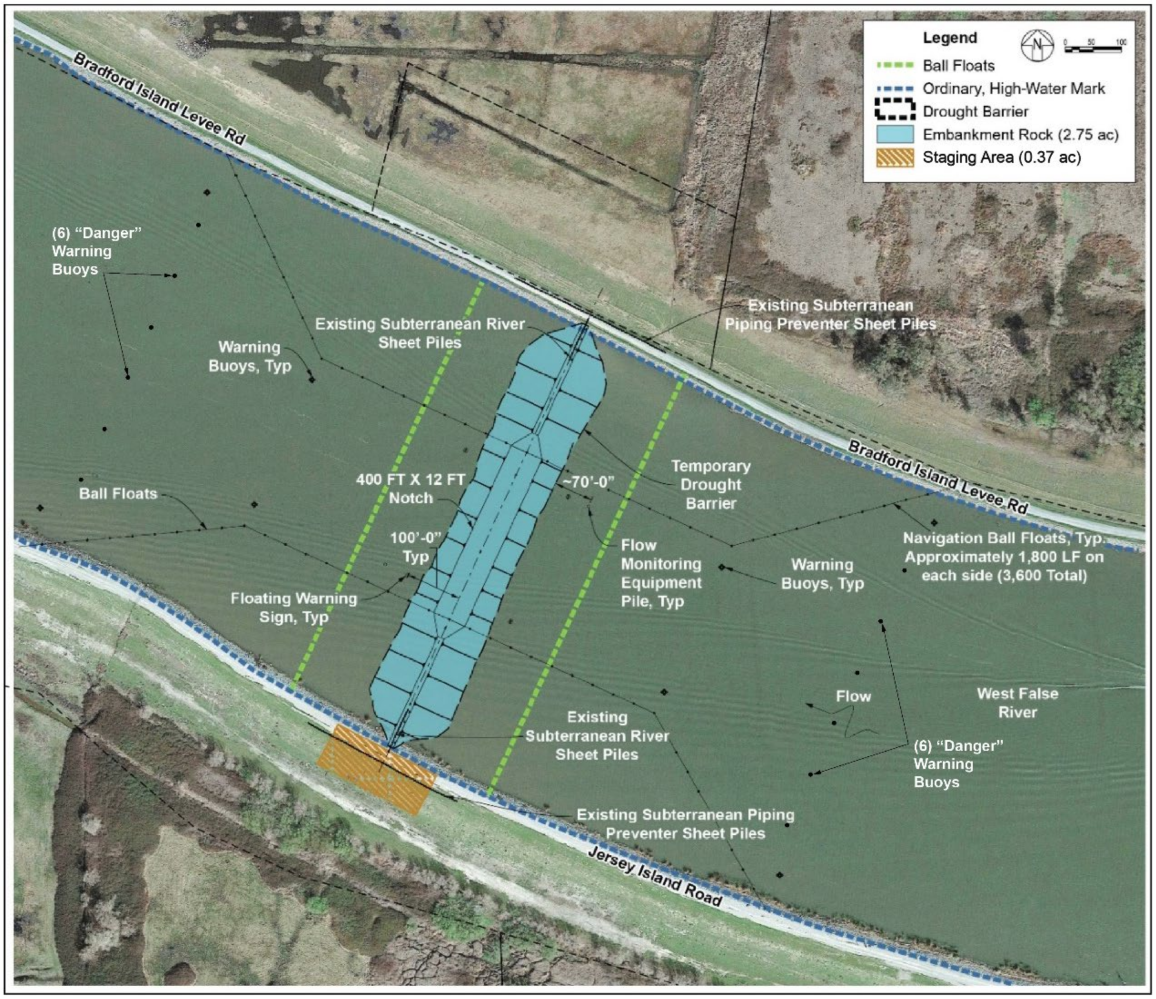


Figure 2-4
Drought Salinity Barrier Notch Design

DWR contractors would transport the rock on barges from the barrier site to either the Weber stockpile site or the Rio Vista stockpile site (shown in Figure 2-3). As was done in 2022, the contractor may store rock excavated from the notch on material barges and or dump scows rather than returning the material to one of the stockpiles.

Table 2-4 identifies the types of construction equipment that would likely be used during the removal of embankment rock for the notch, and **Table 2-5** identifies the types of equipment expected for rock placement back at the Weber or Rio Vista facility. **Table 2-6** lists the quantities of materials associated with construction of the notch. The actual equipment used would depend on the contractor selected and the availability of equipment.

Fencing installed on the levees near the embankment rock to prevent trespassers and structures (e.g., bird spikes) intended to impede ground squirrel movement, which were installed with the barrier in April, would remain in place until the barrier is completely removed. The float lines, signs, and warning buoys on both sides of the barrier would also remain in place until the barrier is completely removed.

TABLE 2-4
CONSTRUCTION EQUIPMENT TO BE USED FOR EMBANKMENT ROCK REMOVAL

Type of Equipment
Crane barges (3)
CAT 390 excavators (2)
CAT 345 excavator
Lattice boom crane
Derrick barge
Water truck (2,000-gallon)
End dump trucks (6)
CAT backhoe
Work boats (2)
Material scows (4)
980 loaders (3)
Crew boat
Skiffs (2)
Tugboats (2)
CAT 140G motor grader (1)

NOTE: Construction equipment may vary based on site conditions and contractor selection.

SOURCE: Data provided by DWR in 2021

TABLE 2-5
CONSTRUCTION EQUIPMENT TO BE USED FOR
EMBANKMENT ROCK PLACEMENT AT THE WEBER OR RIO VISTA STOCKPILE SITE

Type of Equipment
Compactor
Scraper
Water pull
Dozer
Water truck (2,000-gallon)
Motor grader
CAT backhoe
CAT 345 excavator (1)
980 loaders (2)

NOTE: Construction equipment may vary based on site conditions and contractor selection.

SOURCE: Data provided by DWR in 2021

TABLE 2-6
QUANTITIES OF MATERIALS REQUIRED FOR NOTCH CONSTRUCTION

Item	Quantity	Description
Warning buoy	8 each	N/A
Floating warning signs	4 each	N/A
Flow monitoring equipment pile	2 each	12-inch-diameter, 60-foot-long steel pipe.
Navigational ball floats	3,600 lineal feet	N/A
2.5-foot by 2.5-foot by 1.25-foot concrete and steel anchor block (0.289 cy)	52 each	Anchors placed every 100 lineal feet along ball float lines. One anchor block for each warning buoy. Two anchor blocks for each floating warning sign.
Removal of rock barrier	Approx. 13,000 cy	N/A

NOTE: Approx. = approximately; cy = cubic yards; N/A = not applicable

SOURCE: Data provided by DWR in 2021

Provisions for Navigation and Fish Movement with the Notched Barrier

The notched drought salinity barrier is designed to allow both fish passage and vessel navigation through West False River, not requiring alternative routes around West False River. To facilitate fish passage and navigation, DWR developed the notch modification design in the barrier by analyzing peak velocities expected to occur through the modified barrier. Through hydrodynamic modeling, it was determined that a 400-foot-wide by 12-foot-deep notch would achieve desirable velocities for both fish passage and safe vessel traffic through West False River.

Vessel traffic through West False River would not be blocked at the project site with the notched barrier. However, as under the proposed project, alternative routes are available for deep-draft vessels unable to pass through the modified barrier.

Because a large portion of the barrier would remain in place, DWR would maintain signs on each side of the barrier and float lines with orange ball floats to guide boaters away from approaching the barrier. Solar-powered warning buoys with flashing lights would be installed on the barrier crest to prevent nighttime accidents. DWR would also post signs at upstream and downstream entrances to the waterway or other key locations, informing boaters of the restricted access. Navigation signage would comply with the requirements set forth by the U.S. Aids to Navigation System and the California Waterway Marker System, as appropriate. Additional signage and aids to navigation would be provided to safely guide boaters as they approach and navigate through the notch in the barrier.

DWR would coordinate with U.S. Coast Guard District 11 and the California Department of Parks and Recreation, Division of Boating and Waterways, regarding procedures for safe vessel passage. DWR or the contractor would post a notice to mariners, which would include information about the location, date, and duration of channel modifications, and would provide copies of the notice to marinas throughout the Delta.

Operations and Maintenance with the Notched Barrier

No operational features are associated with the proposed notched drought salinity barrier; it is designed to be fully functional when in place. Because the barrier would be in place only temporarily, maintenance would be minimal or nonexistent. However, DWR would inspect the barrier weekly and would inform the permitting agencies (CDFW, USFWS, and NMFS) should any scour occur or major maintenance activities be required (see Mitigation Measure HYDRO-1 in Section 3.5, "Hydrology and Water Quality," for information about the inspection process). DWR would also maintain the navigational aids (e.g., signage, buoy lines) while the drought salinity barrier is in place.

Notched Barrier Closure

To close the notched portion of the barrier, DWR contractors would mobilize their equipment and crew, establish a staging area adjacent to Jersey Island Road (i.e., on the left bank), and install silt and exclusion fencing. The staging area would be used only for parking, portable toilets, and a job trailer. Next, the contractors would transport the embankment rock via barges from DWR's Weber stockpile site to West False River.

DWR contractors would begin placing rock into West False River with a dump scow or barge-mounted cranes, or both, equipped with clamshells and/or dragline buckets. Rock would be placed to backfill the area modified in January. With barge-mounted cranes using clamshell and dragline buckets, the DWR contractors would place the rock in a trapezoid shape and would fill from the left and right banks, working toward the center of the barrier. They would use a barge-mounted crane to place concrete and steel anchor blocks (approximately 9 square feet each) for the warning signs and buoy lines. For construction activities during non-daylight hours, contractors would use light plants, situated on the levees and/or barges, as needed. Lighting would be directed downward toward construction activities to the extent practical.

After construction, DWR contractors would demobilize from the site and regrade the staging area and dirt access road to preconstruction conditions. **Table 2-7** identifies the types of construction equipment that would likely be used for the stockpile operations and embankment rock placement. The actual equipment used would depend on the contractor selected and the availability of equipment.

2.4.3 Barrier Removal (Applicable to Installation Scenarios 1, 2, and 3)

Barrier Removal Schedule

The embankment rock would be removed no later than November 30 in either the same year it was installed or the subsequent year. Late November coincides with the start of the rainy season, when freshwater runoff typically occurs and flood risk increases. Initial ground disturbance activities, such as mobilization and reinstallation of exclusion fencing, would occur before October to prevent giant garter snakes from entering the staging area. Given the volume of embankment rock, DWR anticipates that removal could occur continuously (24 hours per day, 7 days per week) for up to 60 days.

TABLE 2-7
CONSTRUCTION EQUIPMENT TO BE USED FOR STOCKPILE OPERATIONS AND EMBANKMENT ROCK PLACEMENT TO FILL THE NOTCH

Type of Equipment
Crane barges (4)
Dump scows (2)
Radial stackers (2)
CAT 345 excavator (1)
980 loaders (2)
End dump trailers (40)
Derrick barge
Tugboats (5)
Water truck (2,000-gallon)
Skiffs (7)
Survey boat
Crew boat

NOTE: Construction equipment may vary based on site conditions and contractor selection.

SOURCE: Data provided by DWR in 2021

DWR has a contingency plan that it may use for expeditious removal of the barrier if DWR determines that hydrologic conditions have improved. Upon execution of the contingency plan, the entire barrier would be removed within 45–60 days. DWR would also expeditiously remove the barrier if needed in response to a Delta flood, seismic event, or other emergency. Before executing the removal contingency plan, DWR would confer with all applicable permitting agencies on the timing of removal and methods of minimizing impacts.

DWR has developed two indicators that would need to be met for DWR to consider initiating early removal activities:

- *Reservoir Storage Indicator:* Combined storage in Lake Oroville and Lake Shasta reaches 7.5 million acre-feet or greater by April 30.
- *Northern Sierra Precipitation 8-Station Index Indicator:* Cumulative precipitation reaches 73 inches before April 30.

Barrier Removal Construction Methodology

First, DWR contractors would mobilize their construction equipment and crew. **Tables 2-8** and **2-9** identify the types of construction equipment that would likely be used for removal of the drought salinity barrier and for embankment rock placement back at the stockpile site. The actual equipment used would depend on the contractor selected and the availability of equipment. DWR contractors would use multiple barges with excavators, cranes, and work boats that would be transported on the water to the drought salinity barrier site. In-water work would likely occur on both sides of the barrier (e.g., barge-mounted cranes operating upstream and downstream).

TABLE 2-8
CONSTRUCTION EQUIPMENT TO BE USED FOR EMBANKMENT ROCK REMOVAL AT THE DROUGHT SALINITY BARRIER SITE

Type of Equipment
Derrick barge (1)
CAT 390 excavators (2)
CAT 345 excavators (1)
Lattice boom crane (1)
Water truck (2,000-gallon)
End dump trucks (6)
CAT backhoe (1)
Material scows (4)
980 loaders (3)
Tugboats (3)

NOTE: Construction equipment may vary based on site conditions and contractor selection.
SOURCE: Data provided by DWR in 2021

TABLE 2-9
CONSTRUCTION EQUIPMENT TO BE USED FOR EMBANKMENT ROCK PLACEMENT AT THE STOCKPILE SITE

Type of Equipment
Compactor
Scraper
Water pull
Dozer
Water truck (2,000-gallon)
Motor grader
CAT backhoe
CAT 345 excavator (1)
980 loaders (2)

NOTE: Construction equipment may vary based on site conditions and contractor selection.
SOURCE: Data provided by DWR in 2021

Next, DWR contractors would strategically place a material scow adjacent to the barrier to excavate the rock. Barge-mounted cranes with clamshell or dragline buckets and/or excavators would excavate the rock and place it on an available barge. To prevent levee scour, rock removal would begin at the center of the channel and work toward the levees. Excavation would occur from the top of the barrier down to approximate pre-project streambed contours. The contractors would restore the levee geometry to ensure compliance with the requirements of any local maintaining agency. DWR would conduct bathymetric surveys before and immediately after barrier removal to confirm that all exposed rock has been removed. This process may need to be repeated to ensure the removal of all embankment rock. The elevation of the channel bottom would be restored, although some rock that has settled below the mudline would not be removed.

DWR contractors would transport the rock on barges from the project site to an off-loading site, where it would be transferred onto dump trucks using conveyors, excavators, and loaders and then hauled to a stockpile location (outside of waters of the United States). The operation may vary based on the stockpile location used.

Upon the complete removal of the rock barrier, DWR contractors would remove the concrete and steel anchor blocks, float lines, signs, and warning buoys. Because the buoys and signs would be anchored by concrete and steel blocks, the contractors would remove these structures using barge-mounted cranes. As directed by DWR, the contractors would be required to store the material at a stockpile location.

Disturbed upland areas would be restored after the barrier is completely removed. The affected areas would be restored to approximate pre-project conditions and revegetated as appropriate (e.g., via hydroseeding). Any levee access roads damaged by construction equipment or truck use would be restored to preconstruction conditions or better after construction is completed.

Removal of the drought salinity barrier would require a construction crew of approximately 21 people.

2.4.4 Installation and Removal of the Drought Salinity Barrier within the Same Year (Applicable to Installation Scenario 3)

If hydrologic conditions improve and DWR determines that the barrier is no longer needed, it may be removed sooner than proposed under Installation Scenarios 1 and 2, no later than November 30 of the same year in which it was installed. The design, installation schedule, construction methodology, and operations and maintenance would be the same as previously described for the proposed project in Sections 2.4.1 and 2.4.3. If it would be removed within the same year, the drought salinity barrier would not be designed to allow fish passage because the project schedule is generally outside the period of concern for salmonids and delta smelt.

2.4.5 Water Quality Monitoring Station Installation

In 2015, a network of water quality and flow stations was established to evaluate how the EDB affected flow, water quality, and biological constituents in the Central and North Delta (California Department of Water Resources 2019). Concurrently with the next installation of the drought salinity barrier, DWR would install additional water quality and/or flow monitoring stations in San Joaquin County, in Woodward Cut (one monitoring station) and Railroad Cut (two monitoring stations) (Figure 2-3). The stations would be installed on three new 12-inch-diameter steel pipe piles. First, the piles would be driven to a maximum depth of up to 40 feet, using a vibratory pile driver. The water quality and flow monitoring equipment would then be mounted on the piles. Navigational aids would be installed at the stations as needed. The stations would be able to monitor electrical conductivity, turbidity, dissolved oxygen, chlorophyll, nutrients, bromide, and organic carbon, and would be left in place after removal of the drought salinity barrier.

The expanded monitoring network would increase the amount of water quality data for the Central Delta and allow further evaluation of the associated changes in water quality and flow resulting from the proposed project. DWR would visit the stations every three to four weeks to clear away any surrounding vegetation and algal growth and replace equipment as needed. The monitoring stations would remain in place for continued in-situ water quality monitoring beyond the installation and period of time when the drought salinity barrier is in place. An updated water quality monitoring plan that would include details on new equipment locations, monitoring protocol, and data collection frequency would be submitted for final approval by the State Water Board.

2.5 Protective Environmental Measures

DWR would implement the following protective environmental measures as part of the proposed project to assist in minimizing the potential environmental impacts of the project.

2.5.1 Prepare and Implement a Water Quality Control Plan

A water quality control plan will be prepared before the start of ground-disturbing construction activities. The plan will be developed with site-specific measures to control erosion, reduce the likelihood of spills, and control sedimentation, dust, and runoff. The plan will identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline procedures to be followed in case of a spill of a hazardous material. The plan will require that hazardous and potentially hazardous substances being stored on site be kept in securely closed containers located away from drainage courses, storm drains, and areas where stormwater is allowed to infiltrate. It will also stipulate procedures to minimize hazards during on-site fueling and servicing of construction equipment. Finally, the plan will require that users of adjacent land be notified immediately of any substantial spill or release.

The measures in the plan will be implemented to minimize the potential for erosion and sedimentation during barrier construction and removal.

2.5.2 Conduct a Worker Environmental Awareness Program

Construction workers will participate in a worker environmental awareness program that addresses species under the jurisdiction of the permitting agencies (CDFW, USFWS, and NMFS). Workers will be informed that listed and other protected species and their habitats may be present, and that unlawful take of these species or destruction of their habitats is a violation of the federal Endangered Species Act (ESA), California Endangered Species Act (CESA), and/or Migratory Bird Treaty Act. Before the start of construction, a qualified biologist approved by the permitting agencies will instruct all construction workers about the life histories of the protected species and the terms and conditions of the applicable biological opinions, CESA incidental take permit, and other regulatory permits that include biological resources protection measures. Proof of this instruction will be submitted to the permitting agencies upon request.

2.5.3 Conduct Biological Monitoring

A qualified biologist will perform daily biological monitoring during all construction and barrier removal activities conducted during daylight hours and during terrestrial work conducted during nighttime hours, as appropriate. Biological monitors will observe for sensitive species and coordinate with an on-call USFWS-approved biologist in the event that listed species require handling and relocation. The qualifications of the biologist(s) will be presented to the permitting agencies for review and approval before construction activities begin at the project site. The complete set of permitting documents, along with a USFWS-approved giant garter snake relocation plan, will be available on site during construction. The biologist(s) will be given the authority to stop work that may result in the take of a listed species exceeding the limits identified by the permitting agencies in any permitting document (biological opinions, CESA incidental take permit), or if any such take occurs. Should the biologist(s) exercise this authority, the permitting agencies will be notified by telephone and electronic mail within one working day.

A report of daily records from monitoring activities and observations will be prepared and provided to the permitting agencies upon completion of project activities.

2.5.4 Install In-Water Navigational Buoys, Lights, and Signage

Navigational buoys, lights, and signage will be installed in West False River upstream and downstream of the drought salinity barrier, and near Fisherman's Cut, to advise boaters of the presence of the drought salinity barrier and maintain navigation along both waterways. Temporary floating signs and buoys will be anchored to the bottom with cables and concrete and steel anchor blocks. DWR will coordinate with the U.S. Coast Guard on signage and buoys and provide notice to marinas.

2.5.5 Limit Land-Based Access Routes and Construction Area

The number of land-based access routes and size of the construction area will be limited to the minimum necessary. Access routes will be restricted to established roadways and speed limits will be enforced by site safety officers. Construction area boundaries will be clearly demarcated.

2.5.6 Minimize Wildlife Attraction

To minimize the attraction of wildlife to the project site, all food-related trash items, such as wrappers, cans, bottles, and food scraps, will be disposed of in closed containers and removed from the site on a daily basis.

2.6 Regulatory Requirements, Permits, and Approvals

As the lead agency, DWR has the principal responsibility for approving and carrying out the proposed project and for ensuring that the requirements of CEQA are met. The following permitting agencies may also have permitting approval or review authority over portions of the proposed project (including the three installation scenarios). The type of permit or approval that may be required from each agency to implement the proposed project is also listed:

- *NMFS:* Fish and Wildlife Coordination Act, ESA Section 7 formal consultation.
- *USFWS:* Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, ESA Section 7 formal consultation.
- *USACE:* Clean Water Act Section 404 standard (individual) permit, Rivers and Harbor Act Section 10 permit.
- *U.S. Coast Guard:* Notice to mariners and private aids to navigation.
- *CDFW:* California Fish and Game Code Section 1602 streambed alteration agreement, CESA Section 2081 incidental take permit.
- *California State Lands Commission:* Lease agreement or consistency determination with existing memorandum of understanding for SWP facilities.
- *State Water Board/Central Valley Regional Water Quality Control Board:* Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.), Clean Water Act Section 401 water quality certification.
- *State Historic Preservation Officer:* National Historic Preservation Act Section 106 compliance and Public Resources Code Section 5024 clearance.
- *Delta Stewardship Council:* Certification of consistency.
- Reclamation District 2059: Encroachment permit.
- Reclamation District 830: Lease agreement.

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 the draft environmental impact report (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:

- Section 3.2: Air Quality and Greenhouse Gas Emissions
- Section 3.3: Biological Resources
- Section 3.4: Cultural Resources
- Section 3.5: Hydrology and Water Quality
- Section 3.6: Recreation
- Section 3.7: Tribal Cultural Resources

Other resource topics were evaluated in the Initial Study Environmental Checklist, where the West False River Drought Salinity Barrier Project (proposed project) was determined to result in either no impact or less-than-significant impacts; therefore, those topics are not evaluated further in this DEIR. A summary of the analysis relative to these other resource topics is provided in Section 1.3.2, "Initial Study Environmental Checklist," in DEIR Chapter 1 and in the Initial Study Environmental Checklist (**Appendix B**).

Climate change is discussed in Chapter 4, "Climate Change and Resiliency," consistent with the recommendations in the California Department of Water Resources' (DWR's) Climate Action Plan (California Department of Water Resources 2018).

3.1.2 Section Format

Each section contains the following elements:

- Introduction to the analysis contained in the section
- Environmental setting
- Regulatory setting

- Methods of analysis
- 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 proposed project. The setting discussion is followed by a discussion of impacts and mitigation measures.

As described in Chapter 2, "Project Description," the proposed project analyzed in this DEIR includes three potential installation scenarios (see Table 2-2) that could occur up to two times within 10 years, including consecutive years, should a drought occur during the 2023–2032 period. Impacts associated with each installation scenario are discussed individually or in groups, as applicable, in the "Impacts and Mitigation Measures" section of each resource section.

The project sites discussed in Chapter 2 include the West False River drought salinity barrier site, the Rio Vista off-loading and stockpile sites, the Weber off-loading and stockpile sites, and the three new water quality monitoring locations in Woodward Cut and Railroad Cut. The Rio Vista off-loading site (Figure 2-3 in Chapter 2) is not owned or operated by DWR. Because this site is independently operated and permitted, project-related activities at the Rio Vista off-loading site are not evaluated in the resource sections. The DEIR evaluates project-related activities at the West False River drought salinity barrier site, DWR's Rio Vista stockpile site and Weber off-loading and stockpile sites, and the three new water quality monitoring locations.

A summary table precedes each discussion of impacts and mitigation measures. The summary table lists the potential impacts identified for the proposed project and the significance conclusions for those impacts with implementation of mitigation measures, as applicable. Impact analyses 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 Baseline

An environmental impact report (EIR) must include a description of the physical conditions in the project's vicinity, often referred to as the "baseline." Lead agencies refer to the baseline when determining whether a project's impact is significant. Pursuant to *Guidelines for Implementing the California Environmental Quality Act* (State CEQA Guidelines) Section 15125(a), generally, the baseline should consist of conditions that exist at the time the notice of preparation (NOP) is published (for the proposed project, the NOP was published February 23, 2022). Where existing conditions change or fluctuate over time, and where necessary to provide the most accurate picture practically possible of the project's impacts, a lead agency may define existing conditions by referencing either historic conditions or conditions expected when the project becomes operational, or both, that are supported by substantial evidence (State CEQA Guidelines Section 15125(a)(1).

When the NOP for the proposed project was published in February 2022, the 2021–2022 emergency drought barrier (EDB) (with a notch) was in place in West False River; the 2021–2022 barrier is planned for complete removal by November 30, 2022. The baseline used in this DEIR for analyzing the effects of the proposed project consists of conditions in West False River without the barrier in place (i.e., no rock barrier restricting flows through West False River). Although the 2021–2022 EDB was in place when the NOP was published, use of the non-barrier conditions baseline will allow for a more conservative analysis of effects.

3.1.4 Impacts and Mitigation Measures

Each impact discussion includes the following elements:

- 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.
- Identification of relevant mitigation measures, if appropriate.
- 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 3.7.

3.1.5 Terminology

This DEIR uses the following terminology:

- **Thresholds of Significance:** The thresholds of significance are the set of criteria used by DWR to determine the level or "threshold" at which an impact would be considered significant (State CEQA Guidelines Section 15064.7). Thresholds of significance used in this EIR include those discussed in Appendix G of the State CEQA Guidelines; criteria based on factual or scientific information; criteria based on the regulatory standards of federal, state, and local agencies; and criteria 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 is considered less than significant if it does not reach the threshold of significance (State CEQA Guidelines Section 15064.7) and would therefore cause no substantial change in the environment (no mitigation required).
- **Significant Impact:** An impact is considered significant if it would result in a substantial adverse change in the physical conditions of the environment (State CEQA Guidelines Section 15382). Significant impacts are identified by evaluating the effects of the proposed project 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 is considered significant and unavoidable if it would result in a substantial adverse change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level if the proposed project is implemented.

Findings of Fact and a Statement of Overriding Considerations would be adopted for impacts that cannot be mitigated (State CEQA Guidelines Sections 15091 and 15093).

- **Cumulative Impacts:** Cumulative impacts refer to 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:** State CEQA Guidelines Section 15370 defines mitigation as all of the following actions:

  - Avoiding the impact altogether by not taking a certain action or parts of an action.
  - Minimizing impacts by limiting the degree of magnitude of the action and its implementation.
  - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
  - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
  - Compensating for the impact by replacing or providing substitute resources or environments.

3.2 Air Quality and Greenhouse Gas Emissions

3.2.1 Introduction

This section describes the air quality and greenhouse gas (GHG) emissions setting for the region and project vicinity; summarizes the regulatory setting for the proposed project; and evaluates the potential for project construction activities to result in impacts on air quality and GHG emissions.

No comment letters regarding air quality and GHG emissions were received in response to the notice of preparation (see **Appendix A**).

3.2.2 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 proposed West False River drought salinity barrier would be located in Contra Costa County; the Rio Vista and Weber stockpile sites would be in Solano and San Joaquin counties, respectively; the three new water quality monitoring stations would be in San Joaquin County; and barges transporting rock would travel through Sacramento County. Portions of these counties are located within the San Francisco Bay Area Air Basin (SFBAAB), San Joaquin Valley Air Basin (SJVAB), and Sacramento Valley Air Basin (SVAB). The SFBAAB includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties; the southern portion of Sonoma County; and the southwestern portion of Solano County. The SJVAB includes San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare counties, and the western portion of Kern County. The SVAB includes Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties; the western portion of Placer County; and the eastern portion of Solano County.

Although the West False River drought salinity barrier site itself is in Contra Costa County within the SFBAAB, the rock used for barrier construction could be sourced either from a commercially operated quarry located near San Rafael in Marin County or from DWR's Rio Vista or Weber stockpile site. Rock would be transported to the project site via barges. Upon removal of the drought salinity barrier, the rock would be transported to the Rio Vista stockpile site located in Solano County or the Weber stockpile site in Stockton. The entire barge trip route from the San Rafael quarry to the barrier site is assumed to occur within the SFBAAB. Approximately 7.5 miles of the 11-mile outbound barge trip from the barrier site to the Rio Vista stockpile site are assumed to traverse Sacramento County and the remainder of the trip would occur within the SFBAAB. The Rio Vista stockpile site is in the portion of Solano County that lies within the SVAB. Ten miles of the 28-mile outbound barge trip from the barrier site to the Weber stockpile site in Stockton would occur within the SFBAAB and the remaining 18 miles would occur within the jurisdiction of the SJVAB. The proposed project would also include the installation of three water quality monitoring stations in San Joaquin County, located in the SJVAB.

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays that distort normal wind flow patterns. The Coast Ranges, which trend northwest along the western side of the SFBAAB, have two major open areas—at the Golden Gate Bridge and the Carquinez Strait—that allow air to flow into and out of the SFBAAB and the Central Valley. During the summer, temperature inversions can cause pollutant concentrations to build to unhealthy levels because of the lack of dispersion, and winds from the northwest are drawn inland through the bay at the Golden Gate Bridge and over the lower portions of the San Francisco Peninsula. In winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in low potential for air pollution. The Pacific high-pressure cell periodically becomes dominant, bringing strong inversions, light winds, and high pollution potential (Bay Area Air Quality Management District 2017a).

The SVAB is relatively flat, bordered by mountains to the east, west, and north. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Delta, bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Periods of dense, persistent low-level fog that are most prevalent between storms are characteristic of SVAB winter weather. From May to October, the region’s intense heat and sunlight lead to high ozone concentrations. Summer inversions are strong and frequent, but are less severe than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not adequately disperse air pollutants.

The SJVAB is the southern half of California’s Central Valley. The climate of the SJVAB is modified by topography, which is in the shape of a bowl surrounded by mountains on three sides and open to the Sacramento Valley and the San Francisco Bay Area to the north. This creates climatic conditions that are particularly conducive to air pollution formation (San Joaquin Valley Air Pollution Control District 2015).

Criteria Air Pollutants

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. These pollutants are called “criteria air pollutants” because EPA 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 (NO_2), sulfur dioxide (SO_2), 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.

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.

Particulate Matter

PM_{10} and $PM_{2.5}$ are 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). PM_{10} 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 humans' breathing passages. This large dust is of more concern as a soiling nuisance than as a health hazard. The remaining fractions, PM_{10} 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 PM_{10} and $PM_{2.5}$ because their immune and respiratory systems are still developing.

Nitrogen Dioxide

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

Other Criteria Air Pollutants

SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of PM, atmospheric sulfate, and atmospheric sulfuric acid that could precipitate downwind as acid rain. According to EPA, short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease.

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

In addition to the above pollutants, California regulates emissions of hydrogen sulfide, sulfates, visibility-reducing particles, and vinyl chloride; however, these are not considered relevant to the proposed project.

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 (California Air Resources Board 1998). 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 1 million in 1990 to 540 in 1 million in 2000, but it still remains the highest risk to California’s ambient air quality.

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.

Greenhouse Gases

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperatures. A portion of the solar radiation that enters Earth's atmosphere is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. Infrared radiation (i.e., thermal heat) is absorbed by GHGs; as a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth.

"Climate change" is the name given to the increase in the average temperature of Earth's near-surface air and oceans since the mid-20th century. Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. As discussed above, some GHGs occur naturally and are necessary to keep Earth's surface habitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have reduced the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in an increase in global average temperature. GHG emissions associated with human activities are highly likely to be responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (Intergovernmental Panel on Climate Change 2013).

The principal GHGs are carbon dioxide (CO_2), methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, the potential heat-trapping ability of each of these gases varies significantly from the others. For example, methane is 25 times as potent as CO_2, whereas sulfur hexafluoride is 22,800 times as potent as CO_2. Conventionally, GHGs are reported in units of CO_2 equivalents (CO_2e). This approach takes into account the relative potency of non-CO_2 GHGs, converting their quantities to an equivalent amount of CO_2, so that all GHG emissions can be reported as a single comparable quantity. In emissions inventories, GHG emissions are typically reported as metric tons (MT) of CO_2e. CO_2e is calculated as the product of the mass emitted of a given GHG and its specific global warming potential. While methane and nitrous oxide have much higher global warming potentials than CO_2, CO_2 is emitted in higher quantities and accounts for the majority of GHG emissions in CO_2e, both from commercial developments and from human activity in general.

The primary human-made processes that release these gases are the burning of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release methane, such as livestock grazing and decomposition of crop residue; and industrial processes that release smaller amounts of high-global-warming-potential gases, such as sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. Deforestation and land cover conversion have also been identified as contributing to climate change by reducing the earth's capacity to remove CO2 from the air and altering its albedo (or surface reflectance), allowing more solar radiation to be absorbed.

Although climate change has regional and local impacts, those impacts are caused by global increases in emissions, not specifically from emissions in the region of the proposed project. Accordingly, the significance determinations for the proposed project's GHG emissions are framed in terms of impacts on global climate change. See also Chapter 4, *Climate Change and Resiliency*.

Air Quality in the Project Area

The ambient air monitoring network throughout California consists of monitoring stations operated by federal, State, and local agencies. These entities operate more than 250 air monitoring stations throughout the state and along the California/Mexico border.

The nearest ambient air quality monitoring station to the site of the proposed drought salinity barrier is located at 5551 Bethel Island Road, Oakley, approximately 3.6 miles to the south. This station monitors ozone, NO_2, and PM_{10}. **Table 3.2-1** shows a five-year summary of monitoring data (2016 through 2020) for these pollutants from the Bethel Island monitoring station.

Greenhouse Gas Emissions Inventories

U.S. Greenhouse Gas Emissions

In 2019, the United States emitted about 6,558 million MT of CO_2e ($MMTCO_2e$), with 76 percent of those emissions coming from fossil fuel combustion for electricity, heat, and transportation. Of the major sectors nationwide, transportation accounts for the highest volume of GHG emissions (approximately 29 percent), followed by electricity (25 percent), industry (23 percent), commercial and residential (13 percent), and agriculture (10 percent). Between 1990 and 2019, total U.S. GHG emissions increased by 1.8 percent, but emissions generally decreased after peaking in 2007 (U.S. Environmental Protection Agency 2021).

TABLE 3.2-1
SUMMARY OF AIR QUALITY DATA FOR THE PROJECT AREA

Pollutant	Standard	2016	2017	2018	2019	2020
Ozone						
Highest 1-Hour Average		0.089	0.09	0.093	0.082	**0.107**
Days Exceeding State Standard	0.09 ppm	0	0	0	0	1
Highest 8-Hour Average		**0.08**	**0.071**	**0.078**	**0.072**	**0.085**
Days Exceeding National Standard	0.07 ppm	2	1	1	1	2
Days Exceeding National Standard	0.07 ppm	2	1	1	1	2
Respirable Particulate Matter (PM_{10})						
Highest 24-Hour Average		26.0/25.5	**52.0**/52.1	**151.0**/142.9	**57.0**/54.7	40.0/38.6
Measured Days Exceeding State Standard	50 $\mu g/m^3$	0	1	2	2	0
Measured Days Exceeding National Standard	150 $\mu g/m^3$	0	0	0	0	0
Annual Average—State Standard	20 $\mu g/m^3$	–	–	–	15.7	–
Nitrogen Dioxide (NO_2)						
Highest Hourly Average		32.1	34.2	42.6	29.8	29.8
Days over State Standard	180 ppb	0	0	0	0	0
Days over National Standard	100 ppb	0	0	0	0	0
Annual Average—State/National	30/53 ppb	5/5	5/5	5/5	4/4	4/5

NOTES: -- = data were not available; $\mu g/m^3$ = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million.

Bold values are in excess of applicable standard.

Number of days exceeded is for all days in a given year, except for particulate matter. Particulate matter 10 microns or less in diameter and 2.5 microns or less in diameter (PM_{10} and $PM_{2.5}$, respectively) are monitored every three days. Ozone, PM_{10}, and NO_2 monitoring data are from the Bethel Island monitoring station. The California Air Resources Board and U.S. Environmental Protection Agency use different methods to calculate the emissions for certain criteria air pollutants for comparisons to the state and national standards.

SOURCE: California Air Resources Board 2022a

California Greenhouse Gas Emissions

CARB compiles GHG inventories for the state. Based on the GHG inventory data from 2019 (the latest year for which data are available from CARB), emissions from GHG-emitting activities statewide were 418.1 $MMTCO_2e$ (California Air Resources Board 2021). California's net GHG emissions in 2019 were 13 $MMTCO_2e$ below 1990 emissions levels, which is the GHG emissions reduction target for 2020 identified in the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32; California Health and Safety Code, Division 25.5). **Table 3.2-2** identifies and quantifies statewide anthropogenic (human) GHG emissions and sinks (e.g., carbon sequestration resulting from forest growth) in 1990 and 2019. As shown in the table, the transportation sector is the largest contributor to statewide GHG emissions, at approximately 39.7 percent in 2019.

TABLE 3.2-2
STATE OF CALIFORNIA GREENHOUSE GAS EMISSIONS

Category	Total 1990 Emissions using IPCC SAR ($MMTCO_2e$)	Percent of Total 1990 Emissions[e] SAR/AR4	Total 2019 Emissions using IPCC AR4 ($MMTCO_2e$)	Percent of Total 2019 Emissions
Transportation	150.7	35%/35%	166.1	39.7%
Electric Power	110.6	26%/26%	58.8	14.1%
Commercial and Residential Fuel Use	44.1	10%/10%	43.8	10.5%
Industrial	103.0	24%/24%	88.2	21.1%
Recycling and Waste[a]	–	–	8.9	2.1%
High GWP/Non-specified[b]	1.3	<1%/<1%	20.6	4.9%
Agriculture/Forestry	23.6	6%/5%	31.8	7.6%
Forestry Sinks	-6.7		–[c]	–
Net Total (IPCC SAR)	**426.6**	**100%[e]**	–	–
Net Total (IPCC AR4)[d]	**431**	**100%**	**418.2**	**100%**

NOTES: AR4 = Fourth Assessment Report; GWP = global warming potential; IPCC = Intergovernmental Panel on Climate Change; $MMTCO_2e$ = million metric tons of carbon dioxide equivalent; SAR = Second Assessment Report

[a] Included in other categories for the 1990 emissions inventory.
[b] High-global-warming-potential gases are not specifically called out in the 1990 emissions inventory.
[c] Revised methodology under development (not reported for 2019).
[d] The California Air Resources Board revised the State's 1990 level greenhouse gas emissions using GWPs from the IPCC AR4.
[e] Values may not total to 100% due to rounding

SOURCES: California Air Resources Board 2007, 2021

San Francisco Bay Area Air Basin Greenhouse Gas Emissions

Based on 2015 data, in the nine-county San Francisco Bay Area, GHG emissions from the transportation sector represented the largest source of GHG emissions at 41 percent, followed by stationary industrial sources at 26 percent, electricity generation and cogeneration at 14 percent, and fuel use (primarily natural gas) by buildings at 10 percent. The remaining 8 percent of emissions is composed of fluorinated gas emissions and emissions from solid waste and agriculture. According to the Bay Area Air Quality Management District (BAAQMD), of the total transportation emissions in 2015, on-road sources accounted for approximately 87 percent, while off-road sources accounted for the remainder (Bay Area Air Quality Management District 2017b).

Sensitive Receptors

Air pollution 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.

There are no sensitive land uses in the vicinity of the West False River drought salinity barrier location or within 1,000 feet of the Rio Vista and Weber stockpile sites or the sites of the proposed water quality monitoring stations in Woodward Cut and Railroad Cut.

3.2.3 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 3.2-3 presents the current NAAQS and California ambient air quality standards (CAAQS) and briefly describes the principal sources for each pollutant.

TABLE 3.2-3
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	State Standards (CAAQS)[a]	Federal Standards (NAAQS)[b]
Ozone	1 hour	0.09 ppm	NA
	8 hours	0.070 ppm	0.070 ppm[c]
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm
	8 hours	9.0 ppm	9 ppm
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm
	Annual	0.03 ppm	0.053 ppm
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm
	24 hours	0.04 ppm	0.14 ppm
	Annual	NA	0.03 ppm
Particulate Matter (PM_{10})	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual[d]	20 $\mu g/m^3$	NA
Fine Particulate Matter ($PM_{2.5}$)	24 hours	NA	35 $\mu g/m^3$
	Annual	12 $\mu g/m^3$	12 $\mu g/m^3$
Lead	30 days	1.5 $\mu g/m^3$	NA
	Calendar quarter	NA	1.5 $\mu g/m^3$
	Rolling 3-month average	NA	0.15 $\mu g/m^3$
Sulfates	24 hours	25 $\mu g/m^3$	NA
Hydrogen Sulfide	1 hour	0.03 ppm	NA
Visibility-Reducing Particles	8 hours	–[e]	NA
Vinyl Chloride	24 hours	0.01 ppm (26 $\mu g/m^3$)	NA

NOTES: A = Attainment; N = Nonattainment; U = Unclassified; NA = Not Applicable, no applicable standard; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[a] CAAQS = California ambient air quality standards. CAAQS for ozone, CO (except Lake Tahoe), SO_2 (one-hour and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other State standards shown are values not to be equaled or exceeded.

[b] NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The eight-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the three-year average of the 98th percentile is less than the standard.

[c] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over three years, is equal to or less than 0.070 ppm. The U.S. Environmental Protection Agency made recommendations on attainment designations by October 1, 2017. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the ozone level in the area.

[d] State standard = annual geometric mean; national standard = annual arithmetic mean.

[e] Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

SOURCE: Bay Area Air Quality Management District 2017c

Under the 1990 federal Clean Air Act Amendments, the 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.

The SFBAAB is designated as a nonattainment area for the federal ozone $PM_{2.5}$ standards. It is considered an attainment area or unclassified for the other criteria pollutants (Bay Area Air Quality Management District 2017c).

The SVAB is designated as a nonattainment area for the federal eight-hour ozone standards and $PM_{2.5}$ 24-hour standard. For all other pollutants, the SVAB is designated as an attainment area or is unclassified.

The SJVAB is designated as an extreme nonattainment area with respect to the federal eight-hour ozone and $PM_{2.5}$ standards (San Joaquin Valley Air Pollution Control District 2022).

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 3.2-3, 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.

The SFBAAB is designated as a nonattainment area for the State ozone, PM_{10}, and $PM_{2.5}$ standards. It is considered an attainment area or unclassified with respect to other State ambient air quality standards (Bay Area Air Quality Management District 2017c).

The SVAB is designated as a nonattainment area for the State eight-hour ozone standards, the State one-hour ozone standard, and the State PM_{10} standards. The SVAB is designated as an attainment area or is unclassified with respect to all other State ambient air quality standards.

The SJVAB is designated as an extreme nonattainment area with respect to the State one-hour and eight-hour ozone, PM_{10} and $PM_{2.5}$ standards (San Joaquin Valley Air Pollution Control District 2022).

The California Clean Air Act requires air districts with exceedances of State air quality standards to prepare a plan documenting reasonable progress toward attainment, which is the responsibility of regional air pollution control districts and air quality management districts (discussed further below).

Toxic Air Contaminants

The California Health and Safety Code defines TACs as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a present or potential hazard to human health. The State Air Toxics Program was established in 1983 under AB 1807. A total of 243 substances have been designated as TACs under California law; they include the 187 (federal) hazardous air pollutants adopted in accordance with State law. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify, quantify, and evaluate risks from air toxics sources; however, AB 2588 does not regulate air toxics emissions.

California Air Resources Board Measures to Reduce Diesel Emissions

Following the designation of DPM emissions from diesel-fueled engines as a TAC, in 2000, CARB approved a comprehensive diesel risk reduction plan to reduce 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 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 by diesel-fueled commercial motor vehicles. In California, heavy-duty diesel vehicles with a gross vehicle weight rating of 10,000 pounds or heavier are prohibited from idling for more than five minutes. Exceptions to the rule apply for certain circumstances.

In 2008, CARB approved the Truck and Bus Regulation to reduce NO_X, PM_{10}, and $PM_{2.5}$ emissions from existing diesel vehicles operating in California. The requirements, amended in December 2010, apply to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating greater than 14,000 pounds.

In addition to limiting exhaust from idling trucks, CARB promulgated emissions standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation adopted by CARB on July 26, 2007, aims to reduce emissions by calling for installation of diesel soot filters and encouraging the retirement or replacement of older, dirtier engines, or repowering of such engines with newer emission-controlled models. Implementation is staggered based on fleet size (the total of all off-road horsepower under common ownership or control).

Commercial Harbor Craft Regulation

The Commercial Harbor Craft Regulation to reduce PM and NO_X emissions was approved by CARB in 2007 and amended in 2010. The regulation applies to all commercial harbor craft and stipulates the engine emissions tiers required for each different vessel type, by model year and use. The regulation provides a timeline that becomes increasingly stringent—effectively requiring that the California commercial harbor craft fleet become increasingly cleaner. In September 2021, CARB proposed amendments to the Commercial Harbor Craft Regulation that consider new compliance regulations extending beyond 2022.

Local

Bay Area Air Quality Management District

BAAQMD is the regional agency responsible for protecting public health and welfare by enforcing federal and State air quality laws and policies in the SFBAAB. The general procedures for assessing potential air quality impacts of projects and plans proposed in the SFBAAB are described in the *California Environmental Quality Act Air Quality Guidelines* published by BAAQMD (Bay Area Air Quality Management District 2017a). The guidelines also include recommended assessment methodologies and significance thresholds for air toxics, odors, and GHG emissions.

Bay Area CEQA Guidelines and Thresholds of Significance

The *BAAQMD CEQA Air Quality Guidelines* is an advisory document that provides lead agencies, consultants, and project proponents with procedures for assessing air quality impacts and preparing environmental review documents. The document describes the criteria that BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for use in determining whether projects would have significant adverse environmental impacts, identifies methods for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts.

BAAQMD updated its 1999 CEQA air quality guidelines in 2010. In May 2011, BAAQMD adopted an updated version of its thresholds of significance for use in determining the significance of projects' environmental effects under CEQA and published its CEQA guidelines for consideration by lead agencies. The 2011 BAAQMD CEQA air quality guidelines thresholds lowered the previous (1999) thresholds of significance for annual emissions of ROG, NO_X, and PM_{10}, and set a standard for $PM_{2.5}$. The 2011 BAAQMD CEQA air quality guidelines also include methods for evaluating risks and hazards for the siting of stationary sources and of sensitive receptors.

The BAAQMD resolution adopting the significance thresholds in 2010 and 2011 was set aside by the Alameda County Superior Court on March 5, 2012. On August 13, 2013, the California Court of Appeals issued a full reversal of the Superior Court's judgment, and on December 17, 2015, the California Supreme Court reversed in part the appellate court's judgment and remanded the case for further consideration consistent with the Supreme Court opinion. The California Supreme Court ruled unanimously that CEQA review is focused on a project's impact on the environment "and not the environment's impact on the project" (*California Building Industry*

Association v. Bay Area Air Quality Management District [December 17, 2015] 62 Cal.4th 369). The Supreme Court confirmed that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future residents or users." The court also held that when a project has "potentially significant exacerbating effects on existing environmental hazards," those impacts are properly within the scope of CEQA because they can be viewed as impacts of the project on "existing conditions" rather than impacts of the environment on the project.

BAAQMD most recently updated the *BAAQMD CEQA Air Quality Guidelines* in May 2017. These guidelines provide recommended quantitative significance thresholds along with direction on recommended methods of analysis. BAAQMD states that the quantitative significance thresholds are "advisory and should be followed by local governments at their own discretion," and that lead agencies are fully within their authority to develop their own thresholds of significance. However, BAAQMD offers these thresholds for lead agencies to use during their environmental review of development projects in the Bay Area. Lead agencies may also reference the *CEQA Thresholds Options and Justification Report* developed by BAAQMD staff in 2009. This option provides lead agencies with a justification for continuing to rely on the BAAQMD 2011 thresholds.

Bay Area Air Quality Management District Air Quality Plans

The federal Clean Air Act amendments require regional planning and air pollution control agencies to prepare regional air quality plans outlining the measures by which both stationary and mobile sources of pollutants can be controlled to achieve all standards specified in the Clean Air Act. The California Clean Air Act also requires the development of air quality plans and strategies to meet state air quality standards in areas designated as nonattainment (with the exception of areas designated as nonattainment for the State PM standards). Maintenance plans are required for attainment areas that had previously been designated nonattainment to ensure continued attainment of the standards.

For State air quality planning purposes, the SFBAAB is classified as a serious nonattainment area for the one-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that BAAQMD update the Clean Air Plan every three years, to reflect progress in meeting the air quality standards and incorporate new information regarding the feasibility of control measures and new emissions inventory data (Sections 40924 and 40925 of the California Health and Safety Code). The Bay Area's record of progress in implementing the previous measures must also be reviewed. The plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission and the Association of Bay Area Governments.

In April 2017, BAAQMD adopted the *2017 Clean Air Plan,* whose primary goals are to protect public health and to protect the climate (Bay Area Air Quality Management District 2017b). The plan includes a wide range of proposed control measures to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and reduce emissions of potent GHGs. The *2017 Clean Air Plan* updates the *Bay Area 2010 Clean Air Plan* and complies with State air quality planning requirements as codified in the California Health and Safety Code (although the 2017 plan was delayed beyond the three-year update requirement of the code). State law requires the Clean Air Plan to include all feasible measures to reduce emissions of ozone precursors and the transport of ozone precursors to neighboring air basins.

The 2017 Clean Air Plan contains 85 measures to address reduction of several pollutants: ozone precursors, PM, air toxics, and GHGs. Other measures focus on a single type of pollutant: super GHGs such as methane and black carbon that consist of harmful fine particles that affect public health.

Sacramento Metropolitan Air Quality Management District

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is the regional agency with regulatory authority over Sacramento County. SMAQMD regulates air quality in Sacramento County by preparing plans to attain ambient air quality standards, adopting and enforcing rules and regulations for sources of air pollution, and issuing permits for stationary sources of air pollution.

SMAQMD's *Guide to Air Quality Assessment in Sacramento County* is an advisory document that provides lead agencies, consultants, and project proponents with uniform procedures for addressing air quality in environmental documents. Adopted in 2009, the guide has been updated many times, most recently in 2020. SMAQMD has established a significance threshold of 85 pounds per day for construction NO_X emissions. PM_{10} thresholds are 80 pounds per day and 14.6 tons per year, while $PM_{2.5}$ thresholds are 82 pounds per day and 15 tons per year. There is no construction significance threshold for ROG emissions (Sacramento Metropolitan Air Quality Management District 2021).

The following are the most recent air quality plans applicable to the project area:

- *Sacramento Regional 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan* (Sacramento Metropolitan Air Quality Management District 2017).
- SMAQMD's *Triennial Report and Air Quality Plan Revision* (Sacramento Metropolitan Air Quality Management District 2015).
- *PM_{10} Implementation/Maintenance Plan and Redesignation Request for Sacramento County* (Sacramento Metropolitan Air Quality Management District 2010).
- *$PM_{2.5}$ Maintenance Plan and Redesignation Request for Sacramento $PM_{2.5}$ Nonattainment Area* (Sacramento Metropolitan Air Quality Management District 2013).

Yolo Solano Air Quality Management District

The Rio Vista stockpile site is located in Solano County, within the Yolo-Solano portion of the SVAB, which is under the jurisdiction of the Yolo Solano Air Quality Management District (YSAQMD). YSAQMD's primary responsibility to attain and maintain the NAAQS and CAAQS within its jurisdiction, and the district works jointly with EPA, CARB, the Sacramento Area Council of Governments, other air districts in the SVAB, and county and city transportation and planning departments to improve air quality through a variety of programs.

To guide its evaluation of air quality impacts of projects within its jurisdiction, YSAQMD has developed the *Handbook for Assessing and Mitigating Air Quality Impacts* (Yolo Solano Air Quality Management District 2007). YSAQMD's handbook includes a screening methodology and recommended thresholds of significance, including mass emissions thresholds for construction-related and operational ozone precursors (ROG and NO_X) and $PM_{10.}$ YSAQMD has established significance thresholds of 10 tons per year for ROG and NOx emissions from construction activities and 80 pounds per day for construction PM_{10} emissions. There is no construction significance threshold for $PM_{2.5}$ emissions (Yolo Solano Air Quality Management District 2007).

Air quality management plans for YSAQMD are prepared jointly with SMAQMD and other air districts in the SVAB and are discussed above under "Sacramento Metropolitan Air Quality Management District."

San Joaquin Valley Air Pollution Control District

The Weber stockpile used for rock storage is located within the SJVAB. The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the regional agency with regulatory authority over the SJVAB. The 2018 $PM_{2.5}$ Plan and the 2016 Ozone Plan are the current air quality planning documents for the SJVAB (California Air Resources Board 2022b).

Contra Costa County General Plan

The Contra Costa County General Plan (Contra Costa County 2010) includes goals and policies that are intended to encourage energy conservation, protect air quality, and control GHG emissions. Although 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 Contra Costa County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

The following air quality goals and policies in the Conservation Element of the Contra Costa County General Plan are relevant to the proposed project.

Goal 8-AA: To meet Federal Air Quality Standards for all air pollutants.

Goal 8-AB: To continue to support Federal, State and regional efforts to reduce air pollution in order to protect human and environmental health.

Goal 8-AC: To restore air quality in the area to a more healthful level.

Goal 8-AD: To reduce the percentage of Average Daily Traffic (ADT) trips occurring at peak hours.

Policy 8-100: Vehicular emissions shall be reduced throughout the County.

Policy 8-103: When there is a finding that a proposed project might significantly affect air quality, appropriate mitigation measures shall be imposed.

Policy 8-104: Proposed projects shall be reviewed for their potential to generate hazardous air pollutants.

3.2.4 Impacts and Mitigation Measures

Methods of Analysis

Emissions of criteria air pollutants and GHGs resulting from activities associated with the three installation scenarios were estimated separately, using construction equipment data and schedule information from DWR, emissions factors from CARB and EPA models, and other data sources as needed.

Emissions from off-road construction equipment and on-road construction vehicles were estimated using emissions factors from CARB's OFFROAD model for the first possible construction years, 2023 and 2024, using the construction equipment lists provided in Chapter 2, "Project Description." Emissions from off-road construction equipment during installation were estimated based on equipment and activity data collected by DWR for the emergency drought barrier installation in June 2021.

Construction equipment was conservatively assumed to operate 24 hours a day during barrier removal. The exception is the operation of a derrick barge for installation and removal of the barrier. For the derrick barge, emissions were estimated using the CARB OFFROAD emission factors (California Air Resources Board 2017a) and activity was assumed to occur 21.6 hours of each day, as suggested by EPA's 2020 emissions inventory guidance documentation (U.S. Environmental Protection Agency 2020). Based on input from DWR, construction activities for notching the barrier and closing the notch (Installation Scenario 2) were assumed to take place over a period of two weeks each, with equipment operating 12 hours per workday, six days a week.

Emissions from marine vessels supporting the drought salinity barrier's construction, notching, and removal and the transport of rock were estimated using emissions factors published in EPA's 2020 emissions inventory guidance document (U.S. Environmental Protection Agency 2020). The tugboats supporting the derrick barge were assumed to have Tier 2 engines installed. Power estimates for these tugboats were taken from recent emergency drought barrier installation activity records and reflect sizing considered representative of future equipment. Engine loads for the activity were taken from EPA's recent emissions inventory guidance (U.S. Environmental Protection Agency 2020). The analysis assumed that two tugboats would support a derrick barge half the time the barge is operating (i.e., 10.8 hours per day) and that installation would take 45 days, while removal would take 60 days. Rock transport trips were assumed to occur at speeds of 8 knots, consistent with estimates used in the 2015 Port of Oakland emissions inventory documentation (Port of Oakland 2016), and were assumed to require 70 trips to complete either installation or removal.

As detailed previously, the entire barge trip from the San Rafael quarry to the barrier site (approximately 45 nautical miles) was assumed to occur within the SFBAAB. With removal of the drought salinity barrier, rock could be transported to one of two DWR stockpile sites, located in Rio Vista or Stockton. This analysis conservatively considers the longer barge trip length of 28 miles between the barrier location and the Weber stockpile site in Stockton. Ten miles of this barge trip would occur within BAAQMD's jurisdiction and the remaining 18 miles would occur within SJVAPCD's jurisdiction. Emissions from the outbound barge trips were therefore distributed between BAAQMD's and SJVAPCD's jurisdictions, based on the distance traveled within each jurisdiction.

Based on SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts under CEQA* (San Joaquin Valley Air Pollution Control District 2015), the limited construction activity to install the new water quality monitoring stations (i.e., use of a vibratory pile driver for a few days) is assumed not to have a significant air quality impact in that air basin. SJVAPCD's guidance document provides a "small project" exclusion, which exempts some types of projects involving short-term or intermittent operations from performing a quantitative air quality assessment under CEQA. These projects include all gas, oil, and water well drilling operations. Therefore, that activity is not analyzed further in this section.

Estimated criteria pollutant emissions generated within air district jurisdiction are reported separately and compared to the respective significance thresholds. The evaluation of GHG emissions has been conducted according to the guidance presented in DWR's *Climate Action Plan Phase 1: Greenhouse Gas Emissions Reduction Plan Update 2020* (California Department of Water Resources 2020).

The proposed project was also analyzed for consistency with BAAQMD's 2017 Clean Air Plan, CARB's 2017 Scoping Plan Update, and DWR's climate action plan (CAP) (see Chapter 4).

Thresholds of Significance

An impact related to air quality and GHG emissions would be considered significant if 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;
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people;
- 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.

Criteria Air Pollutants

Table 3.2-4 summarizes the thresholds of significance recommended by BAAQMD, SMAQMD, SJVAPCD, and YSAQMD for construction emissions of criteria air pollutants.

TABLE 3.2-4
RECOMMENDED THRESHOLDS OF SIGNIFICANCE FOR CONSTRUCTION ACTIVITIES—CRITERIA AIR POLLUTANTS

Jurisdiction	ROG	NOx	PM_{10}	$PM_{2.5}$
BAAQMD—Average daily emissions (pounds per day)	54	54	82	54
SMAQMD—Maximum daily emissions (pounds per day)[a]	–	85	80	82
SMAQMD—Annual emissions (tons per year)[a]	–	–	14.6	15
SJVAPCD—Annual emissions (tons per year)	10	10	15	15
YSAQMD—Annual emissions (tons per year) for ROG and NOx, daily emissions (pounds per day) for PM_{10}	10	10	80	–

NOTES: BAAQMD = Bay Area Air Quality Management District; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases; SJVAPCD = San Joaquin Valley Air Pollution Control District; SMAQMD = Sacramento Metropolitan Air Quality Management District; YSAQMD = Yolo Solano Air Quality Management District

a SMAQMD daily and annual thresholds for PM_{10} and $PM_{2.5}$ are applicable to projects only if all feasible Best Available Control Technology (BACT)/Best Management Practices (BMPs) for control of particulate matter are applied. Before application of BACT/BMPs, the construction thresholds for PM_{10} and $PM_{2.5}$ are zero.

b ROG and NOx thresholds are as annual emissions (tons per year); the PM_{10} threshold is daily emissions as pounds per day.

SOURCES: Bay Area Air Quality Management District 2017a; Sacramento Metropolitan Air Quality Management District 2021; Yolo Solano Air Quality Management District 2007; San Joaquin Valley Air Pollution Control District 2015

Greenhouse Gases

Any single project would be unlikely to create a significant impact on global or local GHG concentrations. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (Intergovernmental Panel on Climate Change 2013). Therefore, the environmental effects of GHG emissions from the proposed project are addressed cumulatively in this DEIR.

Air Quality Management District Thresholds

BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions. However, lead agencies must quantify and disclose GHG emissions that would occur during construction, and to determine the significance of these construction-generated GHG impacts relative to meeting AB 32 GHG reduction goals, as required by Public Resources Code Section 21082.2. BAAQMD also recommends implementing best management practices to reduce GHG emissions during construction, as feasible and applicable (Bay Area Air Quality Management District 2017a).

SMAQMD has established a GHG significance threshold for construction activities of 1,100 MT of CO_2e per year (Sacramento Metropolitan Air Quality Management District 2021). If a project exceeds this threshold, then all feasible mitigation measures shall be implemented.

SJVAPCD relies on the use of performance-based standards as a method of determining the significance of project-specific GHG emissions impacts and reducing GHG emissions.

YSAQMD does not provide specific thresholds for the evaluation of GHGs, but recommends that project analyses at least include a qualitative discussion of GHGs for sizable projects.

California Department of Water Resources Goals and Thresholds

DWR has developed a series of plans and updates that constitute its CAP, which guides how DWR addresses climate change for the programs, projects, and activities over which it has authority. In 2012, DWR developed the Greenhouse Gas Emissions Reduction Plan (GGERP) (California Department of Water Resources 2012) as the first phase of its CAP to guide decision-making related to energy use and GHG emissions. Meeting its commitment made in 2012, DWR has developed the GGERP Update 2020 (California Department of Water Resources 2020) to review its GHG emissions reductions since the 2012 GGERP and to update strategies for further reductions consistent with legislative changes, including the GHG emissions reduction targets established in Senate Bill (SB) 32.

DWR's near-term goal in the 2012 GGERP was to reduce its emissions to 50 percent below the 1990 emissions level by 2020. DWR was able to achieve this goal in 2015, five years earlier than the 2020 target date. In the GGERP Update 2020, DWR lays out the following mid-term and long-term GHG emissions reduction goals consistent with the State's GHG emissions reduction targets to guide decision-making beyond 2020:

- **Mid-Term Goal—**By 2030, reduce GHG emissions to at least 60 percent below the 1990 level.
- **Long-Term Goal—**By 2045, supply 100 percent of the electricity load with zero-carbon resources and achieve carbon neutrality.

DWR's mid-term goal exceeds the statewide emissions reduction target of 40 percent below the 1990 level by 2030, which was established in SB 32. DWR's long-term goal is consistent with the emissions reduction goals and policies established in SB 100 and Executive Order B-55-18. By achieving carbon neutrality by 2045, DWR will also exceed the statewide goal of reducing emissions by at least 80 percent below the 1990 level by 2050, which was established in Executive Order S-3-05. The GGERP Update 2020 identifies a list of GHG emissions reduction measures to achieve these goals.

In addition to providing the plan for meeting GHG emissions reduction targets, the GGERP Update 2020 is intended to be used for DWR's CEQA analyses of the potential contributions of future DWR projects to the cumulative impact of increased GHG concentrations in the atmosphere. DWR has developed construction emissions thresholds to distinguish between typical construction projects that are analyzed and addressed under the GGERP Update 2020 and "Extraordinary Construction Projects," whose construction emissions are not analyzed or addressed under the GGERP Update 2020. A construction project is considered an Extraordinary Construction Project if either of the following scenarios would occur:

- More than 25,000 MT CO_2e in total would be emitted during the project's construction phase.
- More than 12,500 MT CO_2e would be emitted by the project in any single year of construction.

These thresholds represent a level of GHG emissions that, by themselves, have the potential to adversely affect DWR's ability to achieve its GHG emissions reduction goals. However, construction activities for a project exceeding either of these thresholds would be more extensive than the typical level of construction activity performed by DWR, and thus would exceed the level of cumulative effects analysis included in the GGERP Update 2020.

Thus, the GGERP Update 2020 does not consider or address construction emissions exceeding either of these thresholds. Projects exceeding these thresholds would not be eligible to rely on the analysis in the GGERP Update 2020 for project-specific cumulative impacts analyses under CEQA. DWR states that the thresholds used in the GGERP do not constitute a determination that they are applicable as thresholds of significance for CEQA purposes. Each project must be evaluated on a case-by-case basis, using the most up-to-date calculation and analysis methods.

Project-Specific Impacts and Mitigation Measures

Table 3.2-5 summarizes the impact conclusions presented in this section.

TABLE 3.2-5
SUMMARY OF IMPACT CONCLUSIONS—AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Impact Statement	Impact Conclusion
3.2-1: Implementation of the proposed project could conflict with or obstruct implementation of the applicable air quality plan.	LSM
3.2-2: Implementation 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
3.2-3: Implementation of the proposed project could generate greenhouse gas 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 greenhouse gases.	LTS

NOTES: LTS = Less than Significant; LSM = Less than Significant with Mitigation; SU = Significant and Unavoidable

SOURCE: Data compiled by ICF/ESA in 2022

Impact 3.2-1: Implementation of the proposed project could conflict with or obstruct implementation of the applicable air quality plan.

The federal Clean Air Act and the California Clean Air Act require that plans be developed for areas designated as nonattainment (except areas designated as nonattainment for the State PM_{10} standard). Air quality plans describe air pollution control strategies to be implemented by an air district, city, county, or region. The primary purpose of an air quality plan is to maintain and/or achieve attainment of a CAAQS or NAAQS.

In April 2017, BAAQMD adopted the *2017 Clean Air Plan* (Bay Area Air Quality Management District 2017b). The plan's primary goals are to protect public health and to protect the climate. The plan includes a wide range of proposed control measures, which consist of actions to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and reduce emissions of potent GHGs. This plan represents the applicable air quality plan for the SFBAAB to attain and maintain ambient air quality standards.

To determine whether implementation of the proposed project would conflict with or obstruct implementation of the air quality plan, the following two criteria were used:

- The first criterion was whether the project would exceed the assumptions used as the basis of the air quality plans. Regional air quality plans use emissions estimates based in part on projections of population and vehicle miles traveled that have been developed by the applicable metropolitan planning organization for the region. Thus, if a project does not generate population and vehicle miles traveled in excess of what was assumed in the regional air quality plan, the project would be considered consistent with the plan.
- The second criterion was whether implementing the project would increase the frequency or severity of existing air quality violations, contribute to new violations, or delay the attainment of air quality standards.

The proposed project would generate emissions primarily during its temporary construction phases. There would be no long-term increase in emissions associated with an increase in population or vehicle miles traveled, as the project would not induce or otherwise increase the potential for growth in the project area. The regional air quality plans account for estimates of the region's use of construction equipment for each year, based on permit limits and other data. Therefore, the proposed project's construction emissions from the use of off-road equipment and on-road haul trucks, and from workers' commute trips to and from the project site, would not be inconsistent with the air quality plan's assumptions if these emissions were below the construction significance thresholds established by the regional air districts. The proposed project's construction and emissions are discussed below.

The proposed project's construction emissions would include emissions from off-road equipment such as loaders, excavators, and dump trucks; in-water construction vessels such as barges and tugboats; tug-assisted barges transporting rock to the project site during construction and away from the site during removal; and vehicular emissions from worker commute and truck trips during mobilization and demobilization.

Table 3.2-6 and **Table 3.2-7** show estimated project construction emissions within BAAQMD's and SJVAPCD's jurisdictions, respectively, for the three installation scenarios. The estimates presented in these tables assume that rock would be transported to the Weber stockpile site in Stockton upon removal.

Upon removal of the West False River drought salinity barrier, if rock were transported to the DWR stockpile location in Rio Vista instead of Stockton, the outbound barge trip would traverse BAAQMD's jurisdiction (3.5 nautical miles) and SMAQMD's jurisdiction (7.5 nautical miles). **Table 3.2-8** summarizes the emissions from barge transport within SMAQMD's jurisdiction. If rock were transported to Rio Vista upon removal, total construction emissions within BAAQMD's jurisdiction would be less than those shown in Table 3.2-6 under all three installation scenarios. In addition, part of the off-road equipment emissions shown in Table 3.2-7 would instead occur within the jurisdiction of YSAQMD. Emissions would also be generated from the one-mile trip that trucks would make to transport rock from the off-loading point at Rio Vista to the stockpile site. **Table 3.2-9** shows project emissions within YSAQMD's jurisdiction.

**TABLE 3.2-6
UNMITIGATED CONSTRUCTION-RELATED EMISSIONS OF CRITERIA AIR POLLUTANTS WITHIN THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT'S JURISDICTION**

Source	Daily Emissions (pounds per day)			
	ROG	NOx	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Installation Scenario 1				
Marine equipment at drought salinity barrier site	14.7	284.5	7.5	7.3
Off-road equipment at drought salinity barrier site	23.36	178.7	6.8	6.3
On-road worker trips	0.12	0.6	0.1	0.05
Tugboat-assisted barge transport of rock	3.9	74.8	2.0	1.9
Number of workdays	105			
Average Daily Emissions (pounds per day)	31.7	**458.9**	13.3	12.7
BAAQMD Threshold	*54.0*	*54.0*	*82.0*	*54.0*
Significant?	*No*	***Yes***	*No*	*No*
Annual Emissions—2023 (tons per year)	0.5	10.0	0.3	0.3
Annual Emissions—2024 (tons per year)	1.1	14.1	0.4	0.4
Installation Scenario 2				
Marine equipment at drought salinity barrier site	20.9	411.2	10.7	10.5
Off-road equipment at drought salinity barrier site	37.1	288.7	11.2	10.3
On-road worker trips	0.12	0.6	0.1	0.05
Tugboat-assisted barge transport of rock	4.1	79.0	2.1	2.0
Number of workdays	129			
Average Daily Emissions (pounds per day)	32.3	**490.3**	13.9	13.4
BAAQMD Threshold	*54.0*	*54.0*	*82.0*	*54.0*
Significant?	*No*	***Yes***	*No*	*No*
Annual Emissions—2023 (tons per year)	0.7	13.0	0.3	0.3
Annual Emissions—2024 (tons per year)	1.4	18.6	0.5	0.5
Installation Scenario 3				
Marine equipment at drought salinity barrier site	14.7	284.5	7.5	7.3
Off-road equipment at drought salinity barrier site	23.8	190.7	7.3	6.7
On-road worker trips	0.12	0.6	0.1	0.05
Tugboat-assisted barge transport of rock	3.9	74.8	2.0	1.9
Number of workdays	105			
Average Daily Emissions (pounds per day)	32.0	**465.8**	13.6	13.0
BAAQMD Threshold	*54.0*	*54.0*	*82.0*	*54.0*
Significant?	*No*	***Yes***	*No*	*No*
Annual Emissions—2023 (tons per year)	1.7	24.5	0.7	0.7

NOTES: BAAQMD = Bay Area Air Quality Management District; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases

SOURCE: Data compiled by ESA in 2022. The air quality modeling data are included as Appendix C.

TABLE 3.2-7
CONSTRUCTION-RELATED EMISSIONS OF CRITERIA AIR POLLUTANTS WITHIN THE SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT'S JURISDICTION

Year	Annual Emissions (tons per year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$
Installation Scenario 1				
Year 1 (2023)	–	–	–	–
Year 2 (2024)	0.2	2.4	0.08	0.08
SJVAPCD Annual Threshold	*15*	*15*	*15*	*15*
Significant?	*No*	*No*	*No*	*No*
Installation Scenario 2				
Year 1 (2023)	0.05	0.6	0.02	0.02
Year 2 (2024)	0.1	1.5	0.06	0.05
SJVAPCD Annual Threshold	*10*	*10*	*15*	*15*
Significant?	*No*	*No*	*No*	*No*
Installation Scenario 3				
Year 1 (2023)	0.2	2.5	0.08	0.08
SJVAPCD Annual Threshold	*10*	*10*	*15*	*15*
Significant?	*No*	*No*	*No*	*No*

NOTES: NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases; SJVAPCD = San Joaquin Valley Air Pollution Control District

Includes emissions from tugboat-assisted barge transport of rock between the barrier site and the Weber stockpile site in Stockton for notching the barrier and closing the notch, and upon removal of the barrier, emissions from off-road equipment at the Weber stockpile for notching and barrier removal, and on-road worker trips at the Weber stockpile site.

SOURCE: Data compiled by ESA in 2022. The air quality modeling data are included as Appendix C.

TABLE 3.2-8
CONSTRUCTION-RELATED EMISSIONS OF CRITERIA AIR POLLUTANTS WITHIN THE SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT'S JURISDICTION

Source	Maximum Daily Emissions (pounds per day)		
	NOx	PM_{10}	$PM_{2.5}$
Installation Scenarios 1, 2, and 3			
Tugboat-assisted barge transport of rock from the barrier site to the Rio Vista stockpile site	10.2	0.3	0.3
SMAQMD Threshold	*85*	*80 (with best management practices)*	*80 (with best management practices)*
Significant?	*No*	*No*	*No*

NOTES: NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; SMAQMD = Sacramento Metropolitan Air Quality Management District

SOURCE: Data compiled by ESA in 2022. The air quality modeling data are included as Appendix C.

TABLE 3.2-9
CONSTRUCTION-RELATED EMISSIONS OF CRITERIA AIR POLLUTANTS WITHIN THE YOLO SOLANO AIR QUALITY MANAGEMENT DISTRICT'S JURISDICTION

Source	Project Emissions		
	ROG (tons per year)	NOx (tons per year)	PM_{10} (pounds per day)
Installation Scenarios 1, 2, and 3			
Off-road equipment at the Rio Vista stockpile site	0.1	1.1	1.5
On-road worker and truck trips	<0.01	0.02	0.04
Total emissions	0.1	0.9	0.03
YSAQMD Threshold	*10*	*10*	*80*
Significant?	*No*	*No*	*No*

NOTES: NO_X = oxides of nitrogen; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases; YSAQMD = Yolo Solano Air Quality Management District

SOURCE: Data compiled by ESA in 2022. The air quality modeling data are included as Appendix C.

Installation and removal of the barrier would also generate fugitive dust emissions from activities at the staging areas and stockpile site and from vehicle travel on unpaved roads. BAAQMD does not require that fugitive dust emissions be quantified. Instead it requires that BAAQMD-recommended best management practices be implemented to reduce fugitive dust impacts to a less-than-significant level. SMAQMD also requires implementation of best management practices, which are very similar to the measures required by BAAQMD under Mitigation Measure AQ-1. However, all emissions generated within SMAQMD's jurisdiction would be from marine vessels; no fugitive dust emissions would occur within SMAQMD's jurisdiction.

Impact Conclusion

As shown in Table 3.2-6, daily average construction emissions as averaged over the number of workdays for each scenario would exceed BAAQMD's NO_X threshold under all three installation scenarios. The proposed project would also generate fugitive dust emissions during construction (under all three installation scenarios). Therefore, this impact would be **significant**.

Mitigation Measure AQ-1: Implement BAAQMD Fugitive Dust Control Measures during Construction.

The DWR construction contractor shall implement the following applicable basic and enhanced control measures recommended by BAAQMD to reduce generation of fugitive dust during all construction activities:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping shall be prohibited.

- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- Idling times shall be minimized, either by shutting equipment off when not in use or by reducing the maximum idling time to five minutes (as required by California Code of Regulations Title 13, Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. All equipment shall be checked by a certified visible emissions evaluator.
- A publicly visible sign shall be posted at the project site with the name and telephone number of the person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number also shall be visibly posted for compliance with applicable regulations.
- All construction equipment, diesel trucks, and generators shall be equipped with emissions control technology certified by CARB as the Best Available Control Technology for emission reductions of NO_X and PM at the time of construction.
- All contractors shall be required to use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines.

Mitigation Measure AQ-2: Use Verified Diesel Emissions Control Strategies.

DWR and/or its contractors shall provide a plan for approval by BAAQMD demonstrating that all heavy-duty off-road equipment used for construction activities is equipped with the most effective Verified Diesel Emissions Control Strategies available for the engine type at the time. In this case, the best available Verified Diesel Emissions Control Strategies would be implementation of Tier 4F engines as certified by CARB and EPA. The equipment shall be properly maintained and tuned in accordance with manufacturers' specifications. Compliance with these requirements will be verified through the submittal to BAAQMD of an equipment inventory and certification plan.

Mitigation Measure AQ-3: Meet Tugboat and Derrick Barge Engine Requirements.

DWR and/or its contractors shall provide a plan for approval by BAAQMD demonstrating that all tugboat operations for any aspect of the project will meet or exceed Tier 3 emissions standards, as certified by CARB and EPA. The equipment shall be properly maintained and tuned in accordance with manufacturers' specifications. Compliance with these requirements will be verified through the submittal to BAAQMD of an equipment inventory and certification plan.

Similarly, DWR and/or its contractors shall provide a plan for approval by BAAQMD demonstrating that all derrick barge equipment will be equipped with a 2015 or newer main engine, a 2018 or newer hoist, and a 2018 or newer generator. The equipment shall be properly maintained and tuned in accordance with manufacturers' specifications. Compliance with these requirements will be verified through the submittal to BAAQMD of an equipment inventory and certification plan.

Mitigation Measure AQ-4: Offset Mitigated NO_X Emissions.

DWR and/or its contractor shall monitor construction activities throughout installation and removal of the drought salinity barrier and notching. Data shall be collected on construction activities and equipment and the level of implementation of mitigation measures, mitigated emissions from construction activities shall be calculated, and this information shall be reported to BAAQMD. The terms and specifics of construction monitoring and reporting shall be determined in consultation with BAAQMD. Construction emissions data shall include but not be limited to the following sources: off-road construction equipment, tugboats/barges and work boats, on-road trucks, and construction worker commute vehicles.

After completion of the proposed project (i.e., removal of the barrier), the final construction emissions shall be evaluated to calculate the total offset mitigation fee based on actual construction activities. DWR shall work in coordination with BAAQMD to assess the specific mechanisms associated with construction monitoring, emissions calculations, and payment logistics.

DWR shall use a verifiable program to offset the proposed project's mitigated NO_X emissions that exceed the significance threshold, as determined through the construction monitoring program described above. DWR may achieve the required offset through any combination of the following measures:

- Implement offset emissions and programs available within Contra Costa County and the SFBAAB.
- Submit payment to BAAQMD, on a per-ton-of-NO_X-emissions basis. The price of NO_X emission offsets shall be determined at the completion of the construction monitoring program and emission estimates determined by that program.

Impact Significance after Mitigation: Implementation of Mitigation Measure AQ-1 would reduce impacts from fugitive dust emissions to a less-than-significant level.

Implementation of Mitigation Measures AQ-2 and AQ-3 would reduce emissions from land-based off-road equipment and marine equipment, respectively, by requiring the use of cleaner engines. Implementation of these measures would reduce NOx emissions, but not to levels below the threshold, as shown in **Table 3.2-10**. Therefore, implementation of Mitigation Measure AQ-4, requiring mitigation fees, would be required to reduce this impact to a less-than-significant level. Estimated unmitigated emissions within SJVAPCD's, SMAQMD's, and YSAQMD's jurisdictions would be below the respective thresholds; implementation of Mitigation Measures AQ-2 and AQ-3 would further reduce these emissions.

Because construction-related activities would not exceed the threshold with implementation of Mitigation Measures AQ-1, AQ-2, and AQ-3, and because the proposed project would not exceed population or vehicle miles traveled assumptions in the air quality plans, it would not conflict with or obstruct implementation of the applicable air quality plans. Therefore, this impact would be **less than significant with mitigation incorporated**.

TABLE 3.2-10
MITIGATED[1] CONSTRUCTION-RELATED EMISSIONS OF CRITERIA AIR POLLUTANTS WITHIN THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT'S JURISDICTION

Source	Daily Emissions (pounds per day)			
	ROG	**NOx**	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**
Installation Scenario 1				
Marine equipment at drought salinity barrier site	8.0	249.5	4.9	4.8
Off-road equipment at drought salinity barrier site	7.5	32.6	1.0	1.0
On-road worker trips	0.12	0.6	0.1	0.05
Tugboat-assisted barge transport of rock	1.7	62.9	1.1	1.1
Number of workdays	105			
Total average daily emissions	14.0	**330.8**	6.6	6.5
BAAQMD Threshold	*54.0*	*54.0*	*82.0*	*54.0*
Significant?	*No*	***Yes***	*No*	*No*
Annual Emissions—2023 (tons per year)	0.3	8.4	0.2	0.2
Annual Emissions—2024 (tons per year)	0.5	9.0	0.2	0.2
Emissions to be mitigated through offsets—2023	–	–	–	–
Emissions to be mitigated through offsets—2024	–	–	–	–
Installation Scenario 2				
Marine equipment at drought salinity barrier site	11.4	361.7	7.1	7.0
Off-road equipment at drought salinity barrier site	11.9	55.2	1.6	1.6
On-road worker trips	0.12	0.6	0.1	0.05
Tugboat-assisted barge transport of rock	1.7	66.5	1.2	1.1
Number of workdays	129			
Total average daily emissions	14.6	**365.6**	7.3	7.1
BAAQMD Threshold	*54.0*	*54.0*	*82.0*	*54.0*
Significant?	*No*	***Yes***	*No*	*No*
Annual Emissions—2023 (tons per year)	0.3	10.7	0.2	0.2
Annual Emissions—2024 (tons per year)	0.6	12.9	0.3	0.3
Emissions to be mitigated through offsets—2023	–	0.7	–	–
Emissions to be mitigated through offsets—2024	–	2.9	–	–
Installation Scenario 3				
Marine equipment at drought salinity barrier site	8.0	249.5	4.9	4.8
Off-road equipment at drought salinity barrier site	7.5	32.6	1.0	1.0
On-road worker trips	0.12	0.6	0.1	0.05
Tugboat-assisted barge transport of rock	1.7	62.9	1.1	1.1
Number of workdays	105			
Total average daily emissions	14.0	**330.9**	6.6	6.5
BAAQMD Threshold	*54.0*	*54.0*	*82.0*	*54.0*
Significant?	*No*	***Yes***	*No*	*No*
Annual Emissions (tons per year)	0.7	17.4	0.3	0.3
Emissions to be mitigated through offsets	–	7.4	–	–

NOTES: BAAQMD = Bay Area Air Quality Management District; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases

1 Mitigated emissions presented in this table refer to emissions after the implementation of on-site Mitigation Measures AQ-2 and AQ-3.

SOURCE: Data compiled by ESA in 2022. The air quality modeling data are included as Appendix C.

Impact 3.2-2: Implementation 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.

The analysis of cumulative effects focuses on whether implementing the proposed project would result in a cumulatively considerable contribution to a significant cumulative impact. By its very nature, air pollution is mainly a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within an air basin, and this regional impact is cumulative rather than attributable to any one source. A project's emissions may be individually limited but cumulatively considerable when taken in combination with past, present, and probable future projects. The thresholds of significance are relevant to determining whether the contribution of a project's individual emissions would result in a considerable incremental contribution to the existing cumulative air quality conditions. If a project's emissions would be less than these threshold levels, implementing the project would not be expected to result in a considerable incremental contribution to the significant cumulative impact (Bay Area Air Quality Management District 2017a).

Impact Conclusion

Construction-related emissions impacts associated with the proposed project (under all three installation scenarios) would be significant relative to the BAAQMD thresholds of significance (Impact 3.2-1). Therefore, emissions associated with the proposed project could result in a cumulatively considerable incremental contribution to a significant cumulative impact. This impact would be **significant.**

> **Mitigation Measure AQ-1**: **Implement BAAQMD Fugitive Dust Control Measures during Construction.** (See Impact 3.2-1.)
>
> **Mitigation Measure AQ-2: Use Verified Diesel Emissions Control Strategies.** (See Impact 3.2-1.)
>
> **Mitigation Measure AQ-3: Meet Tugboat and Derrick Barge Engine Requirements.** (see Impact 3.2-1.)
>
> **Mitigation Measure AQ-4: Offset Mitigated NO_X Emissions.** (See Impact 3.2-1.)
>
> **Impact Significance after Mitigation:** Implementing Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 (discussed under Impact 3.2-1 above) would reduce construction-related emissions to a less-than-significant level relative to the BAAQMD thresholds of significance. Therefore, with mitigation, emissions associated with the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact. Unmitigated emissions within the jurisdictions of SMAQMD, SJVAPCD, and YSAQMD would be below the respective thresholds and hence would not considerably contribute to a significant cumulative air quality impact. This impact would be **less than significant with mitigation incorporated**.

Impact 3.2-3: Implementation of the proposed project could generate greenhouse gas 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 greenhouse gases.

GHG emissions would be generated by project sources such as tugboat-assisted barges hauling materials to and from the project site; heavy-duty off-road and marine equipment used for barrier installation, notching, and removal; and on-road worker commute vehicles and construction trucks.

Table 3.2-11 presents the estimated total annual CO_2e emissions associated with each construction year for all three installation scenarios. As shown, the highest annual emissions would occur under Installation Scenario 3, when emissions would be 4,286 MT CO_2e per year, assuming that both installation and removal of the barrier would take place in the same year (2023). GHG emissions per active year would be lower under the other two scenarios because activities would be distributed over two consecutive years. In addition, irrespective of the installation scenario, emissions associated with these activities taking place in future years would be expected to be lower, given the turnover of vehicle and equipment fleets toward cleaner and more fuel-efficient engines. Table 3.2-11 also presents project emissions over the next 10 years during which the barrier may be installed, notched, and removed twice.

TABLE 3.2-11
ESTIMATED GREENHOUSE GAS EMISSIONS ASSOCIATED WITH INSTALLATION, NOTCHING, AND REMOVAL OF THE PROPOSED DROUGHT SALINITY BARRIER

Emissions Source	GHG Emissions by Installation Scenario (MT CO_2e)				
	Installation Scenario 1		Installation Scenario 2		Installation Scenario 3
	2023	2024	2023	2024	2023
Off-road construction equipment and on-road vehicles	941	764	1,088	789	1,704
Marine equipment	898	1,197	1,281	1,827	2,095
Tugboat-assisted barge transport of rock	291	181	319	209	473
Total annual emissions per active year	2,130	2,142	2,688	2,838	4,286
Total emissions over a 10-year project lifetime[1]	8,543		11,053		8,572

NOTES: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons

1 Accounts for two installations and removals over the 10-year period.

SOURCE: Data compiled by ESA in 2022; Appendix C

As discussed previously, BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions, nor does it provide updated guidance on how to address a project's GHG impacts with respect to the SB 32 GHG emissions reduction targets for projects that are not land use development projects. Therefore, the proposed project's GHG emissions impacts were examined by evaluating project consistency with CARB's Climate Change Scoping Plan 2017 Update and DWR's GGERP Update 2020, both of which are consistent with SB 32.

Consistency with the 2017 Scoping Plan Update

CARB's Climate Change Scoping Plan identifies measures to meet California's goal of reducing emissions to 1990 levels by 2020 and reiterates the State's role in achieving the long-term goal established in Executive Order S-3-05, which is to reduce GHG emissions to 80 percent below 1990 levels by 2050 (California Air Resources Board 2008). According to CARB, the 2020 goal was established as an achievable, mid-term target, and the 2050 goal for reducing GHG emissions represents the global level of emissions reduction that scientists believe is necessary to stabilize the climate (California Air Resources Board 2008).

CARB's 2017 Climate Change Scoping Plan Update (California Air Resources Board 2017b) identifies programs to indirectly address GHG emissions from construction activity, which include phasing in cleaner technology for diesel engine fleets (including construction equipment) and developing a Low Carbon Fuel Standard. Policies formulated under the mandate of AB 32 that apply to construction activities, either directly or indirectly, are expected to be implemented automatically during construction of the proposed project as those policies and laws are developed and implemented. Therefore, project emissions generated by construction and transport equipment used for the barrier installation would not conflict with implementation of the Climate Change Scoping Plan.

Consistency with DWR's Greenhouse Gas Emissions Reduction Plan Update 2020

DWR uses Phase 1 of its CAP—the GGERP and its updates—to streamline the CEQA cumulative impact analysis of GHG emissions for current and future DWR projects pursuant to State CEQA Guidelines Sections 15064(h)(3), 15064.4(b)(3), 15130(d), and 15183.5. Section 15183.5 provides that such a document, which must meet certain 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].)

DWR approved the 2012 GGERP after conducting environmental review and adopting a negative declaration. For the purposes of the GGERP Update 2020, DWR prepared an addendum to the negative declaration pursuant to State CEQA Guidelines Sections 15162(b) and 15164(b). In the addendum, DWR evaluated the changes to the 2012 GGERP under its 2020 update and changes in surrounding circumstances (including legislative, regulatory, and market changes). DWR concluded that these changes would not cause any new significant environmental impacts that would require the preparation of a subsequent negative declaration or an EIR.

Chapter 10 of the GGERP Update 2020 outlines the following steps that each DWR project will take to demonstrate consistency:

(1) Identify, quantify, and analyze the project's GHG emissions.

(2) Determine that construction emissions levels do not exceed the Extraordinary Construction Project threshold of either 25,000 MT CO_2e for the entire construction phase of the project or 12,500 MT CO_2e in any single year of construction.

(3) Incorporate into the design or implementation plan for the project all project-level GHG emissions reduction measures listed in Chapter 6 of the GGERP Update 2020, or explain why measures have not been incorporated or do not apply to the project.

(4) Determine that the project does not conflict with DWR's ability to implement any of the specific project GHG emissions reduction measures listed in Chapter 6 of the GGERP Update 2020.

(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.

The proposed project's emissions were estimated, and as shown in Table 3.2-10, the proposed project would not be considered an extraordinary project, as it would generate less than 25,000 MT CO_2e for the entire construction phase, i.e., installation, notching, and removal (under all three installation scenarios) and less than 12,500 MT CO_2e in any single year of construction. Consistent with requirements 3, 4, and 5 above, a GGERP Consistency Determination Checklist has been prepared and is presented in Appendix C, documenting that the proposed project has met each of the required elements.

Impact Conclusion

Based on the analysis in the GGERP Update 2020 and the demonstration that the proposed project is consistent with the GGERP Update 2020 (as shown in the GGERP Consistency Determination Checklist in Appendix C), the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. This impact would be **less than significant**.

Mitigation Measures: None required.

3.3 Biological Resources

3.3.1 Introduction

This section describes the terrestrial and aquatic biological resources that are known or have the potential to occur at the barrier site and in the vicinity of the Weber off-loading and stockpile sites, the Rio Vista stockpile site, and new water quality monitoring stations. "Biological resources" are common vegetation, wildlife, and fisheries resources; sensitive habitats; plant communities, and special-status plant, wildlife, and fish species.

DWR received comment letters regarding biological resources and related policies from the California Department of Fish and Wildlife (CDFW), Delta Protection Commission, and the Delta Stewardship Council in response to the notice of preparation (see **Appendix A**).

3.3.2 Environmental Setting

This section addresses known or potentially occurring biological resources within or adjacent to the barrier site that may be affected by the proposed installation, maintenance, and removal of the drought salinity barrier and potential notch; by installation of the water quality monitoring stations; or by use of the Weber off-loading and stockpile sites or the Rio Vista stockpile site. The information presented herein is based on the following data sources:

- *Efficacy Report, 2015 Emergency Drought Barrier Project* (California Department of Water Resources 2019).
- A reconnaissance-level survey of the West False River drought salinity barrier site and the Rio Vista stockpile site conducted on December 20, 2019.
- The results of monitoring conducted at the drought salinity barrier site and the Weber off-loading and stockpile sites throughout June 2021 as part of the 2021–2022 emergency drought barrier (EDB) installation.
- The results of monitoring conducted in January 2022 during the notching of the drought barrier as part of the 2021–2022 EDB project.
- The results of a botanical survey conducted via boat and on the Jersey Island landside on April 21, 2015.
- The results of a preconstruction botanical survey conducted at the barrier site on May 13, 2021.

Work during the December 2019 reconnaissance survey included identifying suitable habitat for giant garter snake (*Thamnophis gigas*) and documenting whether elderberry (*Sambucus* sp.) shrubs, the sole host for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), occur within the West False River drought salinity barrier site and the Rio Vista stockpile site. The efficacy report for the 2015 EDB project summarizes the results of the preconstruction biological surveys and construction monitoring that was conducted during the 2015 EDB work.

Several biological resources databases were queried and subsequent updated queries were performed to identify sensitive plant, fish, and wildlife species that could be affected by the proposed project:

- The CDFW California Natural Diversity Database (CNDDB) (California Department of Fish and Wildlife 2022a, 2022b).
- The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (U.S. Fish and Wildlife Service 2022a, 2022b, 2022c).
- The California Native Plant Society (CNPS) online Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society 2022a, 2022b).

The CNDDB (California Department of Fish and Wildlife 2022a) and CNPS (California Native Plant Society 2022a) identify special-status species documented on the following 12 U.S. Geological Survey 7.5-minute topographic quadrangles: Woodward Island, Brentwood, Antioch South, Bouldin Island, Jersey Island, Antioch North, Isleton, Rio Vista, Birds Landing, Courtland, Liberty Island, and Dozier. These include the Jersey Island quadrangle, where the West False River drought salinity barrier site is located, and the surrounding eight quadrangles; it also includes the Rio Vista quadrangle, where the Rio Vista stockpile site is located, and its surrounding eight quadrangles.

The CNDDB (California Department of Fish and Wildlife 2022b) and CNPS (California Native Plant Society 2022b) also identify special-status species documented on the Stockton West U.S. Geological Survey 7.5-minute topographic quadrangle, where the Weber off-loading and stockpile sites are located, and eight surrounding quadrangles. These quadrangles include Terminous, Lodi South, Waterloo, Holt, Stockton East, Union Island, Lathrop, and Manteca. The San Rafael quarry was not included because it is an actively operating quarry that was authorized under a separate CEQA/permitting process.

Vegetation Communities and Land Cover Types

Vegetation communities and land cover types present on the barrier site include aquatic habitat associated with West False River and terrestrial habitat associated with the adjacent channel slopes, levee roads, and landside berm along Bradford and Jersey islands.

Aquatic Habitat

Most of the barrier site is open water in West False River, which provides cover and foraging habitat for a variety of aquatic and water-dependent wildlife and native and non-native fish species. Small areas of emergent wetland vegetation, primarily hardstem bulrush (*Schoenoplectus acutus*), are scattered along the channel edges. The three proposed water quality monitoring stations would be placed in Woodward Cut and Railroad Cut, both of which provide perennial riverine habitat.

Terrestrial Cover

The waterside levee slopes are completely rock-lined and generally absent of vegetation. Depending on how recently levee maintenance activities have been conducted, weedy vegetation may be present at the waterside levee crown. Regularly maintained ruderal vegetation occurs landside of the levee roads on both islands. More natural habitat, including some wetland and riparian vegetation, is present more than 100 feet from the boundary of the Jersey Island staging area and 200 feet from the boundary of the barrier site on Bradford Island.

Terrestrial Wildlife Movement Corridors

Terms such as "habitat corridors," "linkages," "crossings," and "travel routes" are used to describe physical connections that allow wildlife to move between patches of suitable habitat in undisturbed landscapes, as well as environments fragmented by urban development.

Wildlife movement corridors are considered an important ecological resource by CDFW and USFWS and under CEQA. Movement corridors may provide favorable locations for wildlife to travel between different habitat areas such as foraging sites, breeding sites, cover areas, and preferred summer and winter range locations. They may also function as dispersal corridors, allowing animals to move between various locations within their range.

Topography and other natural factors, in combination with urbanization, can fragment or separate large areas of open space. Areas of human disturbance or urban development can fragment wildlife habitats and impede wildlife movement between areas of suitable habitat. This fragmentation creates isolated "islands" of habitat that may not provide sufficient area to accommodate sustainable populations, and can adversely affect genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange between separate populations.

No terrestrial wildlife movement corridors for terrestrial species have been identified within the barrier site, because the surrounding areas are islands (i.e., Jersey and Bradford islands) surrounded by water. The banks of West False River within the project area lack a riparian corridor, as they consist of riprap with sparsely established vegetation.

Sensitive Biological Resources

Aquatic Resources

West False River is considered a jurisdictional waters of the United States and of the State. West False River is a navigable waters of the United States, and dredge or fill activities within waters of the United States fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE). West False River is also protected under State regulations, including the Porter-Cologne Water Quality Control Act and the California Fish and Game Code. No jurisdictional wetlands are present in the terrestrial portions of the barrier site (i.e., areas located above the ordinary high-water mark). No other aquatic resources are present within the barrier site.

Special-Status Species

Special-status species are legally protected under the California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA) 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 ESA (Code of Federal Regulations Title 50, Section 17.12 [listed plants] and Section 17.11 [listed animals], and various notices in the *Federal Register* [proposed species]).

(2) Species listed by the State of California or candidates for listing as threatened or endangered under the CESA (California Code of Regulations Title 14, Section 670.5).

(3) Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).

(4) Animal species of special concern to CDFW.

(5) Animals fully protected under the California Fish and Game Code (Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

(6) 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).

(7) Plants considered by CDFW and CNPS to be "rare, threatened or endangered in California" (California Rare Plant Ranks [CRPRs] 1A, 1B, 2A, and 2B, in addition to CRPRs 3 and 4).[1]

Species recognized as falling into these categories are collectively referred to as "special-status species."

A list of special-status plant and wildlife species considered to potentially occur within the project area was developed using information queried from USFWS (U.S. Fish and Wildlife Service 2022a, 2022b, 2022c), CNPS (California Native Plant Society 2022a, 2022b), and the CNDDB (California Department of Fish and Wildlife 2022a, 2022b) (**Appendix D**). This list of species includes those species that occur or may occur in the regional vicinity of the project area. 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' habitat is not on the barrier site or the project area is outside of the species' known range.
- *Low:* Any habitat in the project area is of low quality for the species and there are no suitable migration corridors between documented occurrences and the project area and/or staging areas.
- *Moderate:* The species' required habitat occurs in the project area and/or suitable migration corridors exist.

[1] CDFW works in collaboration with CNPS to maintain a list of plant species native to California that have low numbers, have limited distribution, or are otherwise threatened with extinction. These species are categorized by their rarity in the CRPR system.

- *High:* The species has been documented in the vicinity of the project area.

Table 3.3-1 identifies the special-status species that have been determined to have at least moderate potential to occur in the project area. These species are discussed below.

TABLE 3.3-1
SPECIAL-STATUS SPECIES KNOWN OR WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name *Scientific Name*	Status (Federal/State/ CRPR)	Habitat Requirements	Potential to Occur
Plants			
Bristly sedge *Carex comosa*	–/–/2B.1	Coastal prairie, marshes and swamps, valley and foothill grassland, on lake margins, and wet places; elevation 0–2,100 feet. Blooms May–September.	**Moderate.** Marginal habitat is present in the project area on channel banks.
Delta mudwort *Limosella australis*	–/–/2B.1	Intertidal marshes: Sea level to 10 feet. Blooms May–August.	**Moderate.** Marginal habitat is present in the project area on channel banks.
Delta tule pea *Lathyrus jepsonii*	–/–/1B.2	Coastal and estuarine marshes: Sea level to 15 feet; riverbanks and levees near the water's edge. Blooms May–June.	**High.** This species has been observed near the project area on the waterside slope of the Jersey Island levee.
Marsh skullcap *Scutellaria galericulata*	–/–/2B.2	Lower montane coniferous forest, meadows and seeps, marshes and swamps, wet places; elevation 0–7,000 feet. Blooms June–September.	**Moderate.** Marginal habitat is present in the project area on channel banks.
Mason's lilaeopsis *Lilaeopsis masonii*	–/CR/1B.1	Freshwater and intertidal marshes and streambanks in riparian scrub; generally sea level to 30 feet. Blooms April–October.	**High**. This species has been observed near the project area on the waterside slope of the Jersey Island levee.
Side-flowering skullcap *Scutellaria lateriflora*	–/–/2B.2	Marshes and swamps, meadows and seeps; elevation 0–1,500 feet. Blooms July–September.	**Moderate.** Marginal habitat is present in the project area on channel banks.
Suisun Marsh aster *Symphyotrichum lentum*	–/–/1B.2	Marshes and swamps, often along sloughs; elevation 0–10 feet. Blooms May–November.	**High**. This species has been observed near the project area on the waterside slope of the Jersey Island levee.
Woolly rose-mallow *Hibiscus lasiocarpos* var. *occidentalis*	–/–/1B.2	Perennial herb found in marshes and swamps (freshwater); often found in riprap on sides of levees. Elevation 0 –390 feet. Blooms June–September.	**Moderate.** Marginal habitat is present in the project area on channel banks.
Fish			
Delta smelt *Hypomesus transpacificus*	FT/CE/–	Found in open surface waters in the Delta, and seasonally in Suisun Bay, the Carquinez Strait, and San Pablo Bay. Found in Delta estuaries with dense aquatic vegetation and a low occurrence of predators. May be affected by downstream sedimentation.	**High**. Although there are very few recent records of occurrence in the project area, numbers were higher historically.
Longfin smelt *Spirinchus thaleichthys*	–/CT/–	Estuarine open waters, mid- to lower water column. Prefers salinity of 15–30 ppt, except for spawning and early life stages when freshwater or low salinity is sought. Spawns over sandy or gravel substrate, rocks, and aquatic plants.	**High**. This species is seasonally present in the project area; numbers were higher historically.

TABLE 3.3-1
SPECIAL-STATUS SPECIES KNOWN OR WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name *Scientific Name*	**Status (Federal/State/ CRPR)**	**Habitat Requirements**	**Potential to Occur**
Central Valley steelhead DPS *Oncorhynchus mykiss*	FT/–/–	Inhabits rivers and streams tributary to the Sacramento and San Joaquin rivers and Delta ecosystems.	**High**. This species is seasonally present in the project area.
Central Valley spring-run Chinook salmon ESU *Oncorhynchus tshawytscha*	FT/CT/–	Inhabits rivers and streams tributary to the Sacramento and San Joaquin rivers and Delta ecosystems.	**High**. This species is seasonally present in the project area.
Central Valley fall-/late-fall-run Chinook salmon ESU *Oncorhynchus tshawytscha*	EFH/ CSC/–	Inhabits rivers and streams tributary to the Sacramento and San Joaquin rivers and Delta ecosystems.	**High**. This species is seasonally present in the project area.
Sacramento River winter-run Chinook salmon ESU *Oncorhynchus tshawytscha*	FE/CE/–	Inhabits rivers and streams tributary to the Sacramento and San Joaquin rivers and Delta ecosystems.	**High**. This species is seasonally present in the project area.
Green sturgeon *Acipenser medirostris*	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 estuary.	**High**. This species is expected to be present at least seasonally in the project area.
Sacramento splittail *Pogonichthys macrolepidotus*	–/CSC/–	Sloughs, lakes, and rivers. Estuaries up to 29 ppt salinity. Low to moderate current. Inundated vegetation for spawning.	**High**. This species' potential to occur is high based on known historic occurrences.
Pacific lamprey *Entosphenus tridentata*	FSC/–/–	Streams, mainstem rivers, estuaries, and nearshore ocean.	**High.** This species is likely to be seasonally present in the project area during its migration period.
River lamprey *Lampetra ayresi*	–/CSC/–	Streams, mainstem rivers, estuaries, and nearshore ocean.	**High.** This species is likely to be seasonally present in the project area during its migration period.
Starry flounder *Platichthys stellatus*	EFH/–/–	Benthic habitats of brackish and occasionally freshwater parts of streams with extensive estuaries, as far as the first riffle. Nearshore ocean.	**Moderate.** This species has to potential to be present seasonally in the project area.

TABLE 3.3-1
SPECIAL-STATUS SPECIES KNOWN OR WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name *Scientific Name*	Status (Federal/State/ CRPR)	Habitat Requirements	Potential to Occur
Wildlife			
Invertebrates			
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT/–/–	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus nigra* ssp. *caerulea*). Prefers to lay eggs in elderberry stems 2–8 inches in diameter; some preference shown for "stressed" elderberries.	**Moderate**. No elderberry shrubs, the host plants of valley elderberry longhorn beetle, were observed within 500 feet of the drought salinity barrier site, the Rio Vista stockpile site, and Weber off-loading or stockpile sites. However, elderberry shrubs with stems at least 1 inch in diameter at ground level could become established within the drought salinity barrier site or the Rio Vista and Weber off-loading and stockpile sites in the future.
Amphibians/Reptiles			
Giant garter snake *Thamnophis gigas*	FT/CT/–	Highly aquatic snake; requires water throughout summer. Found in freshwater marsh, ditches, sloughs, and similar aquatic habitat with bankside vegetation such as tule and cattail for basking and cover from predators. Also uses inundated rice fields. Requires nearby uplands with small-mammal burrows above flood height for refuge and winter brumation.	**High**. This species was observed within the project area during the 2015 EDB installation. However, the species was not observed within the drought salinity barrier site or the Weber off-loading and stockpile sites during monitoring conducted in June 2021 and January 2022.
Western pond turtle *Emys marmorata*	–/CSC/–	Agricultural wetlands and other wetlands such as irrigation and drainage canals, low-gradient streams, marshes, ponds, sloughs, small lakes, and associated uplands.	**High**. This species was observed in the vicinity of the project area during the 2015 EDB installation. However, the species was not observed within the drought salinity barrier site or the Weber off-loading and stockpile sites during monitoring conducted in June 2021 and January 2022. This species was observed from the Jersey Island side during a Swainson's hawk survey conducted in March–April 2022.
Birds			
Burrowing owl *Athene cunicularia*	–/CSC/–	Forages in open plains, grasslands, and prairies; typically nests in abandoned small-mammal burrows.	**Moderate.** This species may be present within and near the project area.
Song sparrow ("Modesto" population) *Melospiza melodia*	–/CSC/–	Nests on the ground and in marshes. Inhabits grassland, chaparral, orchard, woodland, wetland, riparian, and scrub-shrub habitats.	**Moderate**. Suitable habitat is present within the project area and stockpile areas along vegetated areas by West False River and other water features.

TABLE 3.3-1
SPECIAL-STATUS SPECIES KNOWN OR WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name *Scientific Name*	Status (Federal/State/ CRPR)	Habitat Requirements	Potential to Occur
Swainson's hawk *Buteo swainsoni*	–/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.	**High**. The mature trees in the vicinity of the project area provide suitable nesting habitat, and the agricultural land and grassland habitat in the area provides suitable foraging habitat for this species.
White-tailed kite *Elanus leucurus*	–/CFP/–	Forages in ponds, marshes, slow-moving streams, sloughs, and irrigation ditches; nests in nearby uplands with low, sparse vegetation.	**High**. The project area presents suitable habitat for this species. This species has been observed flying and perching near the project area in March 2022.
Mammals			
Pallid bat *Antrozous pallidus*	–/CSC/–	Deserts, grasslands, shrublands, woodlands, and forests; most common in open, dry habitats; roosts in rock crevices, oak hollows, bridges, and buildings.	**Moderate**. Potential roosting habitat for this species is present in the trees near the project area. Unidentified bats were observed foraging in the vicinity of the drought barrier site, generally after midnight. during the 2021 EDB construction.
Western red bat *Lasiurus blossevillii*	–/CSC/–	Inhabits cismontane woodland, lower montane coniferous forest, riparian forest, and riparian woodland.	**Moderate**. Potential roosting habitat for this species is present in the trees near the project area. Unidentified bats were observed foraging in the vicinity of the drought barrier site, generally after midnight. during the 2021 EDB construction.

Status Codes

Federal:
- FE = federal endangered
- FT = federal threatened
- FC = candidate
- PT = proposed threatened
- FPD = proposed for delisting
- FD = delisted
- FSC = federal species of concern

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

CNPS Rank Categories:
- 1A = Plants presumed extirpated in California and either rare or extinct elsewhere
- 1B = Plants Rare, Threatened, or Endangered in California and elsewhere
- 2A = Plants presumed extirpated in California, but more common elsewhere
- 2B = Plants Rare, Threatened, or Endangered in California, but more common elsewhere
- 3 = Plants about which more information is needed—A Review List
- 4 = Plants of limited distribution—A Watch List

CNPS Code Extensions:
- .1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
- .2 = Fairly endangered in California (20–80% occurrences threatened)
- .3 = Not very endangered in California (less than 20% of occurrences threatened or no current threats known)

NOTES: CNPS = California Native Plant Society; CRPR = California Rare Plant Rank; Delta = Sacramento–San Joaquin Delta; DPS = distinct population segment; EDB = emergency drought barrier; ESU = evolutionarily significant unit; ppt = parts per thousand

SOURCES: California Natural Diversity Database 2022; California Department of Fish and Wildlife 2022a, 2022b; California Native Plant Society 2022a, 2022b; U.S. Fish and Wildlife Service 2022a, 2022b, 2022c

Special-Status Plants

Eight special-status plant species have potential to occur at the drought salinity barrier site, near the locations of the proposed water quality monitoring stations, and at the Weber off-loading site where the barges would load and unload rock; these species are discussed below. The Rio Vista stockpile site does not provide suitable habitat for any special-status plant species because the stockpile sites are completely disturbed/developed and are landlocked.

Bristly Sedge

Bristly sedge (*Carex comosa*) has a CRPR of 2B.1. Bristly sedge is a perennial rhizomatous herb that occurs within coastal prairie, marshes and swamps, and valley and foothill grassland. The blooming period extends from May through September. The closest documented CNDDB occurrence of this species is approximately 4.4 miles northeast of the drought salinity barrier site at the southwest corner of Webb Tract (California Natural Diversity Database 2022). No occurrences of this species have been documented in the vicinity of the proposed water quality monitoring stations, the Weber stockpile and off-loading sites, or the Rio Vista stockpile site. This species was not observed during the 2015 and May 13, 2021, preconstruction surveys of the drought salinity barrier site.

Delta Mudwort

Delta mudwort (*Limosella australis*) has a CRPR of 2B.1. Delta mudwort is a perennial stoloniferous herb that typically occurs on mud banks in marsh, swamp, and riparian scrub habitat. The blooming period extends from May through August. The closest documented CNDDB occurrence of this species is approximately 1.1 miles east of the drought salinity barrier site at the southwest corner of Webb Tract (California Natural Diversity Database 2022). The closest documented occurrence of this species to the proposed water quality monitoring stations is approximately 0.6 mile to the west along Railroad Cut and Old River. No occurrences of this species have been documented in the vicinity of the Weber stockpile and off-loading sites and the Rio Vista stockpile site. This species was not observed during the 2015 and May 13, 2021, preconstruction surveys of the drought salinity barrier site.

Delta Tule Pea

Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*) has a CRPR of 1B.2. Delta tule pea is a perennial vine in the pea family that flowers from May through June. It occurs in freshwater and brackish marshes and swamps and grows in areas that are often deeply inundated during flood events. The CNDDB includes occurrences approximately 1 mile west and 1.5 miles east of the drought salinity barrier site and within 1 mile northeast of the Rio Vista stockpile site (California Natural Diversity Database 2022). No occurrences of this species have been documented in the vicinity of the proposed water quality monitoring stations or the Weber stockpile and off-loading site. Delta tule pea was found waterside of the Jersey Island levee, approximately 200 feet east of the footprint for the drought salinity barrier, during preconstruction surveys conducted in 2015 for the 2015 EDB project (California Department of Water Resources 2015) and on May 13, 2021.

Marsh Skullcap

Marsh skullcap (*Scutellaria galericulata*) has a CRPR of 2B.2. Marsh skullcap is a perennial rhizomatous herb found in lower montane coniferous forest, meadows and seeps, and marshes and swamps. The blooming period extends from June through September. The closest documented CNDDB occurrence of this species is approximately 4.7 miles east of the drought barrier site near Franks Tract (California Natural Diversity Database 2022). No occurrences of this species have been documented in the vicinity of the proposed water quality monitoring stations, the Weber stockpile and off-loading site, or the Rio Vista off-loading site. This species was not observed during the 2015 and May 13, 2021, preconstruction surveys of the drought salinity barrier site.

Mason's Lilaeopsis

Mason's lilaeopsis (*Lilaeopsis masonii*) has a CRPR of 1B.1. Mason's lilaeopsis is a perennial rhizomatous herb in the carrot family that flowers from April through October. This species occurs along the edges of rivers and sloughs throughout the Delta, particularly the Central and West Delta. The CNDDB includes an occurrence approximately 0.5 mile east and west of the drought salinity barrier site and 2.7 miles northeast of the Rio Vista off-loading site (California Natural Diversity Database 2022). No occurrences of this species have been documented in the vicinity of the Weber stockpile and off-loading site. The species is known to occur near the locations where the water quality monitoring stations would be installed, but installing the monitoring stations is unlikely to affect any shoreline vegetation. The riprap along the outer perimeter of the Weber stockpile and off-loading site and the Rio Vista off-loading site could provide habitat for this species, although no work is occurring along the banks. Mason's lilaeopsis was found waterside of the Jersey Island levee, approximately 1,100 feet east of the footprint for the drought salinity barrier, during preconstruction surveys conducted in 2015 for the 2015 EDB project (California Department of Water Resources 2015) and on May 13, 2021.

Side-Flowering Skullcap

Side-flowering skullcap (*Scutellaria lateriflora*) has a CRPR of 2B.2. Side-flowering skullcap is a perennial rhizomatous herb that occurs in meadows, seeps, and marshes and swamps. The blooming period extends from July through September. This species has been documented in scattered locations within the Delta. The closest CNDDB occurrences for this species are located on Bouldin Island approximately 7 miles northeast of the drought salinity barrier site (California Natural Diversity Database 2022). No occurrences of this species have been documented in the vicinity of the water quality monitoring stations, the Weber stockpile and off-loading site, or the Rio Vista off-loading site. This species was not observed during the 2015 and May 13, 2021, preconstruction surveys of the drought salinity barrier site.

Suisun Marsh Aster

Suisun Marsh aster (*Symphyotrichum lentum*) has a CRPR of 1B.2. Suisun Marsh aster is a rhizome-forming perennial in the sunflower family that occurs in brackish water and wetlands, and flowers from May through November. This species is found throughout the Delta, often on the banks of sloughs. The CNDDB includes an occurrence of the species that extends along a portion of the Jersey Island levee that includes the drought salinity barrier site (California Natural Diversity Database 2022). Suisun Marsh aster is known to occur near the locations where the water quality monitoring stations would be installed, but installing the monitoring stations is unlikely to affect any shoreline vegetation. The nearest CNDDB occurrence is 0.5 mile south of the Rio Vista off-loading site. No occurrences of this species have been documented in the vicinity of the Weber stockpile and off-loading site. Suisun Marsh aster was found during the 2015 EDB and May 13, 2021, preconstruction surveys conducted at the same location as for Mason's lilaeopsis, approximately 1,100 feet east of the drought salinity barrier site (California Department of Water Resources 2015).

Woolly Rose-Mallow

Woolly rose-mallow (*Hibiscus lasiocarpos* var. *occidentalis*) has a CRPR of 1B.2. Woolly rose-mallow is found almost exclusively in the Sacramento Valley and the Delta. This species is a perennial herb to subshrub in the mallow family that blooms with large, showy flowers from June through September. It grows in freshwater marshes and along the banks of rivers and sloughs, including within riprap along levee slopes. The nearest documented occurrence is approximately 1.3 miles east of the drought salinity barrier site and approximately 1.7 miles southwest of the Rio Vista off-loading site (California Natural Diversity Database 2022). The species is known to occur near the locations where the water quality monitoring stations would be installed, but installing the monitoring stations is unlikely to affect any shoreline vegetation. No occurrences of this species have been documented in the vicinity of the Weber stockpile and off-loading site. This species was not observed during the 2015 and May 13, 2021, preconstruction surveys of the drought salinity barrier site.

Special-Status Fish

Various special-status fish species occur in the Delta at some stage of their life histories, including several that are federally listed and/or State-listed as threatened or endangered. The waterways in which the proposed drought salinity barrier and water quality monitoring stations would be placed function primarily as migration or dispersal corridors for these species. The life history characteristics of special-status fish species that likely occur at the drought salinity barrier site are summarized below. No aquatic habitat for special-status fish is present on or adjacent to the Rio Vista and Weber off-loading and stockpile sites.

Delta Smelt

Delta smelt (*Hypomesus transpacificus*) is federally listed as threatened and State-listed as endangered. Adult delta smelt spawn during the late winter and spring months, with most spawning occurring during April through mid-May (Moyle 2002). Spawning occurs primarily in sloughs and shallow edge areas in the Delta. Delta smelt spawning has also been recorded in Suisun Marsh and the Napa River (Moyle 2002).

Most of what is known about delta smelt spawning habitat in the wild is inferred from the locations of spent females and young larvae captured in the CDFW Spring Kodiak Trawl and 20-mm (Millimeter) Survey activities, respectively. The locations in the Delta where newly hatched larvae are present most likely indicate spawning occurrence. The 20-mm trawl has captured small (5 mm standard length) larvae in the Cache Slough Complex, the lower Sacramento River, and the San Joaquin River, and at the confluence of these two rivers (e.g., 20-mm trawl Survey 1 in 2005). Larger larvae and juveniles (size >23 mm standard length), which are more efficiently sampled by the 20-mm trawl gear, have been captured in Cache Slough and the Sacramento Deep Water Channel in July (e.g., 20-mm trawl Survey 9 in 2008).

The timing of spawning may affect the population dynamics of delta smelt. Temperature is a critical driver of the timing, with spawning occurring when water temperatures are between 9 and 18 degrees Celsius (Damon et al. 2016). Lindberg (pers. comm., 2011) has suggested that smelt larvae that hatch early, around late February, have an advantage over larvae hatched during late spawning in May. Early-season larvae have a longer growing season and may be able to grow larger faster during more favorable habitat conditions in the late winter and early spring. An early growing season may result in higher survivorship and a stronger spawning capability for that generation. Larvae hatched later in the season have a shorter growing season, which effectively reduces survivorship and spawning success for the following spawning season.

At all life stages, delta smelt are found in greatest abundance in the water column and usually not in close association with the shoreline; however, it has been postulated that spawning occurs over shallow sandy habitats, potentially in nearshore areas. Delta smelt inhabit open, surface waters of the Delta and Suisun Bay, where they presumably aggregate in loose schools where temperature, salinity, and turbidity conditions are favorable (Moyle 2002). In years of moderate to high Delta outflow (above-normal to wet water years), delta smelt larvae are abundant in the Napa River, Suisun Bay, and Montezuma Slough. The degree to which these larvae are produced by locally spawning fish versus originating upstream and being transported by tidal currents to the bay and marsh is uncertain, although otolith microchemistry studies indicate larval hatching in these areas (Hobbs et al. 2007).

Most young-of-the-year delta smelt rear in the low-salinity zone from late spring through fall and early winter. Once these fish are in the rearing area, growth is rapid, and juvenile delta smelt are 40–50 mm standard length by early August (Erkkila et al. 1950; Ganssle 1966; Radtke 1966). They reach adult size (55–70 mm standard length) by early fall (Moyle 2002). Delta smelt growth slows considerably during the fall months (only 3–9 mm total), presumably because most of the energy ingested is being directed toward gonadal development (Erkkila et al. 1950; Radtke 1966). Some delta smelt remain in areas upstream of the low-salinity zone, particularly the Cache Slough Complex including Liberty Island and the Sacramento Deep Water Ship Channel (Sommer et al. 2011; Sommer and Mejia 2013).

Naturally occurring delta smelt populations are on the decline. Delta smelt abundance, as indexed by relative abundance in fall midwater trawling conducted since 1967, underwent downward step changes in the early 1980s and again in the early 2000s (Thomson et al. 2010). Recently, efforts have been made to introduce hatchery-reared delta smelt back into the wild to supplement delta smelt populations. Between December 2021 and February 2022, a total of 55,733 hatchery-reared delta smelt were released in the North Delta at locations near Rio Vista, Suisun Marsh, and the Sacramento Deep Water Ship Channel.

Designated critical habitat for delta smelt includes all contiguous waters within the legal Delta, including West False River and the barrier site, and the Sacramento and San Joaquin rivers, which are adjacent to the Rio Vista and Weber stockpile facilities.

Longfin Smelt

Longfin smelt (*Spirinchus thaleichthys*) is State-listed as threatened. Longfin smelt typically spawn in their second year of life, largely in the freshwater tidal portion of the upper estuary, but also in brackish tidal marsh habitats farther downstream (Grimaldo et al. 2017; Lewis et al. 2019). Adults generally migrate upstream to the Delta and spawn in freshwater areas as temperatures drop in fall, from November onward. Larvae and early juveniles are subsequently found in upstream areas from January until spring, when they migrate downstream (Moyle 2002; Baxter et al. 1999). Larval abundance in the San Francisco Bay–Delta estuary peaks in January–March (California Department of Fish and Game 2009). Larvae then move downstream into nursery areas in the western Delta and Suisun and San Pablo bays (Baxter et al. 1999).

Central Valley Steelhead Distinct Population Segment

The Central Valley steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) is federally listed as threatened. The peak of adult steelhead upstream migration on the Sacramento River occurs from August through November, with relatively low abundance from December/January to July (Hallock et al. 1957). Spawning occurs during the winter and spring months. Fry emerge from the gravel usually about 4–6 weeks after hatching, but factors such as redd depth, gravel size, siltation, and temperature can speed or retard this time (Shapovalov and Taft 1954). Newly emerged fry move to the shallow, protected areas associated with the stream margin (McEwan and Jackson 1996) and soon move to other areas of the stream and establish feeding locations, which they defend (Shapovalov and Taft 1954). Steelhead rearing during the summer takes place primarily in higher velocity areas in pools, although young-of-year also are abundant in glides and riffles. Productive steelhead habitat is characterized by complexity, primarily in the form of large and small woody debris. Cover is an important habitat component for juvenile steelhead, both as velocity refugia and as a means of avoiding predation (Meehan and Bjornn 1991).

Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows. Emigrating California Central Valley steelhead use the Delta for rearing and as a migration corridor to the ocean. Juveniles feed mostly on drifting aquatic organisms and terrestrial insects and will also take active bottom invertebrates (Moyle 2002).

Some steelhead may utilize tidal marsh areas, nontidal freshwater marshes, and other shallow-water areas in the Delta as rearing areas for short periods before their final emigration to the sea. Hallock et al. (1961) found that juvenile steelhead in the Sacramento River basin migrate downstream during most months of the year, but the peak period of emigration occurs in the spring, with a much smaller peak in the fall. Nobriga and Cadrett (2001) have verified these temporal findings based on an analysis of captures at Chipps Island.

Designated critical habitat for Central Valley steelhead includes the major waterways of the Delta, including the drought salinity barrier site, the Sacramento River adjacent to the Rio Vista stockpile site, and the San Joaquin River adjacent to the Weber stockpile site. Use of the Rio Vista and Weber facilities for the proposed project is not expected to affect aquatic habitats for steelhead. The presence of the drought salinity barrier has the potential to indirectly affect water quality and hydrodynamics.

Central Valley Spring-Run Chinook Salmon Evolutionarily Significant Unit

The Central Valley spring-run Chinook salmon evolutionarily significant unit (ESU) is federally listed and State-listed as threatened. Historically, the spring-run Chinook salmon were the second most abundant salmon run in the Central Valley (California Department of Fish and Game 1998). These fish occupied the upper and middle reaches (1,000–6,000 feet) of the San Joaquin, American, Yuba, Feather, Sacramento, McCloud, and Pit rivers, with smaller populations in most tributaries with sufficient habitat for over-summering adults (Stone 1874; Rutter 1904; Clark 1929).

The Central Valley Technical Review Team has estimated that historically there were 18 or 19 independent populations of Central Valley spring-run Chinook salmon, along with a number of dependent populations and four diversity groups (Lindley et al. 2004). Of these 18 populations, only three populations are extant (Mill, Deer, and Butte creeks on the upper Sacramento River) and they represent only the Northern Sierra Diversity Group. All populations in the Basalt and Porous Lava Group and the Southern Sierra Nevada Group have been extirpated. Adult Central Valley spring-run Chinook salmon leave the ocean to begin their upstream migration in late January and early February (California Department of Fish and Game 1998) and enter the Sacramento River between March and September, primarily in May and June (Yoshiyama et al. 1998; Moyle 2002). Lindley et al. (2004) indicate that adult Central Valley spring-run Chinook salmon enter their native tributaries from the Sacramento River primarily between mid-April and mid-June. Typically, spring-run Chinook salmon utilize mid- to high-elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow over-summering while conserving energy and allowing their gonadal tissue to mature (Yoshiyama et al. 1998).

Spring-run Chinook salmon fry emerge from the gravel from November to March (Moyle 2002) and their emigration timing is highly variable, as they may migrate downstream as young-of-the-year or as juveniles or yearlings. The emigration period for spring-run Chinook salmon extends from November to early May, with up to 69 percent of the young-of-the-year fish out-migrating through the lower Sacramento River and Delta during this period (California Department of Fish and Game 1998). Peak movement by juvenile Central Valley spring-run Chinook salmon in the Sacramento River at Knights Landing occurs in December, and again in March and April. However, juveniles are also observed between November and the end of May (Snider and Titus 2000). Based on the available information, the emigration timing of Central Valley spring-run Chinook salmon appears highly variable (California Department of Fish and Game 1998). Some fish may begin emigrating soon after their emergence from the gravel, while others over-summer and emigrate as yearlings with the onset of intense fall storms (California Department of Fish and Game 1998).

Designated critical habitat for Sacramento River spring-run Chinook salmon in the Delta includes the Sacramento River and several connected waterways, but it does not include the drought salinity barrier site. However, the barrier has potential to indirectly affect water quality and the hydrodynamics of the Sacramento River. The Rio Vista stockpile site is also located adjacent to the Sacramento River, which serves as designated critical habitat for this species. Use of the stockpile location for the proposed project is not expected to affect aquatic habitats, as all activities would be land-based.

Central Valley Fall-/Late-Fall-Run Chinook Salmon Evolutionarily Significant Unit

The Central Valley fall-/late-fall-run Chinook salmon (*Oncorhynchus tshawytscha*) ESU is a federal species of concern and a California species of special concern. Adults of this species enter the Sacramento River system from mid-September through January, with their numbers peaking from mid-October through December. Spawning occurs in the Sacramento and San Joaquin rivers and the tributaries to these rivers, but not the Delta, from mid-October through early February, with peak spawning activity occurring from mid-October through December. During spawning, female salmon dig a redd (gravel nest) where eggs are deposited and then fertilized by the male. Newly emerged fry remain in shallow, lower velocity edgewaters, particularly where debris congregates and provides cover from predators.

Juvenile fall-/late-fall-run Chinook salmon typically rear in fresh water in their natal streams, the Sacramento River system, 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. Important habitat during this period includes flooded bars, side channels, and overbank areas with relatively low water velocities, cover structures, space, and food.

Suitable habitat includes areas with instream and overhead cover in the form of undercut banks, downed trees, and large overhanging tree branches. As juveniles grow, they typically move into deeper water with higher current velocities, but still use velocity refugia to minimize energy expenditures.

Migrational cues, including increasing flows and turbidity from runoff, changes in photoperiod, or intraspecific competition from other fish in their natal streams, stimulate out-migration by juveniles that have reached the appropriate stage of maturation (Kjelson et al. 1982; Brandes and McLain 2001). In larger rivers, juveniles tend to migrate along the channel margins, avoiding the higher water velocities in the deepest part of the channel. When the river channel is relatively deep, juvenile salmon tend to use surface waters (Healey 1982).

Sacramento River Winter-Run Chinook Salmon Evolutionarily Significant Unit

The Sacramento River winter-run Chinook salmon ESU is federally listed and State-listed as endangered. Adults of this species leave the ocean and migrate through the Delta and into the Sacramento River system, the only system in which they spawn, beginning in November. They migrate upstream past Red Bluff Diversion Dam from mid-December through July, and most of the spawning population has passed Red Bluff Diversion Dam by late June. They spawn from mid-April through August.

Juvenile Sacramento River winter-run Chinook salmon occur in the Delta primarily from November through early May, based on data collected from trawls in the Sacramento River at West Sacramento (River Mile 57) (U.S. Fish and Wildlife Service 2001a, 2001b). The timing of migration may vary somewhat because of changes in river flows, dam operations, and water year type. Winter-run Chinook salmon juveniles remain in the Delta until they reach a fork length of approximately 118 mm and are 5–10 months of age; they then begin emigrating to the ocean as early as November, with emigration continuing to May (Fisher 1994; Myers et al. 1998; del Rosario et al. 2013).

Designated critical habitat for Sacramento River winter-run Chinook salmon in the Delta is limited to the Sacramento River and does not include the drought salinity barrier site; however, the Rio Vista stockpile location is adjacent to the Sacramento River, which serves as designated critical habitat for the species. Proposed project activities associated with the use of the stockpile locations would be land-based and are not expected to affect aquatic habitats. However, the presence of the barrier has the potential to indirectly affect water quality and the hydrodynamic characteristics of nearby waterways. The hydrodynamic effects of the drought salinity barrier on out-migrating juvenile winter-run Chinook salmon would be limited because most juveniles would be expected to have left the Delta before closure of the barrier.

Green Sturgeon

The southern DPS of North American green sturgeon (*Acipenser medirostris*) is federally listed as threatened. This species is believed to spawn every 2–5 years, with most spawning occurring at intervals of 3–4 years (Beamesderfer et al. 2007; Brown 2007; Poytress et al. 2012). Adults begin their upstream spawning migrations into fresh water in late February, and spawning occurs between March and July (California Department of Fish and Game 2002; Heublein 2006; Heublein et al. 2009; Vogel 2008). Peaks in spawning activity are influenced by factors that include water flow and temperature (Heublein et al. 2009; Poytress et al. 2011). Peak spawning is believed to occur between April and June. Spawning occurs primarily in cool sections of the upper mainstem Sacramento River in deep pools containing clean gravel or cobble substrate (Poytress et al. 2011). Post-spawn fish may hold for several months in the Sacramento River and out-migrate in the fall, or move into and out of the river quickly during the summer months, although the holding behavior is the behavior that is most commonly observed (Heublein et al. 2009).

Designated critical habitat for the southern DPS of green sturgeon includes most stream channels and waterways in the Delta, including West False River at the drought salinity barrier site, the San Joaquin River adjacent to the Weber stockpile location, and the Sacramento River adjacent to the Rio Vista stockpile location. Proposed rock off-loading activities at each stockpile location are not expected to create any aquatic impacts.

Sacramento Splittail

Sacramento splittail (*Pogonichthys macrolepidotus*) is a State species of special concern that is largely confined to the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh. Outside of the spawning season, the species is rarely found more than 5–10 miles above the upstream boundaries of the Delta (Moyle et al. 1989; Natural Heritage Institute 1992). Spawning runs, however, are more extensive, with major spawning and nursery areas in the Yolo and Sutter bypasses and riparian areas on the lower Cosumnes River during years of high runoff when floodplains are inundated (Sommer et al. 1997, 2011; Crain et al. 2004). Splittail spawn adhesive eggs over flooded streambanks or aquatic vegetation. Spawning has been observed to occur as early as January and to continue through July (Wang 1986), but peak spawning occurs from March through May. Larval splittail are commonly found in shallow, weedy areas where spawning occurs and eventually move into deeper open-water habitats as they grow and become juveniles (Wang 1986).

Pacific Lamprey

Pacific lamprey (*Entosphenus tridentata*) is a federal species of concern. Pacific lamprey is a semelparous (i.e., spawning once and then dying) anadromous fish with a very long freshwater rearing period. Adults of this species spend 6 months to 3½ years in the marine environment and typically return to fresh water in spring and summer. They usually hold in low-velocity areas under large boulders and bedrock crevices before spawning the following spring. Pacific lamprey generally spawn between March and July in gravel-bottom streams, usually at the upstream end of riffle habitat and near suitable habitat for their ammocoetes larvae.

Ammocoetes drift downstream to areas of low stream velocity and burrow into sand or silt substrate, typically in depositional areas with soft substrate near stream margins associated with pools, alcoves, and glides. They are mostly sedentary and remain burrowed in the stream substrate for 3–7 years, filter-feeding on algae, diatoms, and detritus. Ammocoetes move downstream during high-flow events or if disturbed, and metamorphose into the subadult form (macropthalmia), generally from July through November. Out-migration to the ocean occurs during or shortly after transformation and generally peaks with rising stream and river flows in late winter or early spring. (Brostrom et al. 2010.)

River Lamprey

River lamprey (*Lampetra ayresi*) is a State species of special concern thought to occur throughout Pacific coast streams. In California, the species occurs in tributaries of San Francisco Bay, such as the Napa River, Sonoma Creek, and Alameda Creek, as well as the Sacramento, San Joaquin, and Russian rivers (Moyle et al. 1995; Moyle 2002). Limited information is available regarding the life history of this species in California. Current accounts are based mainly on information from Canadian populations (Moyle 2002).

Like Pacific lamprey, river lamprey is semelparous and has a long freshwater rearing period. Adults return to fresh water in fall and winter, and spawning usually occurs in gravelly riffles in small tributary streams from February through March (Moyle 2002). Ammocoetes remain in silty backwater habitats, where they filter-feed on various microorganisms for approximately 3–5 years before migrating to the ocean in late spring (Moyle et al. 1995; Moyle 2002).

Starry Flounder

The drought salinity barrier site occurs within designated essential fish habitat for starry flounder (*Platichthys stellatus*). The species is managed by the Pacific Fishery Management Council under the Pacific Coast Groundfish Fishery Management Plan. Most spawning occurs in estuaries or sheltered inshore bays (Pacific Fishery Management Council 2019). In California, starry flounder spawn from November to February, with spawning peaking in December (Pacific Fishery Management Council 2019). Larvae are found in estuaries and nearshore areas. Larvae are planktivorous. Juveniles are found in estuaries and the lower reaches of major coastal rivers. They feed on copepods, amphipods, and annelid worms. Adults can feed on a wider variety of items including carbs, clams, and benthic fishes (Pacific Fishery Management Council 2019).

Special-Status Wildlife

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) 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.

The life history of valley elderberry longhorn beetle is not well known. Adult beetles are active from March to June, their assumed breeding season. Adults lay eggs in the crevices of bark of elderberry plants with stems 1 inch or greater in diameter at ground level. Larvae hatch days later and bore into the stem of the elderberry shrubs, where they feed on the pith. Larvae cut an emergence/exit hole through the wood and bark of the elderberry plant before pupation inside the stem, and emerge as adults in the spring. Adults can fly between elderberry plants. Evidence of use by valley elderberry longhorn beetle is more commonly observed for clumps of elderberry bushes than for isolated bushes.

Adult valley elderberry longhorn beetles are poor dispersers (Barr 1991; Collinge et al. 2001), and they have rarely been observed to colonize new, unoccupied sites, particularly when unoccupied sites are more than approximately 12 miles from occupied sites (Collinge et al. 2001). Populations typically occur as discrete clusters distributed along river reaches. Local aggregations of valley elderberry longhorn beetle are influenced by habitat patch characteristics, such as the size of the patch, presence of large shrubs and diversity of stem sizes, and habitat connectivity (Talley 2007; Talley et al. 2007). The current presumed range extends throughout the Central Valley from Shasta County to Fresno County within the valley floor and lower foothills (U.S. Fish and Wildlife Service 2017a).

No CNDDB occurrences have been documented within or in the vicinity of the drought salinity barrier site, the Weber stockpile and off-loading sites, the Rio Vista stockpile site, or the locations of the proposed water quality monitoring stations. No elderberry shrubs, the host plants of valley elderberry longhorn beetle, were observed within 500 feet around the Rio Vista off-loading or stockpile site during the December 20, 2019, reconnaissance-level site visit. No elderberry shrubs were observed within 500 feet of the drought salinity barrier site or the Weber off-loading or stockpile sites during monitoring activities conducted in 2021 and 2022. However, elderberry shrubs with stems at least 1 inch in diameter at ground level could become established within these areas in the future, within the potential installation schedule.

Giant Garter Snake

Giant garter snake is federally listed and State-listed as threatened. Giant garter snake resides in marshes, ponds, sloughs, small lakes, low-gradient streams, and other waterways and agricultural wetlands, including irrigation and drainage canals, rice fields, and the adjacent uplands. The ideal aquatic habitat for this species includes the presence of water from March through November, slow-moving or static water with mud substrate, the presence of emergent or bankside vegetation that provides cover from predators, available prey in the form of small amphibians and small fish, basking sites with adjacent vegetation for cover, the absence of large predatory fish, and the absence of flooding that would inundate upland refugia (U.S. Fish and Wildlife Service 2017b). In areas where naturally occurring wetlands have been converted to agriculture, giant garter snake occurs in association with rice cultivation and water supply canals that approximate the aquatic habitat functions of the species' native wetland habitats (Hansen 1986; Wylie et al. 1997, 2000, 2005; Halstead et al. 2015; U.S. Fish and Wildlife Service 2017b).

Although giant garter snake is predominantly an aquatic species, individuals use upland areas near aquatic habitat during their active seasons in the spring and summer and during their inactive season. Upland habitat is used for basking to regulate body temperature, and for cover. Giant garter snakes utilize small-mammal burrows and crevices in the soil in the inactive season for brumation, and in the active season to avoid predation and extreme heat. Giant garter snakes also use roadways, levee crowns, and riprap along levee slopes for basking.

Giant garter snake habitat requirements consist of: (1) adequate water during the snake's active season (roughly April 1–October 1, occasionally as early as March) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and tule, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from floodwaters during the snake's inactive season (U.S. Fish and Wildlife Service 2017b).

Eight CNDDB occurrences of this species have been documented on the Jersey Island quadrangle (California Natural Diversity Database 2022). Two CNDDB records (occurrence numbers 402 and 406) were documented in 2015 within 1 mile of the drought salinity barrier site. Occurrence number 406 was a dead adult that was found on Ferry Road approximately 1 mile from the project area. Occurrence 402 included several giant garter snakes that were observed along West False River on Jersey Island within or adjacent to the construction area, two of which were subsequently relocated from the active construction site after approval from USFWS and CDFW (California Department of Water Resources 2019).

One CNDDB occurrence of this species has been documented within 1 mile west of the Weber stockpile and off-loading site. The nearest occurrence is approximately 1.6 miles northwest of the Rio Vista stockpile site. No occurrences of this species have been documented in the vicinity of the proposed water quality monitoring stations.

Giant garter snakes were not observed during the June 2021 construction of the 2021–2022 EDB, during the January 2022 notching of the 2021–2022 EDB, or during the April 2022 refilling of the notch associated with the 2021–2022 EDB. The intertidal zone at West False River within the drought salinity barrier site and other aquatic features on Jersey and Bradford islands provide aquatic habitat for giant garter snake. The staging area and levee roads provide upland movement and habitat between the irrigation ditches, the landside marsh, and the drought salinity barrier site.

The levee bank along the Sacramento River at the Rio Vista off-loading site may provide suitable habitat for giant garter snake, as giant garter snakes have been found at other locations along the Sacramento River. The Rio Vista rock stockpile yard is located farther inland and is not within 200 feet of suitable aquatic habitat; therefore, the presence of giant garter snakes there is considered unlikely. The Weber off-loading site and stockpile yard are located along the Stockton Deep Water Ship Channel, and giant garter snakes have been documented along this channel historically and as recently as 2018 at a site approximately 8 miles to the west. Although the rock stockpile yard is developed, giant garter snakes could attempt to utilize the site as upland habitat. This species was not observed at the Rio Vista stockpile yard, which was used for the 2015 EDB, or at the Weber stockpile yard, which was used for the 2021–2022 EDB.

Although no giant garter snake occurrences are known from near the locations of the proposed water quality monitoring stations, the status of giant garter snake in that part of the Delta is not well documented. Occurrences have been documented in other reaches of the same waterways. The actual footprints for the water quality monitoring station locations are unknown, but the nearshore areas provide suitable aquatic habitat and the levee banks in the vicinity provide suitable upland habitat for this species. The farther into the water channel, the more the potential for giant garter snake to occur is reduced, given the presence of high flows and predatory fish.

Western Pond Turtle

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. 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 CNDDB includes several pond turtle occurrences within 5 miles of the drought salinity barrier site. One occurrence of this species has been documented approximately 0.8 mile west of the locations of the proposed water quality monitoring stations. No occurrences have been documented in the vicinity of the Weber stockpile and off-loading sites or the Rio Vista stockpile site. Although the Weber stockpile site is developed, the riprap along the banks provides basking habitat for western pond turtle, and disturbed areas above the riprap provide marginally suitable upland habitat. The Rio Vista stockpile site does not provide suitable summer water to support western pond turtle. West False River provides suitable basking habitat along the banks and intertidal zone and aquatic habitat within the riverine habitat. In addition, the upland area beyond the levee toe could potentially provide suitable upland nesting habitat and the large marsh south of the project area provides additional aquatic habitat for this species. This species has been observed within the drought salinity barrier site, and has the potential to occur the Weber off-loading and stockpile site, and the water quality monitoring station sites.

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is a California species of special concern that prefers open, dry habitats. Burrowing owls are mostly dependent on fossorial mammals, such as California ground squirrels (*Spermophilus beecheyi*) and American badgers (*Taxidea taxus*), because burrows created by these animals provide nesting, wintering, roosting, and escape burrows for the burrowing owl. Burrowing owls may also use exposed pipes, culverts, buckled concrete, or other human-made materials as burrows when these features are located within or near suitable foraging habitat. Burrowing owls are known to favor areas with short, sparse vegetation. The burrowing owl is primarily a grassland species, but it can thrive in some landscapes that are highly altered by human activity if suitable burrows for roosting and nesting and short vegetation are present.

Burrowing owls have been documented at two locations south of Jersey Island and one location north of Bradford Island. One CNDDB occurrence of this species has been documented within 0.4 mile northeast of the Weber stockpile and off-loading sites. No occurrences have been documented in the vicinity of the Rio Vista stockpile site or the water quality monitoring stations. Suitable habitat is present along the landsides and watersides of levees near the drought salinity barrier site and in open areas and fields with abundant burrows near the Rio Vista and Weber off-loading and stockpile sites.

Song Sparrow ("Modesto" Population)

The Modesto population of song sparrow (*Melospiza melodia*) is a California species of special concern. This species remains locally numerous in areas where extensive wetlands remain. Hence the Delta represents a current center of abundance for Modesto song sparrow. This species has an affinity for emergent freshwater marshes dominated by tules and cattails and riparian willow thickets. The primary habitats for many subspecies of song sparrow found in California include moderately dense vegetation to provide cover for nest sites, a source of standing or running water, semi-open canopies to allow light, and exposed ground or leaf litter for foraging. Song sparrows forage primarily on the ground, but foraging behavior is highly opportunistic.

The nearest CNDDB occurrence for this species is approximately 1.5 miles northwest of the drought salinity barrier site. The nearest occurrence is approximately 1.4 miles northeast of the Rio Vista stockpile site. No CNDDB occurrences of this species have been documented in the vicinity of the Weber stockpile and off-loading sites. The nearest occurrence of this species to the locations of the proposed water quality monitoring stations is approximately 1.2 miles to the southeast. Suitable habitat for this species is present at the drought barrier salinity site within channel bank vegetation. Song sparrows also could occur in the vicinity of the proposed water quality monitoring stations and at the Rio Vista and Weber off-loading and stockpile sites.

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is State-listed as threatened. 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 are primarily summer residents in the Delta, arriving as early as March and typically departing by October, but small numbers are also known to overwinter. In the Central Valley, 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. Swainson's hawks in the Central Valley 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.

The drought salinity barrier site is within the portion of the Swainson's hawk breeding range that supports the highest density of active nests in the Central Valley; nests have been documented within 0.5 mile of the site (California Department of Water Resources 2013). The nearest

CNDDB occurrences of this species to the stockpile and off-loading sites are approximately 0.7 mile north of the Weber stockpile and off-loading sites and approximately 1.6 miles northwest of the Rio Vista stockpile site. Swainson's hawk has been observed in the vicinity of the drought salinity barrier site in the past, and suitable nest trees are present at several locations near the site. Swainson's hawks have also been observed in the vicinity of the Weber site during monitoring in 2021 and could occur in the vicinity of the proposed water quality monitoring stations and at the Rio Vista off-loading and stockpile sites.

White-Tailed Kite

White-tailed kite (*Elanus leucurus*) is fully protected under Section 3511 of the California Fish and Game Code. White-tailed kites inhabit open lowland grassland, riparian woodland, marshes, and scrub areas in the Central Valley and coastal valleys and foothills (Zeiner et al. 1990). White-tailed kites typically breed in open country with scattered trees. Large shrubs or trees are required for nesting. Nest sites are often near water. Breeding season for the white-tailed kite extends from February through October, with the peak of the nesting occurring between May through August. No CNDDB occurrences of this species have been documented in the vicinity of the Weber stockpile and off-loading sites or the Rio Vista stockpile site. White-tailed kites have been observed in the vicinity of the drought salinity barrier site, and trees adjacent to the site provide suitable nesting habitat. The species also could occur in the vicinity of the proposed water quality monitoring stations, the Rio Vista off-loading and stockpile sites, and the Weber stockpile site.

Pallid Bat and Western Red Bat

California species of special concern including pallid bat (*Antrozous pallidus*) and western red bat (*Lasiurus blossevillii*), in addition to commonly occurring bats, have the potential to occur within the drought salinity barrier site, the locations of the proposed water quality monitoring stations, and the stockpile areas, and unidentified bats were observed foraging over West False River during the nighttime barrier construction monitoring in June 2021, generally past midnight.

Pallid bat occurs throughout California except in parts of the high Sierra and the northwestern corner of the state. 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 may roost alone, in small groups, or gregariously (Western Bat Working Group 2017). Day roosts include caves, crevices in rocky outcrops and cliffs, mines, trees, and various human-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. Night roosts may be located in more open areas, including porches and open windows. Maternity colonies form in early April and may include 12–100 individuals. Maternity colonies are typically characterized by warm, stable temperatures (Gervais 2016). Year-to-year and night-to-night reuse of roosts is common; however, bats may switch day roosts on a daily and seasonal basis.

Western red bat occurs throughout the Central Valley and the western areas of California from Shasta County southward. 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. Females give birth to litters of one to five pups between late May and early July, which are weaned after 4–6 weeks. Activity levels in the Central Valley, as measured by acoustic surveys, have been shown to be highest in riparian habitat corridors greater than 164 feet wide and dominated by mature trees (Pierson et al. 2006).

Although no CNDDB occurrences have been documented for these species in the vicinity of the drought salinity barrier site, the Weber stockpile and off-loading sites, the Rio Vista stockpile site, or the locations of the proposed water quality monitoring stations, unidentified bats have been observed foraging over West False River at the barrier site. Furthermore, trees and structures near the drought salinity barrier site and the Rio Vista and Weber off-loading and stockpile sites, including buildings on Bradford and Jersey islands, and bridges and overpasses near the Weber stockpile and off-loading sites provide potential roosting habitat for special-status bats, including pallid bat and western red bat. Additionally, the trees and the trestle in the vicinity of the monitoring station locations provide suitable roosting habitat. The open water in the vicinity of the drought salinity barrier site, monitoring station locations, and Rio Vista and Weber off-loading and stockpile sites provide foraging habitat. Because roosting and foraging habitat is present and unidentified bats have been observed foraging over West False River, special-status bats have high potential to occur in the project area.

3.3.3 Regulatory Setting

Federal

Federal Endangered Species Act

The ESA protects candidate, threatened, and endangered plants and wildlife and critical habitat. “Candidate species” are those proposed for listing during the environmental review process. Typically, these species are treated as listed species by resource agencies even though the formal listing of the species is still under review. USFWS administers the ESA for all terrestrial wildlife, vegetation, and resident fish (non-anadromous, freshwater species). The National Marine Fisheries Service has jurisdiction over both anadromous fish and marine fish, as well as marine mammals and sea turtles.

Procedures for addressing impacts on federally listed species follow two principal pathways, each of which requires consultation with federal resource agencies. The first pathway, a Section 10(a) incidental take permit, applies to situations in which a nonfederal government entity must resolve potential adverse impacts on species protected under the ESA. The second pathway, Section 7 consultation, applies to projects directly undertaken by a federal agency or private projects requiring a federal permit or approval.

Critical habitat is also designated under the ESA. Critical habitat describes geographic regions with specific biotic and abiotic features that are essential for conservation of listed species, and require special protections.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the former Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. This law establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs. Most actions that result in a taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. Examples of permitted actions that do not violate the MBTA are the possession of a hunting license to pursue specific game birds, legitimate research activities, display in zoological gardens, bird banding, and other similar activities. USFWS is responsible for overseeing compliance with the MBTA.

Clean Water Act

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

Section 404

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

Compliance with CWA Section 404 requires compliance with several other environmental laws and regulations. USACE cannot issue an individual permit or verify the use of a general nationwide permit until the requirements of the ESA and the National Historic Preservation Act have been met. In addition, USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

State

Porter-Cologne Water Quality Control Act

The State Water Resources Control Board and the regional water quality control boards are the principal State agencies with primary responsibility for the coordination and control of water quality. In the Porter-Cologne Water Quality Control Act, the California 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 Water Quality Control Act grants the regional water quality control 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, if affected, would require waste discharge permitting and/or a CWA Section 401 certification (in the case of a required USACE permit under Section 404). The enforcement of the State's water quality requirements is not solely the purview of the regional water quality control boards and their staff. Other agencies (e.g., CDFW under Section 5650 of the California Fish and Game Code) have the authority to enforce certain water quality provisions in State law.

California Endangered Species Act

Under the CESA, CDFW has the responsibility for maintaining a list of endangered and threatened species (California Fish and Game Code, Section 2070). Sections 2050–2098 of the California Fish and Game Code outline the protection provided to California's rare, endangered, and threatened species. Section 2080 prohibits the taking of plants and animals listed under the CESA. Section 2081 established an incidental take permit program for State-listed species. CDFW maintains a list of "candidate species," which are species that CDFW formally notices as being under review for addition to the list of endangered or threatened species.

Pursuant to CESA requirements, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present within the barrier site and determine whether the project would have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any proposed project that may affect a candidate species.

Project-related impacts on species listed under the CESA as endangered or threatened would be significant. Under Section 86 the California Fish and Game Code, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Take of protected species incidental to otherwise lawful management activities may be authorized under California Fish and Game Code Section 206.591. Authorization from CDFW would be in the form of an incidental take permit.

California Fish and Game Code

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 take permitted for scientific research. Section 5050 lists fully protected amphibians and reptiles, Section 5515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals.

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

Protection of Birds and Their Nests

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the code or any regulation made pursuant thereto. Section 3503.5 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Migratory nongame birds are protected under Section 3800, while other specified birds are protected under California Fish and Game Code Section 3505.

Lake and Stream Protection

CDFW exerts regulatory authority over streams and lakes, and the wetland resources associated with these aquatic systems, under California Fish and Game Code Section 1600 et seq. by administering lake or streambed alteration agreements. Such agreements are not permits, but rather mutual accords between CDFW and project proponents.

Under Section 1600 et seq. of the California Fish and Game Code, CDFW has the authority to regulate work that will “substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river lake or stream.” CDFW enters into a lake or streambed alteration agreement with the project proponent and can impose conditions in the agreement to minimize and mitigate impacts on fish and wildlife resources. Because CDFW includes under its regulatory authority streamside habitats that may not qualify as wetlands under the federal CWA’s definition, CDFW’s regulatory authority may be broader than USACE’s jurisdiction.

Pursuant to the California Fish and Game Code, a project proponent must submit a notification of lake or streambed alteration to CDFW before construction. The notification requires payment of an application fee for a lake or streambed alteration agreement, with a specific fee schedule to be determined by CDFW. CDFW can enter into programmatic agreements that cover recurring operation and maintenance activities and regional plans. These agreements are sometimes referred to as “master streambed alteration agreements.”

California Native Plant Protection Act

State listing of plant species began in 1977 with the California Native Plant Protection Act, which directed CDFW to carry out the Legislature’s intent to “preserve, protect, and enhance endangered plants in this state.” The California Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants.

The CESA expanded on the original California Native Plant Protection Act and enhanced legal protection for plants. The CESA established categories for threatened and endangered species, and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, three listing categories for plants are employed in California: “rare,” “threatened,” and “endangered.”

California Rare Plant Rank 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 (or CRPR) system. This information is published in the Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society 2022a, 2022b). Potential impacts on populations of CRPR species may receive consideration under CEQA review. The CRPR definitions are as follows:

- *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.

Delta Reform Act of 2009 and Delta Plan

The mission of the Delta Stewardship Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (Water Code Section 85054). The 2009 Delta Reform Act states that the coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies best available science to further the coequal goals.

The Delta Stewardship Council was granted specific regulatory and appellate authority by the California Legislature under the 2009 Delta Reform Act over certain actions that take place in the Delta or Suisun Marsh, in whole or in part. The council exercises that authority by developing and implementing the Delta Plan and its accompanying regulations.

According to the Delta Reform Act, State or local agencies approving, funding, or carrying out projects, plans, or programs, upon determining that their project is a “permitted action” subject to regulations of the Delta Plan, must certify the consistency of the project with the Delta Plan policies (Water Code Section 85225).

Local

Although 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 local regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.3.4 Impacts and Mitigation Measures

Methods of Analysis

This section assesses the potential for the proposed project to adversely affect biological resources in or around the project area. The impact analysis focuses on foreseeable changes to the no-barrier baseline condition (as explained in Section 3.1, "Introduction to the Analysis") and compares those changes to the significance criteria. Potential impacts are analyzed using the information presented above regarding habitats present in and around the project area and the potential occurrence of special-status and protected species.

Three principal factors have been considered in the impact analysis:

- Magnitude of the impact (e.g., substantial or not substantial).
- Uniqueness (i.e., rarity) of the affected resource.
- Susceptibility of the affected resource to perturbation (i.e., the resource's sensitivity).

The evaluation of significance considers the interrelationship of these three factors. For example, a relatively small-magnitude impact on a federally listed or State-listed species would be significant if the species is exceptionally rare or believed to be highly susceptible to disturbance. Conversely, a plant community such as annual grassland is not necessarily rare or sensitive to disturbance if a small amount of acreage would be affected. Therefore, an impact would need to be of a much larger magnitude to result in a significant impact.

Thresholds of Significance

An impact on biological resources would be considered significant if 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 or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- 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 habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan.

Project-Specific Impacts and Mitigation Measures

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

TABLE 3.3-2
SUMMARY OF IMPACT CONCLUSIONS—BIOLOGICAL RESOURCES

Impact Statement	Impact Conclusion
3.3-1: Implementation of the proposed project could cause loss of special-status plant species.	LSM
3.3-2: Implementation of the proposed project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).	LSM
3.3-3: Implementation of the proposed project could cause disturbance or mortality of and loss of reptiles including giant garter snake and western pond turtle.	LSM
3.3-4: Implementation of the proposed project could cause disturbance or mortality of nesting birds or loss of known nest trees for Swainson's hawk.	LSM
3.3-5: Implementation of the proposed project could cause disturbance or mortality of roosting special-status bats.	LSM
3.3-6: Implementation of the proposed project could cause disturbance to fish species or their habitat by causing changes in water quality.	LSM
3.3-7: Implementation of the proposed project could cause disturbance to fish species or their habitat by modifying aquatic habitat.	LSM
3.3-8: Construction of the proposed project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.	LTS
3.3-9: Implementation of the proposed project could increase the potential for predation on native fish from alterations in aquatic habitat structure.	LSM
3.3-10: Implementation of the proposed project could cause disturbance to fish species or their habitat by affecting fish passage conditions.	LTS
3.3-11: Construction of the proposed project could cause the temporary loss or deterioration of wetlands and waters of the United States and State.	LSM
3.3-12: Implementation of the proposed project could contribute to a cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.	LSM

NOTES: LTS = Less than Significant; LSM = Less than Significant with Mitigation; SU = Significant and Unavoidable

SOURCE: Data compiled by ICF/ESA in 2022

Impact 3.3-1: Implementation of the proposed project could cause loss of special-status plant species.

Three special-status plant species—Delta tule pea, Mason's lilaeopsis, and Suisun Marsh aster—have been recently documented near the barrier site. Two additional species, delta mudwort and woolly rose-mallow, have been documented within approximately 1 mile of the drought salinity barrier site. Three additional plant species—bristly sedge, marsh skullcap, and side-flowering skullcap—have the potential to occur within the project area based on the presence of marginally suitable habitat. All of these species could be affected by barrier construction (under all three installation scenarios) if individual plants were to become established within the waterside work areas during the project term. Individual plants growing within the barrier footprint could be destroyed. However, the proposed project (under all three installation scenarios) would disturb a very small area of waterside habitat, and only a small number of individual plants would be directly affected, if present. Impacts on the habitat at the barrier site would be temporary, and restoration to preexisting conditions would allow plants to recolonize the area after barrier removal.

Plants growing on the riprap along the banks of the drought salinity barrier could be indirectly affected by the barrier (under all three installation scenarios), if these plants were dependent upon particular water levels and if changes in tidal fluctuations were to adversely affect habitat suitability. However, these effects are also anticipated to be limited in scope, affecting only a small number of plants, if any.

Special-status plants could occur along the margins of channels in which the water quality monitoring stations would be installed, and at the Weber off-loading site, but project activities at these locations are not anticipated to affect suitable habitat for these species.

Impact Conclusion

If any special-status plants are present within or in the vicinity of the project area, impacts of the proposed project (under all three installation scenarios) on special-status plants would be **potentially significant**.

Mitigation Measure BIO-1: Avoid, Minimize, and Mitigate Impacts on Special-Status Plants.

A qualified botanist shall conduct a botanical survey within the project area and immediate vicinity before barrier installation, following the survey guidelines established by the California Native Plant Society and CDFW to the extent feasible, given the timing of barrier installation.

If special-status plants are identified, they shall be flagged and avoided if feasible. If Mason's lilaeopsis is identified within the project area and impacts cannot be avoided, DWR shall obtain a CESA Section 2081 incidental take permit. Issuance of an incidental take permit by CDFW would require that DWR implement species-specific avoidance and minimization measures and fully mitigate adverse project impacts, which may include purchasing credits from a mitigation bank, preparing and executing a relocation plan, or restoring suitable habitat for the species.

If special-status plant species other than Mason's lilaeopsis are identified within the project area and impacts cannot be avoided, a qualified biologist shall assess the feasibility of salvaging and transplanting individual affected plants or seeds. If transplanting is not feasible, restoration of the affected site to preexisting conditions following project completion would allow for recolonization of the habitat.

Impact Significance after Mitigation: Implementing Mitigation Measure BIO-1 would reduce this impact to a less-than-significant level because a qualified biologist would conduct focused surveys for potentially occurring special-status plants during the identifiable periods; individuals would be flagged for avoidance, where feasible; and if avoidance is infeasible, impacts on Mason’s lilaeopsis would be fully mitigated through the incidental take permit process through conditions listed, and impacts on non-listed plants would be mitigated through restoration of preexisting conditions. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-2: Implementation of the proposed project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).

The potential for valley elderberry longhorn beetle to occur within the project area is minimal because no elderberry shrubs are currently present on or immediately adjacent to the drought salinity barrier site or at the Rio Vista and Weber off-loading or stockpile sites. Elderberry shrubs could be present within and/or adjacent to the locations of the proposed water quality monitoring stations because these areas were not accessed during the December 20, 2019, biological resources survey. In addition, elderberry shrubs could become established within the sites in the future during the proposed 10-year installation window.

Impact Conclusion

If elderberry shrubs were to become established at some point before or during the proposed 10-year window for installation of the drought salinity barrier, impacts of the proposed project (under all three installation scenarios) on habitat for valley elderberry longhorn beetle would be **potentially significant**.

> **Mitigation Measure BIO-2: Conduct Focused Preconstruction Surveys for Elderberry Shrubs.**
>
> Focused preconstruction surveys for elderberry shrubs shall be conducted before work occurs within the project area. A minimum 165-foot buffer shall be established and maintained around elderberry plants that contain stems measuring 1 inch or greater in diameter at ground level, if any are observed within or in the vicinity of the project area, in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)* (U.S. Fish and Wildlife Service 2017a).
>
> If feasible, a fenced or flagged avoidance area shall be established before the start of construction to protect all elderberry shrubs with stems 1 inch or greater at ground level located adjacent to the construction site or rock stockpile or off-loading areas to prevent encroachment by construction workers and vehicles.
>
> If maintaining 165-foot protective buffers around all elderberry shrubs with a stem greater than 1 inch in diameter at ground level is infeasible, DWR shall consult with USFWS to determine whether specific site conditions warrant a reduced buffer or whether the work will result in take. DWR shall then obtain take authorization, implement minimization measures, and mitigate impacts in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)* (U.S. Fish and Wildlife Service 2017a). Minimization measures may include but are not limited to maintaining the presence of a qualified biological monitor during all construction activities within 165 feet of the elderberry shrub, and refraining from the use of herbicides within the dripline of the shrub.
>
> **Impact Significance after Mitigation:** Implementing Mitigation Measure BIO-2 would reduce this impact to a less-than-significant level because a survey would be conducted for elderberry shrubs; an avoidance buffer would be established within 165 feet of the elderberry shrub, if feasible; and if avoidance is infeasible, DWR would consult with

USFWS to determine whether the project would result in take, and if so, would mitigate the loss of habitat associated with valley elderberry longhorn beetle. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-3: Implementation of the proposed project could cause disturbance or mortality of reptiles including giant garter snake and western pond turtle.

Giant garter snakes and western pond turtles could be affected by the proposed project (under all three installation scenarios). During implementation of the 2015 EDB project, giant garter snakes were observed several times on Jersey and Bradford islands, including within and adjacent to the project area. Giant garter snakes were not observed during installation of the drought barrier during the 2021 EDB project.

Although the Rio Vista and Weber off-loading and stockpile sites are developed, the riprap along the banks provide basking habitat for both giant garter snake and western pond turtle; and given the proximity of the Weber stockpile yard to aquatic habitat, both species could attempt to use the site as a movement corridor. Although West False River is open water that may only be used as a movement corridor, the banks and intertidal zone provide suitable habitat for both species. In addition, the large marsh south of the project area provides aquatic habitat for giant garter snake and western pond turtle. During installation of the 2015 EDB, a number of giant garter snakes were observed very close to the river. The levees in and adjacent to the project area provide movement corridors and basking habitat, and several individual snakes were observed in riprap on the Jersey Island waterside slope during 2015 EDB installation. Giant garter snake occurs within the project vicinity.

Although the proposed project (under all three installation scenarios) would not result in a permanent loss of habitat, construction activities could harm giant garter snake and western pond turtle, if any are present within the drought salinity barrier site and the Rio Vista and Weber off-loading and stockpile sites during construction. Based on aerial imagery, the water quality monitoring station locations could provide habitat for giant garter snake and western pond turtle (Google Earth 2021). Three very small areas of potentially suitable aquatic habitat could be affected by the installation of piles for the new water quality monitoring stations. Should giant garter snakes or western pond turtles be present in the area during pile installation, disturbance levels would be limited, because a vibratory pile driver would be used, the duration of impacts would be brief, and the impact area would be very small. Therefore, giant garter snake and western pond turtle are unlikely to be adversely affected by installation of the water quality monitoring stations.

Impact Conclusion

If any giant garter snakes or western pond turtles are present during construction, impacts of the proposed project (under all three installation scenarios) on these species would be **potentially significant**.

Mitigation Measure BIO-3: Conduct Pre-activity Surveys and Construction Monitoring for Giant Garter Snake and Western Pond Turtle.

The following measures shall be implemented for giant garter snake and western pond turtle in the vicinity of the drought salinity barrier site, the Weber off-loading and stockpile sites, and the locations of the proposed water quality monitoring stations:

- Pre-activity surveys for giant garter snake and potential refugia (i.e., burrows, soil cracks) shall be conducted by a USFWS-approved biologist within 72 hours before ground disturbance within the drought salinity barrier site, the Weber off-loading and stockpile sites, and the locations of the water quality monitoring stations. The biologist shall also survey along the access route. The pre-activity surveys shall include concurrent surveying for western pond turtle.
- A biological monitor shall be present during all daytime project activities occurring at West False River, with the following exception. The presence of a full-time monitor is not required when rock is being placed in or removed from the middle of West False River and when no project activities are occurring along the banks of the drought salinity barrier.
- Exclusion fencing shall be installed, as feasible, along the edge of the construction and staging footprint at the barrier site and at the Weber off-loading and stockpile sites to prevent any giant garter snakes and western pond turtles from entering the work area. A biological monitor shall be present during installation of the fencing.
- Clearing of vegetation shall be limited to the minimum area necessary for barrier installation.
- Speed limits along access roads shall be limited to 15 miles per hour. Speed limits overland shall be limited to 5 miles per hour. Drivers shall look for snakes and turtles on the roadways and overland areas.
- If giant garter snake is observed in the work area, the qualified biologist shall stop all work until the snake is out of the immediate work area. The snake shall be allowed to leave on its own, and the biologist shall remain in the area until the biologist deems his or her presence no longer necessary to ensure that the snake will not be harmed. If authorized by USFWS and CDFW, the biologist shall relocate the giant garter snake to a designated location along West False River, downstream of construction activities. The relocation plan shall be submitted to USFWS and CDFW before the start of the project. Any snakes to be relocated shall be moved according to the relocation plan.
- If a western pond turtle is observed in the work area, the biologist shall halt work to allow the turtle to leave on its own accord, or to relocate the turtle outside of the construction footprint, but within suitable habitat.
- All giant garter snake observations shall be reported to USFWS via email and/or telephone within one working day.
- All observations of giant garter snakes and western pond turtles shall be recorded in the CNDDB.
- Any equipment remaining on site overnight shall be stored in designated staging areas. Equipment parked overnight or for more than one hour on warm days shall be

inspected before operation to ensure that no giant garter snakes have found shelter under the equipment.

- After removal of the drought salinity barrier, any debris associated with the construction activities shall be removed and all temporarily disturbed areas shall be restored to pre-project conditions.
- Pre- and post-construction photo documentation shall be submitted to USFWS once the site is restored to preexisting conditions after removal of the barrier.

Impact Significance after Mitigation: Implementing Mitigation Measure BIO-3 would reduce this impact to a less-than-significant level because pre-activity surveys would be conducted for giant garter snake and western pond turtle; vegetation clearing would be limited to the minimum area necessary; an exclusion fence would be installed along the edge of the construction and staging footprint at the barrier site and at the Weber off-loading and stockpile sites to prevent any giant garter snakes and western pond turtles from entering the work area; speed limits would be limited to 5 miles per hour; and work would be halted if a giant garter snake or western pond turtle were to enter the project footprint and the giant garter snake or western pond turtle would be allowed to leave or be relocated to a designated location along West False River, downstream of the construction activities, if authorized by CDFW and USFWS. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-4: Implementation of the proposed project could cause disturbance or mortality of nesting birds or loss of known nest trees for Swainson's hawk.

The grassland and open ruderal areas adjacent to the drought salinity barrier site and the Rio Vista and Weber off-loading and stockpile sites provide suitable habitat for burrowing owl. The species has not been documented in the immediate vicinity of these sites, but it is known to occur in the region. If burrowing owls are present in uplands adjacent to the drought salinity barrier site or the off-loading or stockpile sites, they could be affected by disturbance caused by project activities. Minor disturbance that would result from installation of the water quality monitoring stations could affect burrowing owls that may be present in the vicinity. Although no direct disturbance of occupied habitat is anticipated, loss of individuals could result from disturbance and subsequent abandonment of active nests during project activities at the drought salinity barrier site and the Rio Vista and Weber off-loading and stockpile sites.

Suitable nesting and foraging habitats for Swainson's hawk, white-tailed kite, and common raptor and passerine species are present adjacent to the areas where project activities would occur at the drought salinity barrier site. No foraging habitat would be permanently affected, but noise and visual disturbances caused by barrier construction, notching, and removal under all three installation scenarios could affect active nests, if any are present in the vicinity when these activities occur. Disturbances of sufficient magnitude could result in nest abandonment, a reduction in the level of care provided by adults (e.g., duration of brooding, frequency of feeding), or forced fledging. Disturbance resulting from installation of the water quality monitoring stations and rock loading and unloading at the Rio Vista and Weber off-loading and stockpile sites could affect nesting raptors and migratory birds, if any are present in or near these areas, if these activities would occur during the nesting season (February 1–August 31). Vibratory pile driving could affect nesting birds and raptors, including Swainson's hawk, depending on the proximity of the nest to the construction site.

Impact Conclusion

Loss or disturbance of active nests of Swainson's hawk, burrowing owl, or other special-status and common passerine birds and raptors could adversely affect local populations of the affected species or cause the take of species protected under the MBTA. Destruction of burrows occupied by burrowing owls in the nonbreeding season could also result in the loss of individuals. Impacts on nesting birds and raptors would be **potentially significant**.

Mitigation Measure BIO-4: Conduct Focused Surveys for Active Nests of Migratory Birds and Raptors.

Focused surveys for active nests of migratory birds and raptors, including white-tailed kite and red-tailed hawk, shall be conducted by a qualified biologist within a 500-foot buffer around the drought salinity barrier site and the water quality monitoring stations. Surveys shall be conducted within 10 days before the start of project activities that are to occur during the nesting season (February 1–August 31).

If an active migratory bird or raptor nest is found near the construction footprint, the biologist shall develop appropriate measures, including but not limited to implementing a protective buffer or minimizing certain work activities in the vicinity, to avoid disturbance of the nest until it is no longer active.

Mitigation Measure BIO-5: Conduct Preconstruction Swainson's Hawk Surveys.

A qualified biologist shall conduct preconstruction Swainson's hawk surveys following the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) or other current protocols. The Swainson's Hawk Technical Advisory Committee recommends conducting three surveys within the two recommended windows immediately before the start of construction activities, excluding Period IV. (Period IV nest monitoring is recommended only if a nest is found in Period III.) The survey periods are as follows:

- *Period I:* January through March.
- *Period II:* March 20 through April 5.
- *Period III:* April 5 through April 20.
- *Period IV:* April 21 through June 10.
- *Period V:* June 10 through July 30.

Therefore, if construction is anticipated to begin April 1, the biologist shall conduct preconstruction surveys during Period I. Even though the April 1 start date occurs within Period II, the biologist shall conduct surveys during the early part of Period II, to ensure that surveys are completed during both survey periods. Surveys shall be conducted within 0.5 mile of the barrier site, where access is permitted. Results of the preconstruction surveys shall be provided to CDFW within 48 hours of the final survey.

All active Swainson's hawk nests within 0.25 mile of the barrier site (the area in which adverse effects are anticipated to occur) shall be monitored during construction activities. Monitoring requirements shall generally be based on the proximity of construction activities to the nest site, as described below. These requirements may be adjusted based on observed behavior patterns and on the response of the nesting pair and/or their young to construction activities. Potential adjustments shall be evaluated on a case-by-case basis and in consultation with CDFW.

- Where a Swainson's hawk nest occurs within 150 meters (approximately 492 feet) of construction, a biological monitor shall monitor the nesting pair during all construction hours to ensure that the hawks are exhibiting normal nesting behavior.
- Where a Swainson's hawk nest occurs within 150–800 meters (approximately 492–2,625 feet) of construction, a biological monitor shall observe the nest one day per week for a minimum of 3 hours to ensure that the hawks are exhibiting normal nesting behavior and to check the status of the nest.

If personnel must approach closer than 25 meters (approximately 80 feet) from an active nest tree for more than 15 minutes while adults are brooding, the nesting adults shall be monitored for signs of stressed behavior. If stressed behavior is observed, personnel shall leave until the behavior normalizes. If personnel must approach closer than 50 meters (approximately 165 feet) for more than 1 hour, the same requirement applies. All personnel outside vehicles shall be restricted to a distance greater than 100 meters (approximately 330 feet) from the nest tree unless construction activities require them to be closer, and the personnel shall remain out of the line of sight of the nest during work breaks.

If a biological monitor determines that a nesting Swainson's hawk is significantly disturbed by project activities, to the point that nest abandonment is likely, the biological monitor shall have the authority to immediately stop project activity and work shall cease until the threat has subsided.

If an active nest is present within 0.5 mile of the barrier site during barrier construction and project activities result in nest failure, DWR shall provide mitigation to compensate for this potential impact. The circumstances under which compensation will be provided will depend on local conditions, such as distance from the nest to the barrier site, baseline human activity levels in the vicinity of the nest, and observed behavior of the nesting pair, and shall be determined in consultation with CDFW. If a nest is abandoned and the nestlings do not survive, DWR shall provide compensation for this loss. The appropriate amount and nature of the compensation shall be determined in consultation with and approved by CDFW, based on the specific circumstances of the impact, and all mitigation shall be implemented in accordance with the incidental take permit issued for the project. Potential compensation measures may include permanently protecting and managing habitat for Swainson's hawk at a mitigation bank, contributing to a Swainson's hawk conservation fund, or promoting the long-term conservation of the species through other feasible means.

Mitigation Measure BIO-6: Conduct a Burrowing Owl Habitat Assessment.

A qualified biologist shall conduct an assessment of burrowing owl habitat suitability at the barrier site and (if applicable) the Rio Vista and Weber off-loading and stockpile sites. The assessment shall evaluate the area subject to direct impact, as well as adjacent areas within 150–500 meters (approximately 490–1,640 feet), where access is not prohibited due to private property, depending on the potential extent of the indirect impact. Based on the habitat assessment, one of these measures would be applicable:

- If suitable habitat, but no sign of burrowing owl presence, is observed during the habitat assessment, surveys and reporting shall be conducted in accordance with Appendix D of CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Wildlife 2012). At a minimum, an initial take avoidance survey shall be conducted no less than 14 days before stockpiling activities begin and a second survey shall be conducted within 24 hours before activities begin.

- If a sign of burrowing owl presence is observed during the habitat assessment, the full survey protocol shall be implemented, to the extent feasible, depending on the timing of project implementation and stockpiling activities. The full survey protocol involves conducting four surveys during the breeding season and four surveys during the nonbreeding season, and conducting three or more daytime survey visits at least 3 weeks apart during the peak of breeding season from April 15 to July 15.

If any occupied burrows are observed, DWR shall develop and implement avoidance and minimization measures, including but not limited to establishing protective buffers, minimizing the use of certain equipment, and incorporating the presence of a full-time monitor during work activities, in consultation with CDFW. CFDW guidance for buffer distances for burrowing owl, which vary depending on time of year and level of disturbance, are presented in **Table 3.3-3**. Reduced buffers for burrowing owl may be implemented if recommended by the monitoring biologist, based on the nature of the activity, and if approved by CDFW.

TABLE 3.3-3
RECOMMENDED RESTRICTED ACTIVITY DATES AND SETBACK DISTANCES BY LEVEL OF DISTURBANCE FOR BURROWING OWLS

	Distance of Disturbance from Occupied Burrows (feet)		
Time of Year	**Low Disturbance**	**Medium Disturbance**	**High Disturbance**
April 1 to August 15	600	1,500	1,500
August 16 to October 15	600	600	1,500
October 16 to March 31	150	300	1,500

NOTES:
Low = Presence of maintenance staff on foot or in vehicles conducting work with light equipment (maintenance trucks, all-terrain vehicles).
Medium = Heavy equipment use with moderate noise levels (approximately 50–75 A-weighted decibels [dBA]).
High = Heavy equipment with high noise levels (more than 75 dBA).

SOURCE: California Department of Fish and Wildlife 2012

A qualified biologist shall monitor the occupied burrows before and during stockpiling activities to inform the development of and confirm the effectiveness of these measures. If it is determined, in consultation with CDFW, that passive exclusion of owls from the stockpile area is an appropriate means of minimizing direct impacts, such exclusion shall be conducted in accordance with an exclusion and relocation plan developed by DWR in coordination with and approved by CDFW.

Burrows occupied during the breeding season (February 1–August 31) shall be provided a protective buffer until a qualified biologist verifies through noninvasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. The size of the buffer shall depend on the distance from the nest to the project footprint, type and intensity of disturbance, presence of visual buffers, and other variables that could affect the susceptibility of the owls to disturbance.

Impact Significance after Mitigation: Implementing Mitigation Measures BIO-4 through BIO-6 would reduce this impact to a less-than-significant level because preconstruction nesting-bird surveys would be conducted for nesting birds and raptors; protocol-level Swainson's hawk surveys, burrowing owl surveys, and a burrowing owl habitat assessment would be conducted; and avoidance and minimization measures would be implemented, including full-time monitoring if nesting birds including Swainson's hawk and burrowing owl are found in the vicinity of the work areas. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-5: Implementation of the proposed project could cause disturbance or mortality of roosting special-status bats.

Potential roosting habitat for special-status bats—western red bat and pallid bat—is present in the vicinity of the project area. Potential roosting sites include several isolated trees and small clumps of trees approximately 500 feet from the drought salinity barrier site. Trees in the vicinity of the Rio Vista and Weber stockpile sites likely provide roosting habitat for these species. Short-term physical disturbance that would result from installation of the water quality monitoring stations is unlikely to affect roosting bats that may be present in the vicinity.

Impact Conclusion

Implementation of the proposed project (under all three installation scenarios) is not anticipated to result in the limbing or removal of any trees or the demolition of any structures that could provide roosting. However, construction-related noise and vibration (under all three installation scenarios) could disrupt roosting behavior. Impacts on special-status bats would be **potentially significant**.

Mitigation Measure BIO-7: Conduct Preconstruction Bat Surveys.

Within 24 hours of construction, a qualified biologist shall conduct a preconstruction survey for special-status bats at the drought salinity barrier site and the Rio Vista and Weber off-loading and stockpile sites. If no special-status bats are observed roosting, the qualified biologist shall provide a report to DWR for its records, and no additional measures are recommended.

If bats are found in the area where construction-related activities are to occur, a minimum 100-foot avoidance buffer shall be established around the roost/maternity area until it is no longer occupied, as determined by a qualified biologist. High-visibility fencing shall be installed around the buffer and shall remain in place until the area is no longer occupied by the bats. If maternity roosts are found, they shall be avoided until the offspring are able to fly. If avoidance is infeasible, additional mitigation shall be developed in consultation with CDFW.

If construction activities must occur within the avoidance buffer, CDFW shall be consulted before the start of construction to determine appropriate avoidance and minimization measures. At minimum, a qualified biologist shall monitor the work at regular intervals as determined by CDFW. The qualified biologist shall be empowered to stop activities that, in the biologist's opinion, threaten to cause unanticipated and/or unpermitted adverse effects on special-status bats.

Impact Significance after Mitigation: Implementing Mitigation Measure BIO-7 would reduce this impact to a less-than-significant level because preconstruction surveys would be conducted, avoidance buffers would be established if roosting/maternity areas are found, and any activities occurring within the avoidance buffer would be monitored. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-6: Implementation of the proposed project could cause disturbance to fish species or their habitat by causing changes in water quality.

Barrier Construction, Notching, and Removal Activities (All Three Installation Scenarios)

The placement and removal of rock in the river channel during construction has the potential to increase turbidity in the water column. The associated increase in turbidity generally has the potential to negatively affect juvenile fishes temporarily by reducing the availability of food, reducing feeding efficiency, and exposing these fishes to toxic sediment released into the water column.

However, for juvenile delta smelt in particular, it is postulated that increased turbidity provides greater forage and capture rates and increased protection from predators (Hasenbein et al. 2013, reviewed by Interagency Ecological Program, Management, Analysis, and Synthesis Team 2015:49–55). In 2015 and 2021, during the EDB installation at West False River, discrete turbidity data were collected in the vicinity of construction during in-water work. The data were generally collected three times per day (in the morning, around 9 a.m.; at midday, around 12 noon; and in the afternoon, around 3 p.m.) on the upstream and downstream sides of the barrier footprint. The monitoring data from both 2015 and 2021 field monitoring activities suggested that turbidity increases occurring during construction were relatively minor and were limited to the area near the barrier. All measurements were well below the 50 nephelometric turbidity units (NTU) specified in the conservation measures based on *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River and the San Joaquin River Basin* (Central Valley Regional Water Quality Control Board 2019).

Turbidity data from channels in the vicinity of False River and Franks Tract confirm that EDB construction activities (e.g., rock placement) likely caused negligible direct increases in turbidity in the immediate vicinity of the construction site. However, the turbidity data also suggested that hydrodynamic changes caused by closure of the barrier indirectly increased turbidity in some adjacent channels by increasing tidal flow redirected from False River, which in turn enhanced local resuspension. This elevated turbidity fluctuated tidally, with the highest levels at the end of flood and ebb tides (from sustained higher velocities).

Overall, the potential effects of increased turbidity and suspended sediment from construction (rock placement, rock removal, and other in-water work) in 2015 and 2021 were determined to have been limited because they were temporary and did not appear to extend far beyond the construction area. The highest turbidity value observed during construction activities associated with the 2015 and 2021 EDBs was 37.4 NTU on September 11, 2015 (California Department of Water Resources 2019). This turbidity value was well below the background turbidity objective of 150 NTU as described in the Basin Plan (Central Valley Regional Water Quality Control Board 2019). For further details on the results of turbidity monitoring conducted during installation of the 2015 and 2021 EDBs, see Section 3.10, “Hydrology and Water Quality.” It is anticipated that similar effects would occur during installation of the proposed drought salinity barrier.

Rock excavation also has the potential to disturb sediments and increase turbidity in the channel, but monitoring of previous installation activities in 2015 showed that such effects would likely be relatively localized. Water quality monitoring conducted in 2015 also indicates that the daily average turbidity values remained low during the EDB removal activities and did not exceed 20 NTU at the False River and Jersey Point monitoring stations (California Department of Water Resources 2017). Discrete monitoring conducted immediately adjacent to the EDB during removal found that increases in turbidity were limited; the highest recorded value was 37.4 NTU on September 11 (Marquez 2015).

Sediment disturbance during installation of the three water quality monitoring stations would similarly be very localized and unlikely to result in adverse effects related to increased turbidity. Although they are unlikely, impacts on water quality may affect sensitive fish species by reducing prey and feeding efficiency, exposing fish to toxic sediment, and increasing predation on listed species. Construction-related impacts on sensitive fish species from barrier installation, modification, and removal activities would impair water quality by elevating turbidity levels. The impact of increased turbidity levels associated with the proposed project would be significant and require mitigation.

Barrier Presence and Notching (All Three Installation Scenarios)

Delta smelt could be affected by changes in salinity (measured in terms of electrical conductivity) resulting from the presence of the drought salinity barrier. The hydraulic effect of the drought salinity barrier would be that the salt field would extend a shorter distance upstream on the lower San Joaquin River, because overall tidal flow into the Delta would be more constrained; little difference in salinity distribution would occur on the lower Sacramento River side of the Delta.

This effect was illustrated by Semi-implicit Cross-scale Hydroscience Integrated System Model (SCHISM) modeling consistent with the DWR efficacy report (California Department of Water Resources 2019). The SCHISM modeling suggested that the presence of the drought salinity barrier would have little difference on X2[2] in the lower Sacramento River, and that X2 would be slightly farther downstream in the lower San Joaquin River with the barrier than with no barrier for the same operations. The general similarity in X2 in the lower Sacramento River suggests that the portion of the delta smelt population present in the low-salinity zone would have a similar area of abiotic habitat with or without the drought salinity barrier for the same operations, given the general relationship between abiotic habitat and the position of the low-salinity zone (Feyrer et al. 2007). As Sommer and Mejia (2013:8) noted, however, delta smelt are not confined to a narrow salinity range and occur in areas ranging from fresh water to water with relatively high salinity (Sommer et al. 2011). Overall, modeling suggests that the effects of a barrier in West False River on the extent of abiotic rearing habitat (a measure of salinity) for delta smelt would not be significant.

Closure of the 2015 EDB led an increase in turbidity (from about 10 NTU to about 15–20 NTU or more) in Fisherman's Cut and at the mouth of Old River because of higher water velocity, and to a turbidity decrease in False River because of lower velocity. Based on the positive correlation between delta smelt and turbidity (Sommer and Mejia 2013), these changes may have increased habitat value in Fisherman's Cut and at the mouth of Old River from the perspective of turbidity. However, the greatly increased water velocity may have diminished habitat value, because velocities were considerably greater than the sustained or critical swimming ability of delta smelt (Swanson et al. 1998), and good habitat quality for delta smelt is associated with low maximum water velocity (Bever et al. 2016). Such effects are assumed to be a representation of the types of effects that could be anticipated to occur with implementation of the proposed project. However, effects of such changes on delta smelt are likely to be limited, given that the species generally occurs within the North Delta Arc of habitat from the Cache Slough Complex, through the lower Sacramento River, to Suisun Marsh and Suisun Bay (Hobbs et al. 2017). The impacts of implementation of the proposed project and elevated velocities on delta smelt would not be significant.

Barrier notching activities described in Chapter 2, "Project Description," would open a portion of the drought salinity barrier to allow for fish passage and vessel traffic through West False River. With this activity, velocities through West False River would be elevated. Opening the barrier during peak fish migrations supports the Basin Plan's beneficial use "MIGR." The notch would be open between January and April, a time frame during which adult delta smelt may be present in West False River. For a discussion of modeled and monitored velocities through the barrier, see Section 3.5, "Hydrology and Water Quality." Although elevated velocities would occur because of the notching, this activity would allow fish to migrate through West False River; therefore, the impact of elevated velocity on delta smelt would be less than significant.

Aquatic Invasive Species

Invasive aquatic vegetation, including submerged vegetation such as Brazilian waterweed (*Egeria densa*), provides habitat that delta smelt occupy less than open-water habitats (Grimaldo et al. 2004; Ferrari et al. 2014). *Egeria* is the dominant submerged aquatic plant in the Delta and may

2 The upstream end of the salinity gradient has been defined as "X2," a point identified by its distance from the Golden Gate Bridge where salinity at the river's bottom is about 2 parts per thousand (2,000 milligrams per liter total dissolved solids).

reduce turbidity (with which delta smelt is positively associated) by slowing water velocity (Hestir et al. 2016). Irrespective of overall Delta hydrology and water operations, the drought salinity barrier could influence the occurrence of *Egeria* and other invasive aquatic vegetation by affecting water depth, turbidity, and channel velocity.

Kimmerer et al. (2019) hypothesized that the reduction in the current's speeds within Franks Tract with the 2015 EDB in place would lead to a more lake-like environment, increasing the biomass of submerged aquatic vegetation and changing its distribution. To assess the change in submerged aquatic vegetation, Kimmerer et al. (2019) compared maps of submerged aquatic vegetation produced using airborne hyperspectral imagery over the Delta in summer 2004 to corresponding maps produced in fall 2015–2017 to determine the immediate effect of the EDB on the extent and density of submerged aquatic vegetation. They concluded that the EDB may have helped submerged aquatic vegetation gain a foothold where it had not been prevalent before, given the greater extent observed during and after installation and removal of the EDB. However, analysis of imagery in 2021 found that the 2021 barrier shifted the distribution of weeds within Franks Tract, but did not increase overall coverage by weeds. Specifically, the west side of Franks Tract increased in weed coverage, but the east side of the tract decreased in weed coverage (Hartman et al. 2022).

Based on the observations from the 2015 EDB as studied by Kimmerer et al. (2019), it is possible that the drought salinity barrier (under all three installation scenarios) could cause an increase in the amount of invasive aquatic vegetation in portions of the Delta such as Franks Tract. Such an increase could have negative effects on delta smelt, such as by decreasing turbidity (Hestir et al. 2016) or reducing the availability of spawning habitat.

Harmful Algal Blooms

As part of Condition 8 of the June 2021 Temporary Urgency Change Order, DWR was required to conduct a special study investigating harmful algal blooms (HABs) caused by cyanobacteria in the Delta. HABs are more common in drought years than during wet years, likely because of high temperatures, residence time, and greater water clarity (Hartman et al. 2022). The presence of the drought barrier would increase residence time and reduce water movement, further increasing the likelihood of HABs occurring during drought years when the barrier is present. HABs caused by cyanobacteria have the potential to degrade water quality as a result of the release of microcystins, a cyanotoxin, in the water column. A multitude of toxins are present in the Delta, not including those associated with HABs, and have the potential to affect fish and other biota in the Delta.

Concentrations of HABs and cyanotoxins are associated with dry years, with visual index data indicating that there is a significantly higher incidence and abundance of cyanoHABs in dry years than in wet years (Hartman et al. 2022). In addition, a slightly higher incidence of *Microycstis* was observed in 2020 (a year without the drought barrier installed) than in 2021, when the barrier at West False River was installed. When comparing visual *Microcystis* observation results with years when the barrier was present, there are no clear patterns between the presence and absence of the drought barrier and elevated HABs. Additionally, cyanobacteria concentrations in 2021 were higher than levels measured in 2015, both years when the barrier was present; however, the 2015 data do not indicate that the barrier increased the potential for HABs.

Harmful effects of elevated microcystins can include impacts on the liver, kidney, gills, growth rate, and behavior of fish (Acuña et al. 2012a; Acuña et al. 2012b; California Office of Environmental Health Hazard Assessment Ecotoxicology et al. 2009). Microcystin concentrations detected in the Delta were well below the median lethal dose (LD_{50}) for fish taxa, but nonlethal effects have also been reported at lower levels (California Office of Environmental Health Hazard Assessment Ecotoxicology et al. 2009). Based on toxicity levels associated with microcystin data from low-water years when compared to levels observed in the Delta with the presence of the 2015 and 2021 EDBs, impacts on sensitive fish would be less than significant.

Impact Conclusion

Water quality data collected during the 2015 and 2021 EDB construction activities did not indicate that turbidity levels would exceed water quality objectives described in the Basin Plan; however, construction activities like rock placement and removal would disturb sediments and elevate turbidity within the riverine system. The presence of the drought salinity barrier may increase the presence of aquatic invasive vegetation and HABs, which has the potential to alter water quality conditions near the barrier. Additionally, elevated velocities through West False River may further affect special-status fish by reducing habitat value. Impacts on special-status fish would be **significant**.

Mitigation Measure BIO-8: Conduct Turbidity Detection and Reduction Activities During In-Water Work.

DWR shall monitor turbidity levels in West False River during in-water activities, including placement of rock fill material and any major maintenance. Monitoring shall be conducted by measuring upstream and downstream of the disturbance area to ensure compliance with the Basin Plan (Central Valley Regional Water Quality Control Board 2019). For Delta waters, the general objectives for turbidity apply, except during periods of stormwater runoff; turbidity of Delta waters shall not exceed 50 NTU. Exceptions to the Delta-specific objectives are considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity exceeding the limits can be tolerated will be defined for the operation and prescribed in a discharge permit.

DWR contractors shall slow or adjust work to ensure that turbidity levels do not exceed those conditions described in the CWA Section 401 water quality certification issued by the State Water Resources Control Board. If slowing or adjusting work to lower turbidity levels is not practical or if thresholds cannot be met, DWR shall consult with the State Water Resources Control Board and permitting agencies to determine the most appropriate measures, including but not limited to altering construction methods while continuing turbidity monitoring, through use of physical in-water best management practices, or temporarily stopping work to minimize turbidity impacts to the maximum extent feasible.

Mitigation Measure BIO-9: Prepare and Implement a Water Quality Monitoring Plan.

DWR shall develop and implement a water quality monitoring plan to assess the effects of the proposed project on flow and water quality throughout the Delta. Monitoring data shall be provided by strategically placed stations within the project area installed during the 2015 EDB project and the three additional stations that would be installed as part of the drought salinity barrier project. DWR may also use data from other existing and recently upgraded stations throughout the Delta.

DWR shall monitor flow, stage, water velocity, water temperature, specific conductance, turbidity, chlorophyll, nutrients, bromide, organic carbon, pH, and dissolved oxygen.

The water quality monitoring plan shall outline the methodology for producing the following elements:

- Water quality data from new monitoring sites and augmentation of existing sites.
- Monthly water quality summaries.
- A final report on project effects on water quality.

Mitigation Measure BIO-10: Remove Invasive Aquatic Vegetation.

The spread of invasive aquatic weeds is an issue throughout the Delta, regardless of the presence or absence of the West False River drought salinity barrier. While the barrier is in place, DWR shall coordinate with the Aquatic Invasive Plant Control Program of the California Department of Parks and Recreation, Division of Boating and Waterways, for the control of invasive aquatic weeds near the barrier that are covered by the control program. DWR shall coordinate with the Division of Boating and Waterways on removal strategies for covered invasive aquatic weeds as necessary to ensure that the barrier does not exacerbate the spread of invasive aquatic vegetation.

Impact Significance after Mitigation: Implementing Mitigation Measures BIO-8, BIO-9, and BIO-10 would reduce this impact to a less-than-significant level because DWR would identify construction events that cause turbidity exceedances and allow adaptive management strategies to reduce impacts of construction on water quality within West False River and adjacent waterways. Removal of invasive aquatic vegetation would also reduce the likelihood of water quality impacts in the vicinity of the barrier. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-7: Implementation of the proposed project could cause disturbance to fish species or their habitat by modifying aquatic habitat.

Effects of Barrier Construction, Notching, and Removal Activities on Critical Habitat (All Three Installation Scenarios)

Installation, notching, and removal of the drought salinity barrier could result in temporary direct and indirect effects on designated critical habitat for Sacramento River winter- and spring-run Chinook salmon, Central Valley steelhead, green sturgeon, and/or delta smelt. The drought salinity barrier would directly affect 2.75 acres of aquatic and benthic habitat, which is designated critical habitat for green sturgeon and delta smelt within the barrier footprint. Disturbance of the channel substrate because of barrier installation, modification, and removal, and to a lesser extent, because of incidental sediment removal activities during barrier removal, would affect the benthic community within the barrier's footprint, including potential prey for green sturgeon.

As described previously, barrier installation, notching, and removal would also result in temporary increases in turbidity and underwater noise at the barrier site, as well as temporary indirect effects on water quality and hydrodynamics in False River and other Delta waterways that are within designated critical habitat for each of the relevant species. Impacts on designated critical habitat through alteration of habitat, water quality impairment, and changes in hydrodynamics would be significant.

Effect of Notch Presence on Critical Habitat Activities (Installation Scenario 2)

Modification of the drought salinity barrier at West False River with a notch has the potential to alter benthic conditions, given the elevated velocities observed through the notch in the 2021 EDB. For a description of observed velocities from the 2021 EDB, see Section 3.5, "Hydrology and Water Quality." Alteration of benthic conditions could reduce the foraging potential of green sturgeon. Impacts on green sturgeon critical habitat would be significant.

Impact Conclusion

Implementation of the drought barrier would directly affect 2.75 acres of designated critical habitat for delta smelt and green sturgeon. In addition, changes in channel substrate, underwater noise levels, and hydrodynamics and water quality would affect critical habitats for all relevant species. Impacts on special-status fish would be **significant**.

> **Mitigation Measure BIO-11: Mitigate the Loss of Designated Critical Habitat.**
>
> After removal of the barrier, DWR shall provide compensatory mitigation through a mitigation bank approved by USFWS and CDFW at a 1:1 ratio for impacts on shallow-water habitat associated with the barrier rock.
>
> **Impact Significance after Mitigation:** Implementing Mitigation Measure BIO-11 would reduce this impact to a less-than-significant level because DWR would mitigate the loss of designated critical habitat by purchasing mitigation credits, which would enhance potential spawning habitat for delta smelt, rearing habitat for salmonids, and foraging habitat for green sturgeon. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-8: Construction of the proposed project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.

As occurred in 2015, most materials needed to construct the drought salinity barrier would be brought to the site by barge, and in-channel activities such as rock placement would generate noise that could disturb fish in the immediate area. Placing rock below the waterline would generate noise and create a physical disturbance that could harass, injure, kill, or displace special-status fishes. Disturbance of habitat in the False River channel could disorient fish and make them attempt to depart from the area, possibly leaving them more susceptible to predation. In 2015, California sea lions were observed many times during construction, sometimes close to working equipment. The sea lions may have been taking advantage of startled fish that were avoiding construction activities, and were observed on three occasions to have caught fish prey, two of which were unidentified bass species. Displaced fish may be more prone to predation in areas away from the zone of disturbance if water levels are lower because of drought (low-outflow) conditions. However, this effect is likely to be very small, because tides near the construction area have a much greater effect on water levels than outflow conditions.

Underwater noise would occur during barrier removal and notching activities (under all three installation scenarios), as the use of clamshell buckets would resulting in some noise from impacts and scraping. Studies of rock removal using a backhoe dredge in New York Harbor suggest a limited area of effect from the rock removal. For example, bottom impact sounds were not detected beyond 75–175 meters from the work sites (Reine et al. 2014), indicating a relatively small area of noise disturbance. Another study analyzing in-water noise from dredge operations found that underwater noise levels from clamshell grab dredges ranged from 107 to 124 decibels referenced to a pressure of 1 microPascal at 154 meters (Dickerson et al. 2001); these sound levels are below the threshold for injury to fishes. It is likely that disturbances present during barrier removal activities would elicit an avoidance response from fish within the area, reducing the likelihood of noise impacts on fish species.

Vibratory pile driving for the water quality monitoring piles that would be installed in Railroad Cut and Woodward Cut would result in temporary noise effects during periods when listed fishes could be present in the South Delta. However, based on data collected during pile driving for the water quality monitoring stations during the 2015 EDB project (ICF International 2016), these effects would be very limited (perhaps 10–15 minutes, with distances of potential effects limited to only a few meters from the source).

Impact Conclusion

Underwater noise impacts from project construction activities would be **less than significant**.

Mitigation Measures: None required.

Impact 3.3-9: Implementation of the proposed project could increase the potential for predation on native fish from alterations in aquatic habitat structure.

Barrier Presence and Notching (All Three Installation Scenarios)

Enhanced predation of juvenile salmonids relative to artificial structures has been observed in the Delta (Sabal et al. 2016). Small fish, including juvenile salmonids and delta and longfin smelt, could be entrained toward the drought salinity barrier by seepage flows, and then hold in front of the barrier to avoid being impinged on the rocks. The resulting presence of concentrations of small fish near the barrier could attract piscivorous fishes and other predators.

For example, biological monitors observed a Caspian tern fishing for several hours along the downstream side of the 2015 EDB. However, no other such documented observations of predatory birds occurred during biological monitoring, and it was not possible to establish whether predatory fishes also were exploiting concentrated small fishes in this manner.

In addition, the 2015 barrier was estimated to have blocked more than 95 percent of flow into and out of False River, greatly limiting the potential for fish to be entrained into the False River channel from the San Joaquin River or Franks Tract area. This would therefore greatly limit the number of fish being concentrated at the drought salinity barrier if the fish were moving primarily with tidal flows, although fish swimming without reliance on tidal flows could still enter the channel and be susceptible to near-field predation at the barrier.

Installing the barrier earlier in the year (i.e., in April) would result in greater potential for predation effects on juvenile salmonids than if the barrier were installed later in the year (e.g., in June, as occurred in 2021). The impact of increased predation on native fish caused by the presence of the proposed drought salinity barrier would be significant.

To further understand predation impacts associated with the presence of a drought salinity barrier, DWR conducted a field predation study during construction activities for the 2021 EDB at West False River. The objectives of this study are to assess impacts of the EDB on predation rate of juvenile salmonids; examine relative predation rates associated with project activities (construction, closure, barrier modifications); determine whether the relative predation rate would increase once construction was complete; and examine the influence of the EDB on predation rate over time. As of May 2022, DWR is still analyzing impacts of this field assessment and collecting field data to complete the study. Preliminary results indicate that predation rates did not change significantly between preconstruction and construction activities. Additionally, closing West False River may reduce predation by reducing habitat connectivity for highly migratory predatory fish like striped bass. It is not yet fully understood how barrier presence affects predation rates specific to native fish; however, analysis of the fish predation study data is still being conducted to assess this impact.

Aquatic Invasive Species

As described previously, the drought salinity barrier could increase the extent of submerged aquatic vegetation in areas such as Franks Tract, which could increase predation risks for juvenile salmonids and other small fish passing through that area from vegetation-associated species such as largemouth bass (Conrad et al. 2016). Increased predation on special-status fish other than juvenile salmonids could also result, although the relative susceptibility of other species to increased predation is not known. For example, juvenile and sub-adult green sturgeon are relatively large and bottom-dwelling and are therefore likely less susceptible to predation than juvenile salmonids.

Impact Conclusion

It is well documented that enhanced predation of salmonids is associated with artificial structures. Additionally, the presence of the drought salinity barrier has the potential to increase the extent of submerged aquatic vegetation, which serves as habitat for predatory fish species like largemouth bass (Conrad et al. 2016). The presence of the drought salinity barrier has potential to increase predation events on native fish. This impact on native fish and habitat would be **significant**.

> **Mitigation Measure BIO-10: Remove Invasive Aquatic Vegetation.** (See Impact 3.3-6.)

Mitigation Measure BIO-11: Mitigate the Loss of Designated Critical Habitat. (See Impact 3.3-7.)

Impact Significance after Mitigation: Implementing Mitigation Measures BIO-10 and BIO-11 would reduce this impact to a less-than-significant level by reducing the amount of aquatic invasive species present around the barrier, which serves as habitat for predatory fish like largemouth bass and striped bass. DWR has also committed to purchasing mitigation credits for impacts on habitat associated with the presence of the barrier. Therefore, this impact would be **less than significant with mitigation incorporated**.

Impact 3.3-10: Implementation of the proposed project could cause disturbance to fish species or their habitat by affecting fish passage conditions.

Barriers to Fish Movement and Navigation

The drought salinity barrier (under Installation Scenarios 1 and 3) would create a physical blockage in West False River, thus impeding the free movement of fish, potentially attracting predatory fish, and creating areas that would enhance the success of predatory fishes in foraging for susceptible species and life stages. This and other potential indirect effects of the barrier's presence are described further below.

DWR anticipates that barrier installation would be complete up to 60 days after the start of construction in early April. The overlap between the presence of the drought salinity barrier and of out-migrant juvenile winter-run salmon in the Delta would be small; historical salvage suggests that very few genetic winter-run Chinook salmon and yearling spring-run Chinook salmon are present in the South Delta after March (Harvey and Stroble 2013). Large numbers of young-of-the-year spring-run Chinook salmon may migrate during April and May in some years. However, observations in fisheries surveys suggest that migration into the Delta is substantially delayed and the duration of Delta residence is shortened during the kind of extreme drought conditions that would warrant installing a barrier. This would serve to minimize the overlap of barrier installation with out-migration.

Extreme conditions also require reduced export rates to maintain Delta water quality, which would reduce the risk of salmonid entrainment into the South Delta and thus further reduce the potential for salmonids to become entrapped on the eastern side of the barrier. Therefore, the relatively small hydrodynamic changes caused by the drought salinity barrier for any given hydrology and water operations would overlap with the occurrence of a relatively small percentage of the Delta's total juvenile salmonid populations.

The presence of the drought salinity barrier would require out-migrating fish entering West False River to take an alternate route using either Fisherman's Cut or eastern False River. Fish taking these routes could be subject to longer migration time and delayed out-migration (Cavallo et al. 2015). This delay is not considered a significant impact, because only a small portion of the total out-migrants would likely be affected and the potential delay would be limited to the additional time needed to travel the distance to the mainstem of the San Joaquin River.

The presence of the proposed drought salinity barrier may reduce the likelihood of entrainment of juvenile salmonids and delta and longfin smelt toward the South Delta export facilities. The proposed barrier would likely not affect the downstream migration potential of delta and longfin smelt larvae/juveniles that occur in the Delta, although fish hatched in the Old and Middle River corridor may be affected. The drought salinity barrier would eliminate the potential for delta smelt to move from the lower San Joaquin River through False River and Franks Tract into Old River and upstream toward the export pumps (where the risk of entrainment-related mortality is high). However, because water exports from the South Delta are likely to be low during drought conditions, the risk of entrainment in the lower San Joaquin River similarly would likely be relatively low overall. Thus, blocking passage from the San Joaquin River through False River may have relatively little effect. The spawning distribution of longfin smelt is generally more upstream during dry years, and the barrier is more likely to be installed during these years. However, the peak periods of longfin smelt migration and spawning are generally earlier in the year than the proposed dates for barrier installation, so impacts would be limited to larvae.

Because the drought salinity barrier would not allow fish passage while in place, the presence of the barrier could also trap juvenile salmonids and delta and longfin smelt emigrating from the San Joaquin River basin upstream of the barrier (e.g., in the Franks Tract area). These fish otherwise might have moved (emigrated) through False River into the lower San Joaquin River. However, as stated above, the hydrodynamic effects of the drought salinity barrier would overlap with a relatively small percentage of the Delta's juvenile salmonid populations. Additionally, limited swimming abilities and negative Old and Middle River flows would severely restrict the ability of larval delta and longfin smelt to migrate out of the South Delta regardless of the barrier's presence in dry years.

Blockage of juvenile sturgeon passage would represent a delay in migration to juveniles generally moving around the Delta and seeking foraging areas without specific destinations. Green sturgeon actively migrating toward the ocean from the South Delta would be affected more by the presence of the barrier, but they would be able to seek alternative pathways through the adjacent San Joaquin River and other channels including Fisherman's Cut, eastern False River, and Dutch Slough.

Adult salmonids returning to upstream natal tributaries—or, in the case of steelhead adults that have survived spawning and are migrating downstream after spawning—could encounter the drought salinity barrier and have their passage blocked. However, this blockage would result in only a minor delay, and in some cases, it may reduce migration time through the Delta (e.g., for fish returning to the Sacramento River that had entered the lower San Joaquin River, and otherwise would have penetrated farther into the interior Delta through False River). The presence of the barrier is not expected to impede access to freshwater spawning habitat for adult salmonids.

The timing of barrier closure—based on the approximate 3-week period between the start of construction and barrier closure that occurred in 2015 and 2021, this would be around April 22 with an April 1 construction start date—could overlap a considerable portion of the spring upstream migration period of adult green sturgeon (Heublein et al. 2009). Barrier closure activities could take up to 45 days to complete. However, the barrier may prevent adult green sturgeon migrating to the Sacramento River from following what otherwise may be a more circuitous pathway through the Central/South Delta, and could reduce overall migration time. Although the barrier would be an impediment for adult green sturgeon accessing the Sacramento River, the alternative routes that sturgeon may take would likely reduce migration time. Therefore, this impact would be less than significant.

Seepage Flow and Impingement

Estimates of seepage flow through the EDB in 2015 suggest that flow between the rocks of the drought salinity barrier (under all three installation scenarios) may result in impingement of small delta and longfin smelt (e.g., larvae and early juveniles) that are present upstream and downstream of the drought salinity barrier site. However, 2015 flow measurements suggest that the rock barrier blocks more than 95 percent of the tidal flow into and out of False River. This means that water exchange between False River and adjacent water bodies is greatly reduced, eliminating the potential for additional delta and longfin smelt to be entrained into the False River channel (assuming that most smelt use tidal flows as the primary means of transport over longer distances). Therefore, this impact would be less than significant.

Effect of Notch Presence on Fish Passage

For fish such as delta smelt and longfin smelt moving upstream into the lower San Joaquin River in December, the full barrier would greatly reduce the potential for fish entry into the South Delta, thereby possibly reducing entrainment risk at the South Delta water export facilities. However, this risk would already be limited by water export restrictions under the State Water Project's incidental take permit issued by CDFW and the biological opinions for the State Water Project and Central Valley Project issued by the National Marine Fisheries Service and USFWS.

The fully closed barrier in December would also greatly limit tidal movement of covered fish species into False River, e.g., delta smelt (Bennett and Burau 2015), juvenile Chinook salmon (Cavallo et al. 2015), and adult Chinook salmon (Milner et al. 2012). Adult delta smelt may be present near the barrier site between January and April, while the notch is in place. The presence of the notch would facilitate passage for smelt through West False River; therefore, this impact would be less than significant.

The presence of the barrier would have the potential to delay passage of upstream-migrating adult winter-run and spring-run Chinook salmon should they encounter the barrier. False River is not on the main migration pathway for these species returning to the Sacramento River basin; spring-run adults returning to the San Joaquin River may have greater potential to encounter the barrier. Adult Chinook salmon encountering the barrier in December before the notch modification under Installation Scenario 2 would have to seek alternative migration pathways in adjacent channels, although this would apply only to winter-run Chinook salmon.

At times during the period of notch presence (January–March), winter-run and spring-run Chinook salmon adults encountering the barrier would experience relatively high water velocity that could delay migration. Velocity of 5 feet per second represents a suitable threshold for consideration in terms of migration delay. Hydrodynamic analysis with the SCHISM model indicates that flow velocity through the notch would exceed 5 feet per second approximately

30 percent of the time. This indicates that adult winter-run and spring-run Chinook salmon occurring at the notch could be delayed during these high-velocity periods but should be able to pass through the notch within a few hours as velocity decreases during the tidal cycle. Therefore, this impact would be less than significant.

Impact Conclusion

Impacts on fish passage from presence of the drought salinity barrier would be **less than significant**.

> **Mitigation Measures:** None required.

Impact 3.3-11: Construction of the proposed project could cause the temporary loss or deterioration of wetlands and waters of the United States and State.

Barrier construction (under all three installation scenarios) would result in the temporary filling of approximately 2.75 acres in West False River. Filling would occur across the entire width of the river (under all three installation scenarios) and would result in flow alteration and potential adverse effects on water quality.

Impact Conclusion

Barrier construction (under all three installation scenarios) would result in temporary filling of approximately 2.75 acres in West False River and potential adverse effects on water quality. This impact would be **potentially significant**.

> **Mitigation Measures: Implement Mitigation Measures BIO-2, BIO-3, and BIO-4 and the protective environmental measures identified in Chapter 2, "Project Description."** (See Impacts 3.3-2, 3.3-3, and 3.3-4 for the mitigation measures; see Section 2.2 of Chapter 2 for the protective environmental measures.)
>
> **Impact Significance after Mitigation:** Implementing the protective environmental measures as part of the contract specifications (see Section 2.2 in Chapter 2, "Project Description") would reduce adverse water quality effects. These protective environmental measures require the preparation and implementation of a water quality control plan to control erosion, reduce the likelihood of spills, and control sedimentation, dust, and runoff. Implementing Mitigation Measures BIO-2, BIO-3, and BIO-4 would further reduce the potential for adverse effects on water quality because DWR would implement turbidity monitoring and adjust construction activities accordingly, implement a water quality monitoring plan to assess the effects of the proposed project on flow and water quality throughout the Delta, limit habitat disturbance, return disturbed upland areas to pre-project conditions, and compensate at a 1:1 ratio for temporary fill. This impact would be **less than significant with mitigation incorporated**.

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 hydrology and water quality resources. The area of analysis for these cumulative impacts includes two levee strengthening projects conducted in 2014–2015 on Bradford and Jersey islands adjacent to the barrier site, by Reclamation Districts 2059 and 830, respectively, and DWR's temporary EDBs installed in 2015 and 2021–2022 at the location of the proposed drought salinity barrier.

Impact 3.3-12: Implementation of the proposed project could contribute to a cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.

Historic and ongoing loss of natural habitats suitable for terrestrial species has occurred as natural habitats have been converted to urban and agricultural development. Future development is expected to continue in the region. Projects in the region would be required to comply with local ordinances and policies, in addition to the CESA, the ESA, the CWA, the California Fish and Game Code, and other relevant regulations, permits, and requirements. The project area includes upland habitats that have been highly modified for agricultural purposes and aquatic riverine habitat found within West False River. Additionally, affected terrestrial habitats are mostly isolated from other areas of similar habitat because they occur on islands.

Impacts on upland and aquatic habitats resulting from the proposed project (under all three installation scenarios) would be temporary. Returning the affected habitats to their existing conditions and enhancing offsite aquatic habitats through the mitigation requirements described above would ensure that there would be no considerable contribution to the cumulative loss for terrestrial and aquatic species in the region.

The presence of the proposed drought salinity barrier (under all three installation scenarios) would not prevent fish from migrating to spawning areas. As described in Impact 3.3-10, West False River is not a preferred migratory corridor for any listed species. For those individual fish that may encounter the barrier, the barrier's presence may provide more preferential migration routes for many species through reduced migration effort, or avoidance of areas like Franks Tract where predation impacts on sensitive fish species may be higher. Additionally, water quality effects caused by construction and eventual removal of the barrier would be temporary, and would not result in significant impacts on the species.

Impact Conclusion

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. This impact would be **potentially significant**.

Mitigation Measures: Implement Mitigation Measures BIO-1 through BIO-11. (See Impacts 3.3-1 through 3.3-9.)

Impact Significance after Mitigation: Implementing Mitigation Measures BIO-1 through BIO-11 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. The impact would be **less than significant with mitigation incorporated**.

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3.4 Cultural Resources

3.4.1 Introduction

This section examines the potential impacts of the proposed project on cultural resources. Tribal cultural resources are discussed separately in Section 3.7. For the purposes of this analysis, the term "cultural resource" is defined as follows:

> Native American, and non-Native American 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.

This section relies on the information and findings presented in *West False River Drought Salinity Barrier Project, Contra Costa and San Joaquin Counties, California: Archaeological and Architectural Resources Inventory Report* (Hoffman 2022). That report (confidential **Appendix E**) 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.

DWR received a comment letter regarding cultural resources from the California Native American Heritage Commission (NAHC) on February 24, 2022, in response to the notice of preparation (see **Appendix A**).

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 pre-contact and historic-era Native American archaeological resources, as well as non–Native American archaeological resources from the historic era:
  - *Native American 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).
  - *Non–Native American historic-era archaeological resources* consist of townsites, 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.

3.4.2 Environmental Setting

Environmental

The main hydrologic unit of the project area and vicinity is the San Joaquin River, which, along with its tributaries, is the principal watershed for Central and Southern California. The project area and vicinity are rural, and the natural environment has been heavily influenced by agricultural development and water control and conveyance systems (e.g., levees, canals).

The surficial geology of the portions of the project area that are not existing waterways consists of Holocene muds (Rogers 1966; Dawson 2009). Most of the project area does not have any mapped soil units, because it consists of existing waterways. The exception to this is the banks of West False River in the drought salinity barrier portion of the project area, where mapped soils consist of Rindge series mucks, which are very deep, very poorly drained organic soils formed in freshwater marshes, sloughs, and drainage channels. Rindge series mucks have only organic horizons and are black, slightly hard to soft, with depth, and up to 152 centimeters deep (U.S. Department of Agriculture 2019). Rindge series soils are historic-era to modern (approximately 150 years ago to present) in age (Meyer and Rosenthal 2008). Historic-era and modern engineering of the landscape, notably through the construction of the levees and canals, has heavily disturbed most if not all of the project area.

Before Euroamerican settlement of the area, the project area would have consisted of tidal freshwater emergent wetlands, which are wetlands that supported abundant freshwater rooted vegetation (Whipple et al. 2012). Large populations of tule elk, pronghorn, and black-tailed deer would have been found in the project area and vicinity before Euroamerican settlement, in addition to a wide variety of other fauna. The arrival of Euroamericans to the area led to a dramatic decrease in the populations of the faunal species caused by overhunting and habitat loss (Rosenthal et al. 2007; Bartolome et al. 2007).

Cultural

Pre-contact Setting

Categorizing the pre-contact period into cultural stages allows researchers to describe a broad range of archaeological resources with similar cultural patterns and components during a given time frame, thereby creating a regional chronology. Rosenthal et al. (2007) provide a framework for the interpretation of the Central Valley’s pre-contact archaeological record and have divided human history in the region into three basic periods: *Paleo-Indian* (13,550 to 10550 years Before Present [BP]), *Archaic* (10,550 to 900 BP), and *Emergent* (900 to 300 BP). The Archaic period is subdivided into three sub-periods: *Lower Archaic* (10550 to 7550 BP), *Middle Archaic* (7550 to

2550 BP), and *Upper Archaic* (2550 to 900 BP) (Rosenthal et al. 2007). Economic patterns, stylistic aspects, and regional phases further subdivide cultural patterns into shorter phases.

This scheme uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods. The following summary of the region's prehistory is derived principally from Rosenthal et al. (2007) and Moratto (1984 [2004]).

Paleo-Indian Period (13,550 to 10,550 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 on the mid- and upper elevations of the Sierra Nevada and a nearly contiguous confer forest on the Coast Ranges. The Central Valley was covered with extensive grasslands and riparian forests. The 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 were likely focused on large game hunting, although evidence remains scant, as does understanding of lifeways during this period.

Lower Archaic Period (10,550 to 7550 BP)

The Paleo-Indian Period was followed by the Lower Archaic Period. During this period, the ancient lakes, which had been the subsistence base during the Paleo-Indian Period, began to dry up as a result of climate change. This led to a rapid expansion of oak woodland and grassland prairies across the Central Valley. After 10550 BP, a significant period of soil deposition ensued in the valley, capping older Pleistocene formation. This was followed around 7000 BP by a second period of substantial soil deposition in the valley.

It was during this period that the first evidence of milling stone technology appeared, indicating an increased reliance on processing plants for food. This period is often termed the "Milling Stone Horizon" in California. The appearance of milling technology may also indicate less emphasis on hunting as individuals became more familiar with the local plant resources. Milling stones include handstones and milling slabs and are frequently associated with a diverse tool assemblage including cobble-based pounding, chopping, and scraping tools. Milling tools were used for processing seeds and nuts. The Lower Archaic also saw the development of well-made bifaces used for projectile points and cutting tools, commonly formed from meta-volcanic greenstone and volcanic basalts. Most artifacts during this period were manufactured of local materials and trade was limited. The primary social unit remained the extended family (Fredrickson 1992).

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 Delta and associated marshlands. An initial period of upland erosion and lowland deposition was followed by a long period of stabilization of landforms. Scant evidence of human occupation from this period has been found in the Sacramento Valley or the adjacent Coast Ranges. Most evidence comes from the Sierra foothills in Calaveras and Tuolumne counties.

Upper Archaic Period (2550 to 900 BP)

Evidence for Upper Archaic human occupation in the Central Valley is much more extensive than for earlier periods. The development of the Holocene landscape buried older deposits, resulting in the identification of more sites from the Upper Archaic than from older periods of development. Alluvial deposition was partially interrupted by two consecutive droughts, known as the “Medieval Climatic Anomaly.”

Two fundamental adaptations developed side by side during the Upper Archaic period, evidenced by a diversification in settlement patterns. Populations in the Central Valley tended toward large, high-density, permanent settlements. These villages were used as hubs from which the populace roamed to collect resources, utilizing a wide range of technologies. The populations in the foothills and mountains lived in less dense settlements, moving with the seasons to maximize resource returns. Tools tended to be expedient and multipurpose for use in a wide variety of activities. Village sites show extended occupation as evidenced by well-developed midden, frequently containing hundreds of burials, storage pits, structural remains, hearths, ash dumps, and extensive floral and faunal remains.

Emergent Period (900 to 300 BP)

A major shift in material culture occurred around 900 BP, marking the beginning of the Emergent Period. Particularly notable was the introduction of the bow and arrow. The adoption of the bow occurred at slightly different times in various parts of the Sacramento Valley, but by 750 BP, it was in use in the Delta region. The bow was accompanied by the Stockton Serrated point, an invention seemingly developed by people in the area, distinctive from point types used in other parts of the state.

Another key element of material culture from this period is the big-head effigy ornaments thought to be associated with the Kuksu religious movement. In areas where stone was scarce, baked clay balls are found, presumably for cooking in baskets. Other diagnostic items from this period are bone tubes, stone pipes, and ear spools. Along rivers, villages are frequently associated with fish weirs, with fishing taking on an increasing level of importance in the diet of the local populace.

Ethnography

Beginning in the early 16th century, but primarily during the late 19th and early 20th centuries, Native American lifeways and languages were documented throughout California. Whether by professional ethnographers or anthropologists, field personnel from government agencies such as the U.S. Bureau of Indian Affairs, soldiers, merchants, settlers, or travelers, ethnographic accounts partly illuminate the traditions, beliefs, and cultures of Native American groups during specific points in time.

Synthesized narratives such as the *Handbook of North American Indians* (Heizer 1978) categorize Native traditions and practices; however, the complexity of regional diversity should not be overlooked. Depopulation and relocation of Central Valley Native Americans in the 19th century resulted in conflicting and incomplete information about tribal locations. Although cultural descriptions of these groups in the English language are known from as early as 1849, most current cultural knowledge comes from various early-20th-century anthropologists (Levy 1978:413).

The uncertainty regarding the territorial boundaries of the Native American groups that occupied the project area and vicinity derives from the fact that ethnographies historically demarcated contact-period tribal boundaries in various and conflicting ways. The drought salinity barrier portion of the project area is in a location historically attributed to the Plains Miwok, a subgroup of the Eastern Miwok (Levy 1978:398–399), while the water quality monitoring stations portion of the project area is in an area historically attributed to the Northern Valley Yokuts (Wallace 1978:462). Before Euroamerican settlement in the region, the Plains Miwok and Northern Valley Yokuts had similar cultural practices; therefore, they are discussed together in the following sections.

Native Americans typically situated their larger, permanent settlements on high ground along the region's major rivers, such as the Sacramento River and its tributaries (Kroeber 1925 [1976]:351; Levy 1978). The Plains Miwok are part of the larger Eastern Miwok group, who form one of the two major divisions of the Miwokan subgroup of Utian speakers. The Plains Miwok lived in the Central Valley along the Sacramento, Cosumnes, and Mokelumne rivers (Levy 1978). The traditional territory of the Northern Valley Yokuts, a Penutian-speaking people (Heizer and Elsasser 1980:15), encompassed much of the north end of the southern San Joaquin Valley, including the area extending from the northward bend of the San Joaquin River, northward almost to the Mokelumne River, and from the crest of the Coast Ranges eastward to the foothills of the Sierra Nevada (Wallace 1978). Both groups typically built their homes on high ground, with principal villages concentrated along major drainages. The Plains Miwok had two forms of house construction: conical-shaped houses constructed with poles and thatching of brush, grass, or tule, and semi-subterranean earth-covered houses. Larger villages had an assembly house, a 40- to 50-foot-diameter semi-subterranean structure, in addition to a sweathouse, a smaller version of the assembly house (Levy 1978; Wallace 1978).

Seasonality defined the subsistence strategies of these groups, and their economy was based principally on the use of natural resources from the grasslands and riparian corridors adjacent to the area's many drainages. Like the majority of California Native American groups, these groups relied heavily on the acorn for food. Other non-animal foods consisted of nuts, seeds, roots, greens, berries, and mushrooms. Animal foods included tule elk, pronghorn antelope, jackrabbit, squirrel, beaver, quail, and waterfowl. Salmon was the principal animal food for these groups, ranking above other river resources such as sturgeon. Salt, nuts, basketry, and obsidian were obtained through trade with groups to the east for shells, basketry, and bows obtained in turn through trade from the west (Levy 1978; Wallace 1978).

Wooden digging sticks, poles, and baskets were used for gathering vegetal resources, while stone mortars, pestles, and cooking stones were used for processing foods. Items used for obtaining animal resources included nets, snares, seines, bows, and arrows. Arrow points were made primarily of basalt and obsidian (Levy 1978; Wallace 1978).

The Plains Miwok avoided most contact with the Spanish until the 1800s. The Book of Baptisms from Mission San José, dating to 1811, contains the first recording of Plains Miwok converts. The Plains Miwok, like other neighboring indigenous groups, were heavily disrupted by missionization and epidemics. With the annexation of California, several Plains Miwok signed treaties with the U.S. government for land acquisitions and provisions that were never realized. Disease and prejudice by fur trappers, gold miners, and settlers created a hostile environment, with many Plains Miwok subsequently being driven to the Sierra Nevada foothills. Some Plains Miwok found residence within rancherias while still moderately practicing a traditional hunting-gathering subsistence. In the early 1900s, the U.S. government issued reservation lands to Plains Miwok; however, many Plains Miwok still occupied areas of the Sierra Nevada foothills well into the 1970s (Levy 1978:401).

The Plains Miwok have found membership amongst several federally recognized tribes, including the Wilton Rancheria, Buena Vista Rancheria of Me-Wuk Indians, California Valley Miwok Tribe, and United Auburn Indian Community of the Auburn Rancheria (UAIC). Several other California Native American Tribes that are not federally recognized also represent the Plains Miwok. The Wilton Rancheria, with which DWR has formally consulted on the proposed project, acquired federal recognition and 38.77 acres of land in 1928 for the Plains Miwok living in the Sacramento area. Federal recognition was lost in 1964 due to termination, but was restored in 2009, after 10 years of court proceedings. The Wilton Rancheria has plans to develop the Wilton Resort Casino and Spa, which would provide economic independence and stability, and would fund the Tribe’s economic, social, and cultural programs (Wilton Rancheria 2020).

A review of ethnographic literature for the current investigation did not result in the identification of any documented Native American villages in or near any portion of the project area (Levy 1978; Kroeber 1925 [1976]; Wallace 1978). However, as mentioned above, most of these ethnographic accounts date to the early 20th century and, given the rapid decimation of the Plains Miwok and Northern Valley Yokuts soon after 19th-century Euroamerican settlement in the area, the lack of Native American settlements described in the vicinity of the current project area should not be taken as definitive evidence of their absence.

Historic Period

The earliest European presence in California came with the Spanish discovery and exploration of the California coast in the mid-16th century. European expansion commenced when Spain began establishing a string of Franciscan missions throughout the region to Christianize and assimilate the native population of California and to gain political and social control of the area. Alongside the missions came a network of military establishments or presidios and civilian settlements or pueblos. Exploration of the California hinterland focused predominantly on identifying rancho sites to support the mission network, as well as the recapture of runaway Native Americans (Gudde 1998; Hoover et al. 2002).

Although the original Spanish plan for the mission system included secularization, the process did not begin until Mexico gained independence from Spain in the 19th century. The Mexican government began secularization in mid-1834, with mission lands granted to high-ranking Mexican Californian soldiers, politicians, and socialites. Most ranchos were intensively involved in the hide-and-tallow trade, supporting huge herds of cattle on their vast landholdings. Beginning in the 1830s, Americans began to migrate to California. Many Americans became Mexican citizens, married into prominent Californio families, and were granted lands by the governor (Gudde 1998; Hoover et al. 2002).

The discovery of gold in California in 1848 instigated one of the largest migrations in history. Thousands came by land and sea in search of their fortunes. Most came to dig for gold, but many came with the foresight that miners needed supplies. Mining camps and towns were established almost immediately throughout California's gold-bearing regions, which are generally located along the western foothills of the Sierra Nevada and along the Klamath and Trinity river basins. The influx also brought an extreme diversity of cultures and nationalities. Almost immediately after the discovery of gold, investors began talking about the construction of a transcontinental railroad that would connect eastern goods, money, and services to the new western enterprises (Gudde 1998; Hoover et al. 2002).

Before 1850, much of California's low-lying Central Valley was naturally subject to regular flooding over large areas, making much of that land unusable for most agricultural purposes. The Swamp and Overflow Land Act of 1850 dramatically changed the natural landscape of the Delta by transferring title to swamplands from federal to State ownership. The act authorized the survey and settlement of swamp lands with the caveat that the land would be reclaimed for agriculture. In 1861, California established the Board of Swamp Land Commissioners to create swampland reclamation districts and to realign flood control works. The board constructed levees for the Sacramento Basin among other projects, but generally met with little success. Once a district was organized, it would cut off the natural bypasses and sloughs, causing flooding in other places because the water no longer had a natural means of diversion (Gudde 1998; Hoover et al. 2002).

By the early 20th century, reclamation benefited from technological advances that included the clamshell, hydraulic, and steam-driven dredges, in addition to the mechanical ditch digger that took the place of the horse-drawn scrapers and dredges of the early period of reclamation. Steam-powered and electrical pumps also helped to drain the land. Reclamation of virgin land ended in the early 1920s, but work remained to secure already reclaimed lands (Gudde 1998; Hoover et al. 2002).

The 20th century also ushered in improved transportation to the Sacramento River and Delta region. Changes included the construction of bridges and roadways on the tops of levees, and gasoline-powered (rather than steam) riverboats that plied the waterways. Before the transportation improvements, roadways were virtually nonexistent, with most local travel being accomplished by schooners or barges. Independent operators from Stockton and Sacramento operated most of these smaller workboats. Railroads also constructed alignments in the vicinity of the project area. These railroads not only connected the area to populated centers such as Sacramento and San Francisco, but also encouraged the movement of agricultural products from the area to outlying markets (Gudde 1998; Hoover et al. 2002).

Existing Cultural Environment

California Historical Resources Information System Records Search

In 2019, Environmental Science Associates (ESA), one of DWR's environmental consultants for the proposed project, conducted a cultural resources records search for the project area and vicinity at the Northwest Information Center at Sonoma State University, in Rohnert Park, and the Central California Information Center at California State University, Stanislaus, in Turlock. The Northwest Information Center maintains the official California Historical Resources Information System (CHRIS) records of previous cultural resources studies and recorded cultural resources for the drought salinity barrier portion of the project area, and the Central California Information Center maintains the official CHRIS records for the water quality monitoring stations portion of the C APE. The study area for the records searches consisted of the project area with a 0.25-mile buffer.

The CHRIS has records of two previously recorded cultural resources mapped within the 0.25-mile search area, neither of which are mapped within the project area. Of the previously recorded cultural resources mapped within 0.25 mile of the project area, both are historic-era architectural resources (P-39-000112, P-39-004399) in the vicinity of the water quality monitoring stations portions of the project area. P-39-000112 is a segment of the Atchison, Topeka, and Santa Fe Railroad located between water quality monitoring stations #1 and #2, while P-39-004399 is the Mokelumne Aqueduct, located south of both water quality monitoring stations #1 and #2.

The CHRIS has records of three previous cultural resources studies that have been conducted in or within 0.25 mile of the project area. Only one of these covered the project area.

Cultural Resources Study for the Previous Emergency Drought Barrier Project

Two previous cultural resources studies, not on file at the CHRIS, were conducted for previous phases of the proposed project (AECOM 2014; Rehor 2016). Between these two studies, all of the current project area was covered. One of these studies identified, recorded, and evaluated the eligibility for listing in the California Register of Historical Resources (California Register) of two structures in the project area: the Bradford Island Levee and the Jersey Island Levee. Both resources were recommended as not eligible for the California Register (AECOM 2014).

Shipwrecks Database

The California State Lands Commission (CSLC) maintains the Shipwrecks Database, which currently identifies approximately 1,550 recorded shipwrecks in California. In December 2019, ESA corresponded with the CSLC requesting a records search of the CSLC's Shipwrecks Database for the drought salinity barrier portion of the project area. The CSLC indicated that the Shipwrecks Database has records of three shipwrecks in the general area:

- *Washoe*, a river steamer that sank on September 6, 1864, from a boiler explosion. The owner of the ship was California Navigation & Imrov. Co. and the captain was G. W. Kidd. A note in the database states that this shipwreck is also shown as sunk 5 miles down from Sacramento and that the hull was raised.
- *Alert*, a sidewheel steamboat that was built in 1885 and foundered September 26, 1919, at Rio Vista. This was a 65-ton ship built at Benicia.
- *Grace Barton*, a 195-ton sternwheel steamboat built in 1890 that sank at Rio Vista in 1916. This ship was owned by the Alden Bros. and a note states that the ship was burned during the making of the movie "Jim Bludso."

The CSLC also noted that not all shipwrecks are listed in the Shipwrecks Database and that listed locations may be inaccurate; previously unidentified vessels or parts of vessels may exist.

Field Survey

In December 2019, ESA conducted an intensive cultural resources pedestrian survey of non-inundated areas of the drought salinity barrier portion of the project area on Jersey Island. Specific attention was given to inspecting the areas of the drought salinity barrier portion of the project area where two architectural resources (Bradford Island Levee, Jersey Island Levee) had been previously recorded by AECOM (2014). The Jersey Island Levee was revisited and the Bradford Island Levee was observed from across West False River, on the Jersey Island side of the drought salinity barrier portion of the project area. During the field survey, no new cultural resources were identified in the project area, but two previously recorded cultural resources were identified there: the Bradford Island Levee and the Jersey Island Levee. Both cultural resources identified in the project area are historic-era levees.

DWR concurs with AECOM's previous recommendation regarding both the Bradford Island Levee and the Jersey Island Levee, concluding that they are not eligible for the California Register, as neither meet the significance criteria for associations with important events related to reclamation, or persons important to local, state, or national history. The levees do not represent new or innovative designs, nor are they the work of a notable engineer. No archaeological deposits were identified within the project area, and the levees themselves are not considered to contain information that would be useful in addressing questions important to history. Therefore, the Jersey Island Levee and the Bradford Island Levee are not considered historical resources for the purposes of CEQA.

Native American Correspondence

ESA contacted the NAHC on December 24, 2019, 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 to ESA on December 27, 2019, stating that the Sacred Lands File has no record of sacred sites in the C-APE; the reply also included a list of Native American representatives to contact who may be interested in the proposed project. To obtain current information, on November 25, 2020, ESA again contacted the NAHC requesting a search of the Sacred Lands File and a list of Native American representatives who may have interest in the proposed project. The NAHC replied to ESA on December 12, 2020, stating that the Sacred Lands File has no record of sacred sites in the project area, and provided a list of Native American representatives to contact who may be interested in the proposed project.

In support of required Native American consultation for the proposed project pursuant to Public Resources Code (PRC) Section 21080.3.1, and in accordance with the California Natural Resources Agency's Final Tribal Consultation Policy and DWR's Tribal Engagement Policy, DWR sent letters via certified mail on March 25, 2021, to the following Native American representatives:

- Herbert (Lou) Griffith, Wilton Rancheria
- Katherine Perez, North Valley Yokuts Tribe
- Anthony Roberts, Yocha Dehe Wintun Nation (YDWN)
- Sara Dutschke Setshwaelo, Ione Band of Miwok Indians
- Gene Whitehouse, UAIC

These letters provided information on the proposed project and requested that the recipients notify DWR if they would like to consult pursuant to PRC Section 21080.3.1. The only response to these letters came in a letter to DWR from Isaac Bojorquez (YDWN) dated April 8, 2021, which stated that the proposed project is not within YDWN's aboriginal territory and that YDWN declines to comment on the proposed project.

On April 12, 2021, DWR sent follow-up emails to the four Native American representatives listed above who did not reply to the initial letter; the email included the original outreach letters and maps. DWR followed up again with a similar email on April 16, 2021. DWR received one reply to the emails, from Anna Starkey (UAIC) on April 13, 2021, stating that the proposed project is outside UAIC's tribal territory and that UAIC declines to consult on the proposed project. Ms. Starkey contacted DWR again, via email on April 30, 2021, asking whether any other Native American tribes had requested to consult on the proposed project. DWR responded to the email the same day, stating that no other tribes had requested consultation.

In support of required Native American consultation for the proposed project pursuant to PRC Section 21080.3.1, and in accordance with the Tribal Consultation Policy and Tribal Engagement Policy, DWR sent letters via certified mail on January 27, 2022, to the five Native American representatives listed above; these letters provided information regarding revisions to the proposed project and requested that DWR be contacted if the Tribes would like to consult pursuant to PRC Section 21080.3.1. Only one Tribe, the Wilton Rancheria, responded, on February 15, 2022, stating that they would like to consult on the proposed project pursuant to PRC Section 21080.3.1. Between February and March 2022, DWR and the Wilton Rancheria consulted on the proposed project through emails and conference calls, including DWR's invitation to the Tribe to the EIR scoping meeting, which occurred on March 9, 2022, and additional project details. The Wilton Rancheria did not state that they had any specific concerns regarding the proposed project's potential to affect cultural resources or tribal cultural resources.

In accordance with the Tribal Consultation Policy and Tribal Engagement Policy, DWR sent letters on March 25, 2021, to the following Native American representatives:

- Donal Duncan, Guidiville Indian Rancheria
- Andrew Galvan, The Ohlone Indian Tribe
- Corrina Gould, The Confederated Villages of Lisjan
- Lloyd Mathiesen, Chicken Ranch Rancheria of Me-Wuk Indians
- Charlene Nijmeh, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
- Neil Peyron, Tule River Indian Tribe
- Rhonda Morningstar Pope, Buena Vista Rancheria of Me-Wuk Indians
- Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan
- Cosme Valdez, Nashville Enterprise Miwok-Maidu-Nishinam Tribe
- Charlie Wright, Cortina Rancheria–Kletsel Dehe Band of Wintun Indians
- Irene Zwierlein, Amah Mutsun Tribal Band of Mission San Juan Bautista

These letters provided information regarding the proposed project and requested that the recipients notify DWR if they had any concerns regarding the proposed project and effects on cultural resources.

On April 16, 2021, DWR sent a follow-up email to the above-listed contacts requesting that they notify DWR if they had any concerns regarding the proposed project and effects on cultural resources. On April 21, 2021, DWR left or attempted to leave voice mails for Mr. Galvan, Ms. Gould, Ms. Sayers, and Ms. Zwierlein, as a follow-up to the letters and emails; note that the NAHC contacts list did not provide phone numbers for the other above-listed contacts. DWR did not receive any replies from these individuals.

In accordance with the Tribal Consultation Policy and Tribal Engagement Policy, DWR sent emails on January 27, 2022, to the 11 Native American representatives listed above. These letters provided information regarding revisions to the proposed project and requested that DWR be contacted if the Tribes had any concerns regarding the proposed project. DWR did not receive any response from these Tribes.

Confidential Appendix E provides documentation of the proposed project correspondence with Native American representatives to date.

Summary of Existing Cultural Environment

Through archival research, a records search, correspondence with Native American representatives, and a field survey, this study identified two cultural resources, both architectural resources, in the project area: the Bradford Island Levee and the Jersey Island Levee. DWR concludes that both resources are not eligible for the California Register. Therefore, no historical resources or unique archaeological resources, as defined by CEQA, have been identified in the project area.

3.4.3 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, an office of the California Department of Parks and Recreation, oversees adherence to CEQA regulations and maintains the California Historical Resource Inventory. Typically, a resource must be more than 50 years old to be considered as a potential historical resource. The California Office of Historic Preservation advises recording any resource 45 years or older, because there is commonly a five-year lag between identification of a resource and the date that planning decisions are made.

Historical Resources

The State CEQA Guidelines (California Code of Regulations [CCR] Title 14, Section 15000 et seq. [14 CCR Section 15000 et seq.]) recognize that historical resources include all of the following:

(1) A resource in the California Register;

(2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and

(3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or

cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and 14 CCR Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the State CEQA Guidelines, then the site may be treated in accordance with the provisions of 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; or
- 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, historical, or tribal cultural resource, the effects of the project on those cultural resources shall not be considered a significant effect on the environment (14 CCR Section 15064.5[c][4]).

Assembly Bill 52 and Tribal Cultural Resources

California Assembly Bill (AB) 52, enacted in September 2014, recognizes that California Native American Tribes have expertise with regard to their tribal history and practices. AB 52 established a new category of cultural resources in CEQA, "tribal cultural resources" (TCRs), to consider tribal cultural values when determining the impacts of projects on cultural resources (PRC Sections 21080.3.1, 21084.2, and 21084.3). The law also requires that CEQA lead agencies consult with California Native American Tribes to identify, evaluate, and assess potential project impacts on TCRs (PRC Sections 21080.3.1, 21080.3.2, and 21082.3).

PRC Section 21074(a) defines a TCR 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 TCR 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 TCR 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 TCRs separately from impacts on archaeological resources (PRC Sections 21074 and 21083.09) because TCRs have cultural values beyond their ability to yield data important to prehistory or history. 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. Because the notice of preparation for the proposed project was filed on February 23, 2022, 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]). The criteria for eligibility for the California Register are based upon the criteria for listing in the National Register of Historic Places (National Register) (PRC Section 5024.1[b]). Certain resources are determined by the statute to be 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 local, State, and/or federal 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; or
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. Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed in the National Register (and those formally Determined Eligible for the National Register);
- California Registered Historical Landmarks from No. 770 onward; and
- Those 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.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 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; and
- TCRs.

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 Edmund G. Brown Jr.'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."

California Department of Water Resources 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.

Delta Reform Act of 2009 and Delta Plan

The mission of the Delta Stewardship Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (California Water Code Section 85054). The 2009 Delta Reform Act states that the coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The Delta Stewardship Council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies best available science to further the coequal goals.

The Delta Stewardship Council was granted specific regulatory and appellate authority by the California Legislature under the 2009 Delta Reform Act over certain actions that take place in the Delta or Suisun Marsh, in whole or in part. The Delta Stewardship Council exercises that authority by developing and implementing the Delta Plan and its accompanying regulations.

According to the Delta Reform Act, State or local agencies approving, funding, or carrying out projects, plans, or programs, upon determining that their project is a "permitted action" subject to regulations of the Delta Plan, must certify the consistency of the project with the Delta Plan policies (Water Code Section 85225).

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 CSLC (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.

3.4.4 Impacts and Mitigation Measures

Methods of Analysis

Historical Resources

Impacts on historical resources are assessed by identifying any activities that would affect them, 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 California Health and Safety Code Section 7050.5. For the purposes of this analysis, intentional disturbance, mutilation, or removal of interred human remains without following the notification and consultation procedures outlined in PRC Section 5097.89 and California Health and Safety Code Section 7050.5 would be a significant impact.

Thresholds of Significance

An impact on cultural resources would be 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.

The following analysis describes archaeological resources, both as historical resources according to State CEQA Guidelines Section 15064.5, and as unique archaeological resources as defined in PRC Section 21083.2(g).

Project-Specific Impacts and Mitigation Measures

Table 3.4-1 summarizes the impact conclusions presented in this section.

TABLE 3.4-1
SUMMARY OF IMPACT CONCLUSIONS—CULTURAL RESOURCES

Impact Statement	Impact Conclusion
3.4-1: 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
3.4-2: Implementation of the proposed project could disturb human remains, including those interred outside of dedicated cemeteries.	LSM
3.4-3: 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
3.4-4: Implementation of the proposed project could contribute to significant cumulative damage to unidentified human remains.	LSM

NOTES: LSM = Less than Significant with Mitigation

SOURCE: Data compiled by ICF/ESA in 2022

Impact 3.4-1: 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.

No archaeological resources, including any submerged cultural resources, have been identified in the project area. 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 project area. As a result, no substantial evidence exists for the presence in the project area of any archaeological resources, as defined in State CEQA Guidelines Section 15064.5. Therefore, the proposed project (under all three installation scenarios) is not expected to affect any archaeological resource, including any shipwrecks and other submerged cultural resources, pursuant to State CEQA Guidelines Section 15064.5.

Impact Conclusion

Although no substantial evidence exists for the presence of archaeological resources in the project area, the proposed project (under all three installation scenarios) 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 15064.5, impacts of the proposed project on archaeological resources would be **potentially significant**.

Mitigation Measure CUL-1: Conduct Preconstruction Cultural Resources Awareness and Sensitivity Training.

Before project construction, a qualified archaeologist—defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology and has expertise in California archaeology—shall develop a cultural resources awareness and sensitivity training program for all construction and field workers involved in the project's ground-disturbing activities. The qualified archaeologist shall develop this program in coordination with culturally affiliated California Native American Tribes. The program shall include a presentation that covers, at a 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 Measures CUL-2 and CUL-3) and human remains (see Mitigation Measure CUL-4). Written materials associated with the program shall be provided to project personnel as appropriate. Personnel working in areas of project ground-disturbing activities shall receive the training before working in these areas.

Mitigation Measure CUL-2: Implement Unanticipated-Discovery Protocol for Native American or Historic-Era Archaeological Resources.

If Native American or historic-era archaeological resources are encountered during project construction or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. DWR and its qualified archaeologist—defined as one who meets the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology and has expertise in California archaeology—shall be informed of the discovery immediately. The qualified archaeologist shall inspect the discovery. Native American archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (midden) containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-era materials might include building or structure footings and walls, and deposits of metal, glass, and/or ceramic refuse. If the qualified archaeologist determines that the resource is or is potentially Native American in origin, culturally affiliated California Native American Tribes shall be contacted to assess the find and determine whether it is potentially a TCR; in cases where an archaeological resource is Native American in origin, the specific mitigation for the resource relies on future consultation with culturally affiliated California Native American Tribes.

If DWR determines, based on recommendations from the qualified archaeologist—and from culturally affiliated California Native American Tribes, if the resource is Native American—that the resource may qualify as a historical resource or unique archaeological resource (as defined in State CEQA Guidelines Section 15064.5) or a TCR (as defined in PRC Section 21074), the resource shall be avoided if feasible. “Avoidance” means that no activities associated with the project that may affect cultural resources shall occur within the boundaries of the resource or any defined buffer zones. DWR shall determine whether avoidance is feasible considering factors such as the nature of the find, project design, costs, and other considerations.

If avoidance is not feasible, DWR shall consult with its qualified archaeologist, culturally affiliated California Native American Tribes (if the resource is Native American), 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. DWR shall prepare a treatment plan to document the treatment measures and their implementation methods. Treatment measures shall address the specific attribute(s) that qualify the discovery as an historical resource or unique archaeological resource. Treatment for most resources would consist of (but would not necessarily be limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be affected by the project. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and State repositories, libraries, and interested professionals. 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) authored by a qualified archaeologist, to be filed with the CHRIS. Project 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.

If, during project implementation, DWR determines that portions of the project area may be sensitive for archaeological resources or TCRs, DWR may authorize construction monitoring of these locations by an archaeologist and tribal monitor. Any monitoring by a tribal monitor shall be completed under agreements between DWR and culturally affiliated California Native American Tribes.

Mitigation Measure CUL-3: Implement Unanticipated-Discovery Protocol for Submerged Cultural Resources.

If a shipwreck, and associated artifacts, or other cultural resource on or in the tide and submerged lands of California is encountered during project development or operation, Mitigation Measure CUL-2 shall be implemented, in addition to the following measures:

- DWR shall initiate consultation with CSLC 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 shall be presumed to be archaeologically or historically significant.
- If the find is a maritime archaeological resource, the qualified archaeologist assessing the find shall have expertise in maritime archaeology.
- DWR shall consult with the CSLC 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. Treatment measures would typically consist of (but would not necessarily be limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be affected by the project. DWR shall prepare a treatment plan to document the treatment measures and their implementation methods. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and State repositories, libraries, and interested professionals. 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) authored by a qualified archaeologist, to be filed with the CHRIS. Project 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.
- DWR shall submit to the CSLC 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: Implementing Mitigation Measures CUL-1, CUL-2, and CUL-3 would reduce this potentially significant impact to a less-than-significant level because worker awareness training would be conducted and, if an archaeological resource is inadvertently discovered, work would be temporarily halted and DWR and its qualified archaeologist would assess any previously unrecorded archaeological resource. If the resource is determined to potentially be significant pursuant to State CEQA Guidelines Section 15064, the resource would be avoided if feasible; or, if avoidance is not feasible, culturally affiliated Native American Tribes would be consulted with (if the resource is indigenous in origin) and culturally appropriate treatment measures would be determined and implemented, including through development and implementation of a treatment plan and subsequent professional-level technical report documenting the results of treatment plan implementation. Because details on any currently unidentified archaeological resource of Native American origin that could be affected by the project are unknown, by nature, specific mitigation for such resources relies on future consultation with culturally affiliated California Native American Tribes. The impact would be **less than significant with mitigation**.

Impact 3.4-2: Implementation of the proposed project could disturb human remains, including those interred outside of dedicated cemeteries.

No human remains have been identified in the project area through archival research, field surveys, or Native American consultation or correspondence, nor do the land use designations for the project area include cemetery uses. Therefore, there is no substantial evidence that the proposed project would disturb any human remains.

However, the proposed project (under all three installation scenarios) would involve ground-disturbing activities. It is possible that such activities could unearth, expose, or disturb previously unknown human remains.

Impact Conclusion

Should human remains be discovered and be disturbed or damaged during construction activities, impacts of the proposed project (all three installation scenarios) on the human remains would be **potentially significant**.

Mitigation Measure CUL-4: Implement Unanticipated-Discovery Protocol for Human Remains.

If human remains are uncovered during project construction, all work shall immediately halt within 100 feet of the find and the appropriate county's 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 California Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. Per PRC Section 5097.98, DWR shall ensure that the immediate vicinity of the location of the Native American human remains is not damaged or disturbed by further development activity until DWR has discussed and conferred with the most likely descendant regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

Impact Significance after Mitigation: Implementing Mitigation Measure CUL-4 would reduce this potentially significant impact to a less-than-significant level because it would require that work in the area cease and that appropriate State law be followed if human remains are discovered. The impact would be **less than significant with mitigation**.

Cumulative Impacts

The 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 West False River project site and surrounding vicinity.

Other projects considered include two levee strengthening projects conducted in 2014–2015 on Bradford and Jersey islands adjacent to the project site by Reclamation Districts 2059 and 830, respectively, and DWR's temporary emergency drought barriers installed at the location of the proposed project in 2015 and 2021–2022.

This area of analysis considers the traditional territory of the local Native American community for impacts on Native American archaeological resources and human remains, and areas of Euroamerican settlement and development for impacts on non–Native American historic-era archaeological resources and human remains.

Impact 3.4-3: 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.

The cumulative context for impacts on archaeological resources includes the West False River project site and surrounding vicinity, considering the traditional territory of the local Native American community for impacts on Native American archaeological resources, and areas of Euroamerican settlement and development for impacts on non–Native American historic-era archaeological resources.

The project area and vicinity contain a number of archaeological resources that, in many cases, have 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 Native American 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 project implementation, could affect previously unidentified archaeological resources in the project area, resulting in a considerable contribution to this cumulative impact.

Likewise, the project area 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.

Impact Conclusion

Implementation of the proposed project (under all three installation scenarios) could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to State CEQA Guidelines Section 15064.5. Therefore, the cumulative effect of the proposed project on archaeological resources would be **potentially significant**.

> **Mitigation Measures: Implement Mitigation Measures CUL-1, CUL-2, and CUL-3.**
>
> **Impact Significance after Mitigation:** Implementation of Mitigation Measures CUL-1, CUL-2, and CUL-3 would reduce the proposed project's contribution to cumulative impacts on archaeological resources to a less-than-considerable level. The impact would be **less than significant with mitigation**.

Impact 3.4-4: Implementation of the proposed project could contribute to significant cumulative damage to unidentified human remains.

The cumulative context for impacts on human remains includes the West False River project site and surrounding vicinity, considering the traditional territory of the local Native American community for impacts on Native American human remains, and areas of Euroamerican settlement and development for impacts on non–Native American 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 project area, 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.

Impact Conclusion

Implementation of the proposed project (under all three installation scenarios) could contribute to significant cumulative damage to unidentified human remains. Overall, the cumulative effect of the proposed project on unidentified human remains would be **potentially significant**.

> **Mitigation Measure: Implement Mitigation Measure CUL-4.**
>
> **Impact Significance after Mitigation:** Adherence to State laws regarding human remains and implementation of Mitigation Measure CUL-4 would reduce the proposed project's contribution to cumulative impacts on human remains to a less-than-considerable level. The impact would be **less than significant with mitigation**.

3.5 Hydrology and Water Quality

3.5.1 Introduction

This section addresses the hydrology and water quality resources that could be affected by the proposed project. Specifically, it evaluates potential erosion, scour, siltation and water quality effects during installation and removal of the temporary drought salinity barrier (up to two times, under all three installation scenarios) and potential construction of a notch (or partial opening) in the middle of the barrier.

DWR received comment letters regarding hydrology and water quality and related policies in response to the notice of preparation, from the Central Valley Regional Water Quality Control Board (RWQCB), Delta Protection Commission, Delta Stewardship Council, and Contra Costa Water District, along with verbal comments received during the public scoping meeting on March 9, 2022 (see **Appendix A**).

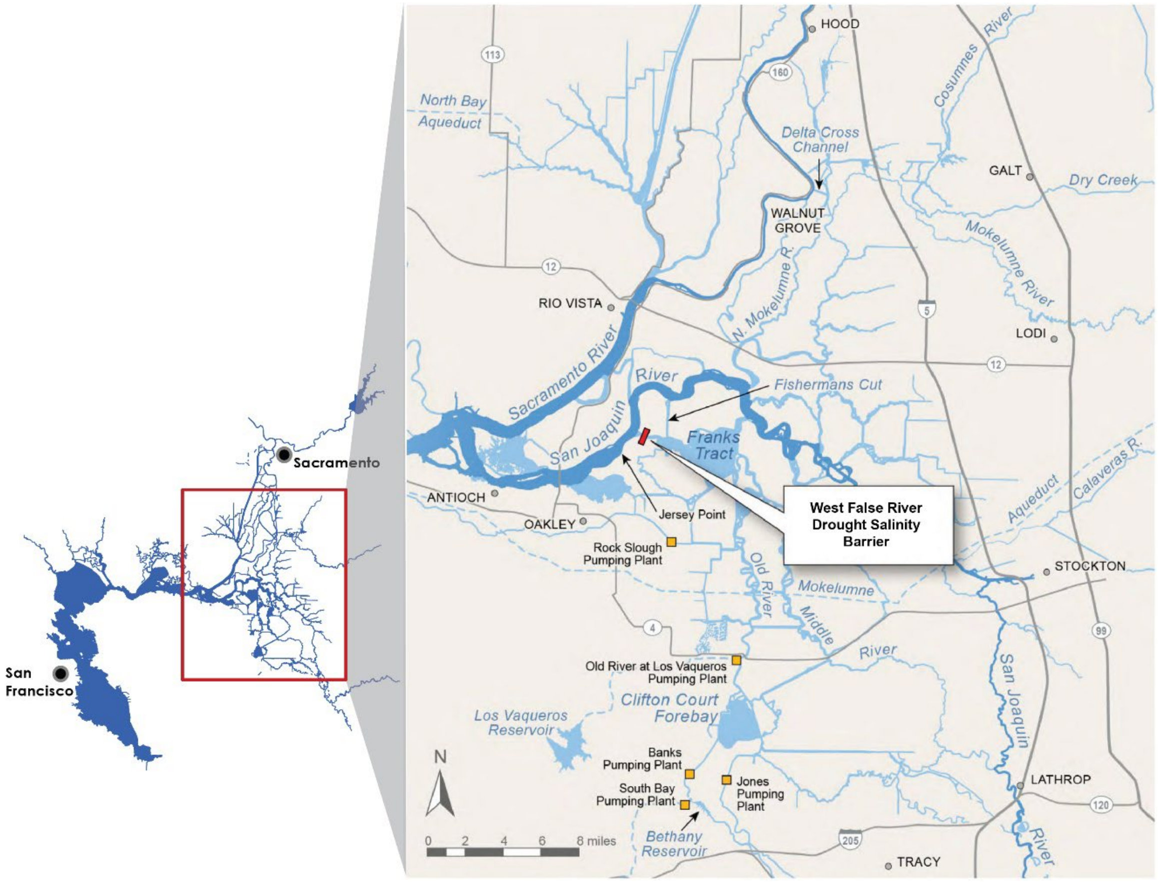
3.5.2 Environmental Setting

The project area is located in the Delta, an inland or inverted river delta that forms at the confluence of the Sacramento and San Joaquin rivers in Central California. As shown in **Figure 3.5-1**, the Delta encompasses approximately 1,000 square miles of tidal wetlands, sloughs, and islands before flowing into San Francisco Bay, and eventually to the Pacific Ocean (MacVean 2018; The Bay Institute 2003). The Delta and San Francisco Bay represent contiguous components of a single estuary, with the Delta being the easternmost (upstream) portion extending northeast and southeast from Chipps Island (the legal western boundary of the Delta) (The Bay Institute 2003).

Hydrology

Surface Water

The Delta is a complex system that provides numerous pathways from tidally influenced, higher salinity seawater to flow inland. Notable pathways in the area of the project site include Franks Tract, a flooded area in the Delta; Fisherman's Cut, a canal situated near Serpents Slough southeast of Bradford Island; Dutch Slough, which comprises diked lands and tidal marsh; and Old River, a tidal distributary upstream of the project site. Tidal flows in the Delta are controlled by channel geometry, tidal elevations at the Golden Gate Bridge, inflows from the Sacramento and San Joaquin rivers, in-Delta consumptive use, Central Valley Project (CVP) and State Water Project (SWP) export pumping in the South Delta, and Delta outflows. Average tidal flows in False River in the area of the project site are on the order of ±35,000 cubic feet per second (cfs); the mean tidal elevation is around 4 feet North American Vertical Datum of 1988 (NAVD88), with a tidal range of around 3.5 feet.



SOURCE: California Department of Water Resources 2019

Figure 3.5-1
West False River Drought Salinity Barrier Location in the Sacramento–San Joaquin Delta

Water movement through the area is influenced by both upstream and downstream sources. Sources upstream of the Delta consist of a series of drainage basins where streamflow directly reflects runoff from rainfall and/or snowmelt in the Sierra Nevada that is stored in surface water reservoirs as part of the CVP and SWP. Water releases from these storage facilities to the Delta are critical for controlling salinity intrusion (The Bay Institute 2003). While streamflow historically exhibits substantial seasonal and inter-annual variability, consecutive years of below average snowpack presents challenges to water quality in the Delta. Downstream tidal flows to and from the Delta's wetlands comprise a network of channels developed from larger subtidal waterways. In the South-Central Delta, low and irregular banks allow the island interiors to be flooded with each high tide (The Bay Institute 2003).

All areas of the Central Valley historically experienced regular flooding, but the Sacramento and San Joaquin Valleys normally did not flood at the same time. In the Sacramento Valley, rainfall induced floods (December–March) predominated, while in the San Joaquin Valley, particularly the Tulare Lake Basin, prolonged snowmelt flooding (April–June) was the norm. Large, sometimes simultaneous floods in the San Joaquin and Sacramento valleys occurred during the winter months because of prolonged high elevation rainfall on a saturated snowpack (The Bay Institute 2003).

Groundwater

Shallow groundwater conditions adjacent to most Delta channels generally are a result of seepage flow through the levees and alluvial Delta sediments toward the adjacent, lower elevation agricultural islands. Groundwater elevation (depth to the water table) is controlled by the mean tide and adjacent land elevations, soil types and properties of the adjacent land, and the subsurface soils underlying the channels and levees. Groundwater elevations on Jersey and Bradford islands around the project site are controlled by the network of drainage channels that are used to maintain groundwater elevations below the root zone of the pasture and crops grown on those islands.

Water Quality

Surface Water Quality

Salinity and concentrations of other water quality constituents in the Delta are heavily influenced by freshwater inflows from the Sacramento and San Joaquin rivers and by Delta outflow, which primarily determines salinity intrusion at Collinsville and other western Delta locations. Salinity intrusion is the result of the dynamic balance between strong tidal mixing and the inflow of fresh water at the upstream end of the estuary (to Suisun Bay), which is often referred to as “Delta outflow.” Diversions for agricultural use occur in the Delta, and the CVP and SWP pumping plants in the southern Delta export water south of the Delta for municipal and agricultural uses. Therefore, the Delta outflow that controls the estuarine salinity gradient must be calculated from the measured river inflows minus the measured water exports and estimated agricultural diversions (channel depletions).

Because tidal mixing in the Delta is generally constant from day to day, with some differences between neap tide and spring tide, salinity intrusion increases with lower outflow and decreases with higher outflow. Higher Delta outflow (caused by higher river inflows) will “push” fresh water farther downstream, so that the upstream end of the salinity gradient will shift downstream with higher outflow. The upstream end of the salinity gradient has been defined as “X2,” which is the point—identified by its distance from the Golden Gate Bridge—where salinity at the river’s bottom is about 2 parts per thousand (2,000 milligrams per liter total dissolved solids).

Water quality constituents such as minerals, nutrients, metals, and contaminants are generally higher during drought conditions because river flows are lower and provide less dilution of these substances. In the Delta waterways near the project site, constituents identified on the Clean Water Act (CWA) 303(d) total maximum daily load (TMDL) list include chlorpyrifos (western and central portions of the Delta waterways); mercury (western, central, southern, and eastern portions); and dichlorodiphenyltrichloroethane, better known as DDT (central portion). Other constituents are to be listed, but TMDLs have not been completed for those constituents. Among the relevant constituents are chlorophyll, nutrients, bromide, turbidity, and dissolved oxygen (DO). Salinity is measured as electrical conductivity (EC), and levels of all minerals or other substances from seawater (e.g., chloride, bromide) are proportional to changes in EC.

A large proportion of the San Joaquin River’s inflow generally is pumped at the CVP and SWP export facilities in the South Delta; therefore, water quality in the San Joaquin River has very little effect on False River water quality during drought conditions. Therefore, water quality in False River around the project site is usually controlled by Sacramento River inflow mixed with salts and other constituents in seawater.

Groundwater Quality

Groundwater quality in the project vicinity is controlled by seepage water flowing from the surface water channels to the adjacent islands. Groundwater quality below and adjacent to Delta channels is therefore similar to surface water quality (i.e., with regard to salinity, nutrients, and organic carbon).

Flood Flows and Flood Hazards

Major flood events in the Central Valley are generally the result of high-rainfall or snowmelt runoff events, which have occurred only in mid-November through June in recorded history. Potential flood flows from the Sacramento River are diverted at Fremont Weir to the Yolo Bypass; therefore, flows in the Sacramento River at Freeport are limited to about 100,000 cfs. Farther downstream on the Sacramento River, some of the remaining higher flows are diverted to Sutter, Miner, and Steamboat sloughs, with remaining flows continuing to the Walnut Grove diversion into Georgiana Slough.

The Sacramento River's water surface elevation increases to about 27.5 feet NAVD88 at Freeport at the maximum flow of 100,000 cfs, and to approximately 17.5 feet in Walnut Grove and approximately 12.5 feet at the mouth of Steamboat Slough and Cache Slough (California Department of Water Resources 1995). The 100-year flood flow elevation in West False River is about 10 feet, only 4 feet higher than the mean higher high-water elevation of about 6 feet.

Since 1900, more than 160 levee failures have occurred in the Delta, primarily as a result of levee overtopping or structural failure. Flood hazards for land adjacent to Delta channels can result from levee failures caused by flood flows and associated higher water elevations, excessive levee seepage (e.g., channeling), erosional events (e.g., wave overtopping), or seismically induced failure. However, large-scale improvements made to the Delta levee system since 1982 have reduced the incidences of failure to just one major failure in the past 30 years. Most Delta levees have been strengthened in recent years with increased height, increased width from landside buttressing, or both. Levee stability (structural integrity) generally is greatest for wider levees composed of mineral soils (i.e., high sand, silt, and clay content, rather than peat and other organic soils), with a lower side slope and height above adjacent land.

Levees on Bradford and Jersey islands, located adjacent to the proposed West False River barrier, have been strengthened in recent years and have sufficient height to contain anticipated floodwater surface elevations. In addition, implementation of the 2015 emergency drought barrier (EDB) project included the placement of rock fill along the Jersey Island and Bradford Island levee toes approximately 225 feet upstream and downstream of the barrier's centerline to strengthen the levees for barrier installation. For that project, 300 feet of sheet piles were installed parallel to the channel through the levees on both islands to a depth of approximately 35 feet, to prevent water piping beneath the levees from the river. These measures also limit the flood hazard risks associated with the proposed project.

3.5.3 Regulatory Setting

Federal

Clean Water Act

The CWA—the Federal Water Pollution Control Act of 1972 and subsequent amendments—provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters.

Section 404

CWA Section 404 prohibits the discharge of fill material into waters of the United States, including many wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA). To discharge dredged or fill material into waters of the United States, including wetlands that come within the definition of that term, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through USACE. "Waters of the United States" are generally defined as waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters.

Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require a federal agency's approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

Water quality certification requires the evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing the discharge of dredged and fill materials into waters of the United States. The federal government delegates water pollution control authority under CWA Section 401 to the states (and in California, ultimately to the RWQCBs).

Section 303

CWA Section 303(d) requires states to develop lists of water bodies that do not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each listed pollutant. The TMDL is the amount of the pollutant that the water body can receive and still be in compliance with water quality objectives. The TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. EPA must either approve a TMDL prepared by the state or disapprove the state's TMDL and issue its own. After implementation of the TMDL, the problems that led a given pollutant to be placed on the Section 303(d) list are expected to have been remediated.

State

Central Valley Flood Protection Board

The Central Valley Flood Protection Board (CVFPB), previously known as The Reclamation Board, was created in 1911. Its purpose was to help manage flood risks in the Central Valley on a systemwide basis by developing a comprehensive flood control plan for the Sacramento and San Joaquin rivers, and to act as the nonfederal sponsor for federal flood control projects in the Central Valley. The CVFPB has jurisdiction throughout the Sacramento and San Joaquin valleys, an area synonymous with the drainage basins of the Central Valley, and includes the Sacramento–San Joaquin Drainage District.

The CVFPB's mission is as follows:

- To control flooding along the Sacramento and San Joaquin rivers and their tributaries in cooperation with USACE.
- To cooperate with various agencies of the federal, State, and local governments in establishing, planning, constructing, operating, and maintaining flood control works.
- To maintain the integrity of the existing flood control system and designated floodways through its regulatory authority by issuing permits for encroachments.

The CVFPB is a major partner for federal flood control works in the Central Valley; it shares costs with the federal government and the local districts and provides land easements and rights-of-way for federal projects. The CVFPB assumes responsibility for operation and maintenance only after a local maintenance agency has agreed to assume ultimate responsibility for the operation and maintenance. The CVFPB also approves or denies plans for reclamation, dredging, or improvements that alter any project levee. It has authority to approve or deny any land reclamation plan (related to public works) or flood protection that involves excavation near rivers and tributaries, and has legal responsibility for oversight of the entire Central Valley flood management system.

The CVFPB also adopts floodway boundaries and approves uses within those floodways. The purpose of the designated floodway program is to control encroachments and development within the floodways and to preserve floodways to protect lives and property. Various uses are permitted in the floodways, such as agriculture, canals, low dikes and berms, parks and parkways, golf courses, sand and gravel mining, structures not used for human habitation, and other facilities and activities that would not be substantially damaged by the base flood event and would not cause adverse hydraulic impacts that would raise the water surface in the floodway. A permit from the CVFPB is required for most activities other than normal agricultural practices within the boundaries of designated floodways. The only designated floodways in the Delta are along the Cosumnes and Mokelumne rivers up to their confluence with each other and the Stanislaus River up to its confluence with the San Joaquin River.

California Code of Regulations Title 23 and the Water Code provide guidance to DWR and the CVFPB on how to enforce appropriate standards for flood control projects in the Central Valley. These codes provide DWR and the CVFPB with the authority to enforce standards for the erection, maintenance, and operation of levees, channels, and other flood control works within their jurisdiction.

Delta Protection Act of 1959

The Delta Protection Act (Water Code Sections 12200–12205) was enacted in 1959 for the protection, conservation, development, control, and use of the waters in the Delta for the public good. This law was enacted at the same session during which the California Legislature enacted the Burns-Porter Act, financing the initial facilities of the State Water Resources Development System (now known as the SWP). The Delta Protection Act of 1959 required the SWP, in conjunction with the federal CVP, to provide salinity control and an adequate water supply for the users of water in the Delta.

Delta Protection Act of 1992

The Delta Protection Act (Public Resources Code Sections 29700–29716) includes a series of findings and declarations regarding the quality of the Delta environment and emphasizes the national, state, and local importance of protecting the Delta's unique resources. The law mandated a State-level planning effort to address the needs of Delta communities. The Delta Protection Commission was made a permanent State agency in 2000 because a need for continued planning and management was identified.

Delta Reform Act of 2009 and Delta Plan

The mission of the Delta Stewardship Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (Water Code Section 85054). The council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies best available science to further the coequal goals.

The Delta Stewardship Council was granted specific regulatory and appellate authority by the California Legislature under the 2009 Delta Reform Act over certain actions that take place in the Delta or Suisun Marsh, in whole or in part. The council exercises that authority by developing and implementing the Delta Plan and its accompanying regulations.

According to the Delta Reform Act, State or local agencies approving, funding, or carrying out projects, plans, or programs, upon determining that their project is a "permitted action" subject to regulations of the Delta Plan, must certify the consistency of the project with the Delta Plan policies (Water Code Section 85225).

California Water Rights

California has a dual system for water rights: Both the riparian doctrine and the prior-appropriation doctrine apply. Riparian rights result from the ownership of land bordering a surface water source and are normally senior in priority to most appropriative rights. Owners with riparian water rights may use natural flows directly for beneficial purposes on adjoining lands without a permit from the State Water Resources Control Board (State Water Board).

The State Water Board oversees water rights and water quality functions in California. It issues permits and licenses for appropriating water from surface and subterranean streams that flow through known and definite channels. The California courts have jurisdiction over the use of infiltrating groundwater, the riparian use of surface waters, and the appropriative use of surface waters from diversions begun before 1914. Water rights issues are a recurrent theme in any discussions involving the Delta, the heart of California's water supply system.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) was enacted in 1969, 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 established the State Water Board and divided the state into nine regions, each overseen by an RWQCB. The responsibilities of the State Water Board and RWQCBs are described in more detail below.

If USACE determines that only nonfederal waters are present in a project area, then no federal CWA permit is required. Regardless of federal jurisdiction, however, the project requires a permit, or waste discharge requirements, for impacts on any waters of the state. The waste discharge requirements are issued by the appropriate RWQCB or, for statewide or multi-regional projects, by the State Water Board. Under the Porter-Cologne Act, discharges to all waters of the State, including all wetlands and other waters of the State (including but not limited to isolated wetlands), are subject to State regulation.

A discharger whose project disturbs one or more acres of soil, or disturbs less than 1 acre but is part of a larger common plan of development that in total disturbs 1 acre or more, must obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, Order No. 2009-009-DWQ (Construction General Permit). Construction activity subject to this permit includes clearing, grading, grubbing, and disturbances to the ground such as stockpiling or excavation; however, it does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a storm water pollution prevention plan.

State Water Resources Control Board

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. 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 RWQCBs. The State Water Board's Water Right Decision 1641 (D-1641) requires CVP and SWP operations to protect beneficial uses in the Delta as identified in *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin* (Basin Plan). The version of D-1641 amended on March 15, 2000, amended five of DWR's water right permits to add terms and conditions intended to protect municipal and industrial, agricultural, and fish and wildlife beneficial uses of the Delta. Unplanned occurrences such as levee breaks, agricultural discharges, or other factors that may alter flow and circulation patterns (e.g., prolonged statewide drought) can create Delta water quality issues beyond the operational control of the CVP and SWP.

Regional Water Quality Control Board

The nine RWQCBs have primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Under the Porter-Cologne Act, "water quality objectives" are limits or levels of water quality constituents or characteristics established for the protection of beneficial uses. The Porter-Cologne Act requires the RWQCBs to establish water quality objectives while acknowledging that water quality may be altered to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, and an antidegradation policy also constitute water quality standards under the federal CWA. The water quality objectives provide requirements for water quality control.

Central Valley Regional Water Quality Control Board

Under the Porter-Cologne Act, the Central Valley RWQCB 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 RWQCB. 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 RWQCB 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 RWQCB oversees many major programs to support and provide benefits 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 the National Pollutant Discharge Elimination System [NPDES]); Wastewater to Land Discharge; Water Quality Certification; and Watershed Management.

The Central Valley RWQCB addresses aquatic resource impairments caused by pesticides through its Nonpoint Source Program, Irrigated Lands Regulatory Program, and NPDES permits program. The RWQCB 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.

Water Quality Control Plans

Under the Porter-Cologne Act, waters of the State fall under jurisdiction of the State Water Board and the nine RWQCBs. "Waters of the State" means any surface water or groundwater, including saline waters, within the boundaries of the state (Water Code Section 13050[e]). The State Water Board and RWQCBs have been delegated federal authority to implement the requirements of the federal CWA in California, including issuing NPDES permits, under the Porter-Cologne Act. However, the requirements of the Porter-Cologne Act are even broader than those of the CWA.

The Porter-Cologne Act requires the RWQCBs to prepare and periodically update water quality control plans, also known as basin plans. Each basin plan establishes water quality objectives sufficient to ensure that the designated beneficial uses of surface water and groundwater are reasonably protected, and actions to control nonpoint and point sources of pollution.

Any person who discharges or proposes to discharge any waste that could affect the quality of the waters of the state must file a "report of waste discharge" with the appropriate RWQCB. "Waste" includes any and all waste substances associated with human habitation, of human or animal origin, or from any producing, manufacturing, or processing operation (Water Code Section 13050[d]). Upon receipt of a report of waste discharge, the RWQCB may issue "waste discharge requirements" designed to ensure compliance with applicable water quality objectives and other requirements of the basin plan.

A public review process is conducted every three years to identify and prioritize the actions needed to address water quality concerns and maintain the effectiveness of the basin plan. Amendments to basin plans may include site-specific water quality objectives for a single constituent, basin-wide control programs for a suite of potential pollutants, and/or policy recommendations and strategies for addressing emerging contaminants and/or climate change.

The Central Valley RWQCB's Basin Plan, the *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (1995 Bay-Delta Plan), and the State Water Board's D-1641 protect beneficial uses in the Delta (described in more detail below). **Table 3.5-1** describes the beneficial uses designated for the Delta.

Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin

The Central Valley RWQCB's Basin Plan covers an area including the entire Sacramento and San Joaquin river basins, involving an area bounded by the Sierra Nevada on the east and the Coast Ranges and Klamath Mountains on the west. The Basin Plan was designed to protect the beneficial uses of the Sacramento and San Joaquin rivers and their tributaries and was last amended in 2018 (Central Valley Regional Water Quality Control Board 2019).

Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary and Water Rights Decision D-1641

The 1995 Bay-Delta Plan was developed as a result of the 1994 Bay-Delta Accord, which committed the CVP and SWP to new Delta habitat objectives. The new objectives were adopted through the State Water Board's water rights decision (D-1641) for CVP and SWP operations (described above). One of the main features of the 1995 Bay-Delta Plan was the estuarine habitat objectives ("X2") for Suisun Bay and the western Delta. The X2 standard refers to the position at which 2 parts per thousand salinity occurs in the Delta, and is designed to improve shallow-water fish habitat in the spring of each year. Other elements of the 1995 Bay-Delta Plan include export-to-inflow ratios intended to reduce entrainment of fish at the export pumps, Delta Cross Channel gate closures, minimum Delta outflow requirements, and San Joaquin River salinity and flow standards.

TABLE 3.5-1
BENEFICIAL USES FOR THE SACRAMENTO–SAN JOAQUIN DELTA, SAN JOAQUIN DELTA HYDROLOGICAL UNIT

Beneficial Use	Description of Beneficial Use
Municipal and Domestic Supply (MUN)	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Commercial and Sport Fishing (COMM)	Uses of water for commercial or recreational collection of fish, shellfish, or other organisms intended for human consumption or bait purposes.
Irrigation and Stock Watering (AGR)	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.
Industry Process (PROC); Industrial Process Supply (PRO)	Uses of water for industrial activities that depend primarily on water quality.
Industrial Service Supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality, including but not limited to mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
Water Contact Recreation (REC-1)	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include but are not limited to swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, or use of natural hot springs.
Non-Contact Water Recreation (REC-2)	Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include but are not limited to picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Freshwater Habitat (WARM, COLD)	Uses of water that support warmwater ecosystems, including but not limited to preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. WARM: Striped Bass, Sturgeon, and Shad. COLD: Salmon and Steelhead.
Migration (MIGR)	Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish. WARM: Striped Bass, Sturgeon, and Shad. COLD: Salmon and Steelhead.
Spawning (SPWN)—Spawning, Reproduction, and/or Early Development	Uses of water that support high-quality aquatic habitats suitable for reproduction and early development of fish. WARM: Striped Bass, Sturgeon, and Shad.
Wildlife Habitat (WILD)	Uses of water that support terrestrial or wetland ecosystems, including but not limited to preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
Navigation (NAV)	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

SOURCE: Central Valley Regional Water Quality Control Board 2019

On December 12, 2018, through State Water Board Resolution No. 2018-0059, the State Water Board adopted the plan amendments and Final Substitute Environmental Document establishing the Lower San Joaquin River flow objectives and revised southern Delta salinity objectives (State Water Resources Control Board 2018). On February 25, 2019, the Office of Administrative Law approved the plan amendments, which are now in effect.

State Water Resources Control Board Statement of Policy with Respect to Maintaining High Quality of Waters in California

In 1968, the State Water Board adopted a policy (Resolution No. 68-16, frequently referred to as the "Antidegradation Policy") stating that if water quality is better than the State Water Board's adopted water quality requirements, the higher water quality shall be maintained until it is demonstrated that the change in water quality will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than prescribed in adopted policies. The policy also stated that any activity that discharges or proposes to discharge wastes to waters with higher water quality than specified in adopted policies must implement best practicable treatment, or must provide that a pollution or nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

In July 1990, the State Water Board issued an administrative procedures update to the RWQCBs, describing procedures for findings that would allow degradation of water quality if balanced against the benefit to the public of the activity that caused the water quality degradation. The administrative procedures update stated that the findings should indicate the pollutants that will lower water quality, the socioeconomic and public benefit of the action, and the beneficial uses affected.

Water Quality Criteria for Toxics

The *Policy for Implementing Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* is referred to as the State Implementation Policy. This State policy for water quality control was adopted by the State Water Board on March 2, 2000, and became effective by May 22, 2000. The policy applies to discharges of toxic pollutants into the inland surface waters, enclosed bays, and estuaries of California subject to regulation under the State Porter-Cologne Act (Division 7 of the Water Code) and the federal CWA. Such regulation may occur by issuing NPDES permits, or through other relevant regulatory approaches. This policy establishes all of the following:

- Provisions for implementing priority pollutant criteria promulgated by EPA through the National Toxics Rule (Code of Federal Regulations [CFR] Title 40, Section 131.36 [40 CFR 131.36]) (promulgated December 22, 1992, and amended May 4, 1995) and through the California Toxics Rule (40 CFR 131.38) (promulgated May 18, 2000, and amended February 13, 2001), and for priority pollutant objectives established by the RWQCBs in their water quality control plans.
- Monitoring requirements for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) equivalents.
- Chronic toxicity control provisions.

In addition, the policy includes special provisions for certain types of discharges and factors that could affect the application of other provisions in the policy.

The California Toxics Rule is applicable to all State waters, as are the EPA advisory National Recommended Water Quality Criteria.

State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

The State Water Board adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Discharge Procedures), for inclusion in the *Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California,* effective May 28, 2020. The Discharge Procedures consist of four major elements: (1) a wetland definition; (2) a framework for determining whether a feature that meets the wetland definition is a water of the State; (3) wetland delineation procedures; and (4) procedures for the submittal, review, and approval of applications for water quality certifications and waste discharge requirements for dredged or fill activities.

The Discharge Procedures, formerly known as the Wetland Riparian Area Protection Policy, have been renamed to communicate that the procedures apply to discharges of dredged or fill material to all waters of the State, not just wetlands.

Local

The Contra Costa County General Plan includes goals and policies that are intended to preserve and protect the county’s water and groundwater resources. As a State agency, DWR is not subject to local regulations. However, DWR would aim to implement the proposed project in a manner that would not conflict with applicable Contra Costa 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

Impacts on hydrology and water quality in the project area were evaluated to assess changes that could result from the proposed project. The impact analysis focuses on the foreseeable changes to the no-barrier baseline condition (as explained in Section 3.1, “Introduction to the Analysis”).

Data collected during installation of the 2015 EDB in West False River from May through October were used to evaluate potential impacts on hydrology and water quality. Water quality measurements, including for water temperature, turbidity, EC, DO, chlorophyll, and nutrients, were taken from selected locations in the West, Central, and North Delta upstream and downstream of the project site (California Department of Water Resources 2019). New stations were installed in the North Delta, Central Delta, and Suisun Bay to monitor salinity intrusion up the Sacramento River and into the Cache Slough Complex to provide a more representative understanding of potential changes in hydrology and water quality as a result of the proposed project (see California Department of Water Resources 2019, Figure 3-6 for locations of water quality monitoring stations). Flow stations measuring velocity were also consulted to determine whether the proposed project may result in significant changes to existing conditions (California Department of Water Resources 2019). Other environmental reports and modeling studies relevant to the project area were also consulted and incorporated as applicable.

Thresholds of Significance

An impact would be 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 offsite;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; 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; or
  - Impede or redirect flood flows;
- 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.

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—HYDROLOGY AND WATER QUALITY

Impact Statement	Impact Conclusion
3.5-1: Implementation of the proposed project could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	LSM
3.5-2: Implementation of the proposed project could 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 offsite.	LSM
3.5-3: Implementation of the proposed project could 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 impede or redirect flood flows.	LTS
3.5-4: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	LSM
3.5-5: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 offsite.	LSM

TABLE 3.5-2
SUMMARY OF IMPACT CONCLUSIONS—HYDROLOGY AND WATER QUALITY

Impact Statement	Impact Conclusion
3.5-6: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 impede or redirect flood flows.	LTS

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

SOURCE: Data compiled by ICF/ESA in 2022

Impact 3.5-1: Implementation of the proposed project could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

Two of the water quality parameters with objectives (standards) in the Basin Plan and 1995 Bay-Delta Plan are turbidity and salinity, typically measured and reported in nephelometric turbidity units (NTU)[1] and EC, respectively. These water quality parameters are monitored (with 15-minute data) at several stations near the site of the proposed West False River drought salinity barrier. Other water quality parameters, including algae pigments, nutrients, and dissolved organic carbon, were sampled periodically as part of the 2015 EDB water quality monitoring plan (California Department of Water Resources 2017).

Turbidity

During construction and removal of the proposed barrier and potential notching (under all three installation scenarios), turbidity would increase as a result of sediment disturbance during rock placement and removal. The applicable water quality criterion (i.e., performance standard) for Delta waters, except during periods of storm runoff, states that turbidity shall not exceed 50 NTU in the waters of the Central Delta and 150 NTU in other Delta waters (Central Valley Regional Water Quality Control Board 2019). The placement and removal of rock has the potential to result in an exceedance of the applicable turbidity limits.

Because turbidity monitoring was implemented during installation and removal of the 2015 and 2021–2022 EDBs, the turbidity increases were measured and future installations of the drought salinity barrier (under all three installation scenarios) would likely have similar turbidity effects. The monitoring data from 2015 suggested that increases in turbidity during construction were localized near the barrier (California Department of Water Resources 2019). The water quality objectives, as outlined in the water quality certification issued May 4, 2015, were met on all occasions. During installation and removal of the barrier, turbidity was monitored, confirming that project construction resulted in values below the background threshold of 150 NTU. Settleable solids did not exceed the threshold of 0.1 milliliter per liter. During rock placement, the highest recorded turbidity measurement—34.3 NTU—occurred on May 15, 2015. During rock

[1] The continuous sensors measure and report in Formazin nephelometric units (FNU); at low values typical of the project area, the difference between NTU and FNU is negligible.

removal, the highest recorded turbidity measurement—37.4 NTU—occurred on September 11, 2015 (California Department of Water Resources 2019).

The monitoring data from 2021 also showed compliance with turbidity limits (California Department of Water Resources 2022). Turbidity and settleable solids samples were taken three times a day during in-water construction activities, at approximately 9 a.m., 12 noon, and 3 p.m. Samples were taken either from the shore or by boat at a nominal distance of 300 feet upstream and downstream of construction activities. Samples were taken for 20 consecutive days during EDB installation, from Thursday, June 3, 2021, to Tuesday, June 22, 2021. Turbidity values ranged from 4.3 NTU to 18.3 NTU, well below the allowable limit of 150 NTU. All settleable solids values were less than 0.1 milliliters per liter, the allowable limit (California Department of Water Resources 2022).

In summary, all measurements from 2015 and 2022 associated with construction and removal of the barrier were well below the NTU limits specified in the Basin Plan. Therefore, the drought salinity barrier (under all three installation scenarios) would not result in a turbidity exceedance.

Salinity (EC)

Before installation of the 2015 and 2021–2022 EDBs, the State Water Board issued temporary urgency change orders for D-1641 to establish temporary emergency water quality standards for the CVP's and SWP's water rights. This permit process would also occur for the proposed project before installation of the barrier (under all three installation scenarios). The U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife consult on the petition and implementation would be consistent with their findings.

The 1995 Bay-Delta Plan and D-1641 EC objectives for a critically dry water year are 2.78 milliSiemens per centimeter [mS/cm] at Emmaton, 2.2 mS/cm at Jersey Point, and 0.87 mS/cm at San Andreas Landing from April 1 to August 15 (maximum 14-day moving average). Through issuance of the temporary urgency change orders, the State Water Board moved the Emmaton compliance location to the Threemile Slough Bridge (about 4 kilometers upstream) for the 2015 and 2021–2022 EDBs. It is reasonable to assume that similar processes would occur with implementation of the proposed project (under all three installation scenarios). The minimum required Delta outflow would control salinity intrusion in the western Delta, including EC at Jersey Point, located just downstream of West False River.

Salinity intrusion downstream of the confluence of the San Joaquin and Sacramento rivers is controlled by Delta outflow and would be essentially unaffected by the proposed West False River drought salinity barrier (California Department of Water Resources 2019). Salinity intrusion at Emmaton on the Sacramento River and at Jersey Point on the San Joaquin River is controlled by Delta outflow and the tidal flows upstream of the rivers' confluence. The 2015 and 2021 water quality monitoring data show that the barrier would reduce salinity intrusion from Jersey Point into Franks Tract and Old River (California Department of Water Resources 2017, 2022).

During implementation of the drought salinity barrier, Delta EC would be consistent with the prevailing D-1641 objectives for EC, including at Emmaton (or Threemile Slough, if the compliance location were temporarily changed, as occurred in 2015 and 2021), Jersey Point, or San Andreas Landing. In 2015, agricultural EC objectives for the western Delta were exceeded for 15 days (during July 7–22) on the Sacramento River at Threemile Slough, where the exceedance was 2.85 mS/cm, compared to the compliance value of 2.78 mS/cm; and for eight days (during July 9–17) on the San Joaquin River at Jersey Point, where the exceedance was 2.23 mS/cm, compared to the compliance value of 2.20 mS/cm (California Department of Water Resources and U.S. Bureau of Reclamation 2015).

The exceedances were only minimally greater than compliance values and resulted from a higher than projected tide elevation, exacerbated by a strong westerly Delta breeze and low barometric pressure, rather than the effects of the 2015 EDB. Therefore, Delta outflow coupled with meteorological conditions (low pressure), rather than the drought salinity barrier, would be the main driver of salinity conditions.

Retrospective modeling allowed a comparison of Delta conditions in 2015 with the EDB and without the EDB, and suggested that the proposed project would be more effective at controlling salinity, thereby decreasing salinity, in the Central (mid) Delta. Consistent with the data analysis presented by DWR (California Department of Water Resources 2019), the modeling results indicate that the 2015 EDB reduced salinity in the interior Delta by as much as 300 microSiemens per centimeter while salinity to the west and north increased in similar magnitude (California Department of Water Resources 2019).

Salinity intrusion increases slightly with higher tidal flows (e.g., during spring tides), but increases substantially with lower Delta outflow. The 2015 and 2021 EC measurements indicate that the drought salinity barrier (under all three installation scenarios) would not substantially change EC at the western Delta stations, including the EC compliance stations (California Department of Water Resources 2019, 2022).

Based on the data collected for the 2015 and 2021–2022 EDBs, it is reasonable to assume that the proposed West False River drought salinity barrier (under all three installation scenarios) would reduce salinity intrusion into Franks Tract and Old River (in the Central Delta) and potentially increase salinity intrusion into the West and North Delta—areas that are also influenced by tidal flows. The salinity of agricultural diversions from Franks Tract and Old River would also be reduced slightly with the barrier; fluctuations, including increases, in salinity associated with barriers are not anticipated to create conditions where irrigation water could damage irrigated crops in the West or North Delta regions (AECOM 2015).

Other Water Quality Parameters

Nutrient data were reviewed from the 2015 and 2021 EDB installations. During summer 2015, most sites did not see a rise in chlorophyll over 5 micrograms per liter (µg/L) until December, well after the barrier was removed. The conditions in Franks Tract—warm temperatures, low turbidity, reduced flows, and abundant direct sunlight—were opportune for algal growth, but no significant blooms were observed during the summer (California Department of Water Resources

2017). However, in 2021 a significant, high concentration of cyanobacteria was seen in Franks Tract during late July and early August (Hartman et al. 2022). This bloom included chlorophyll-a concentrations exceeding 20 µg/L, although all toxin levels were below the levels that would be of concern to recreational use. Therefore, assuming that conditions under the proposed project with Installation Scenarios 2 and 3 would be similar to 2015 conditions, Installation Scenario 1 would include the presence of the barrier in the winter without a notch, which could influence the presence of algal blooms. See Section 3.3, "Biological Resources," for additional discussion.

The proposed project (under all three installation scenarios) would involve construction activities that could inadvertently result in spills of fuels, lubricants, and/or other pollutants. Improper handling, storage, or disposal of these materials in the project vicinity could degrade surface water quality if the materials were eventually washed into West False River.

Impact Conclusion

Changes in water quality during the installation and presence of the 2015 and 2021–2022 EDBs, and during notching of the 2021–2022 EDB, were reviewed to determine potential impacts on water quality from the proposed West False River drought salinity barrier (under all three installation scenarios). Substantial increases in turbidity were not measured, but if a turbidity increase were to occur, this would be a potentially significant impact. The EDB operations protected the Central Delta from salinity intrusion; slight increases in salinity were measured in the north and west (on the mainstem Sacramento and San Joaquin rivers), but they did not extend beyond acceptable levels (California Department of Water Resources 2019). Although the proposed project would temporarily alter levels of salinity (EC), these changes would not exceed any water quality standards and the barrier would protect Central Delta water quality during drought conditions. As reported, the 2015 EDB conserved approximately 100,000 acre-feet of water, suggesting benefits for Delta water users as a result of the proposed project.

As mentioned, the presence of the barrier in the winter without a notch (under Installation Scenario 1) could potentially influence the presence of algal blooms. If they were to occur, temporary turbidity increases during barrier installation and removal and the potential for the proposed project to influence the presence of algal blooms would be a potentially significant impact. DWR may consider incorporating the installation of culverts with flap gates into the proposed project design to allow one-way flow from Franks Tract to the San Joaquin River at Jersey Point on ebb tides, to reduce the potential for algae growth in the area. DWR will also consider adding chlorophyll-a continuous sensors paired with flow stations at the three new water quality monitoring locations on Woodward Cut and Railroad Cut, which would allow for a quantified comparison of algae growth and transport in the Old River and Middle River corridor.

A water quality control plan would be prepared and implemented as part of contract specifications during all ground-disturbing construction activities (see Protective Environmental Measure 2.5.1, "Prepare and Implement a Water Quality Control Plan," in Section 2.5, "Protective Environmental Measures"). Implementing the water quality control plan would provide protection from the potential release of fuels, lubricants, and/or other pollutants that could substantially degrade receiving water quality during construction activities. DWR would also 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 3.3-12 in Section 3.3, "Biological Resources") and DWR would comply with requirements set forth by the Central Valley RWQCB based on CWA Section 401 requirements.

The potential for the proposed project (under all three installation scenarios) to increase turbidity, influence the presence of algal blooms, and negatively affect water quality would be a **potentially significant** impact.

Protective Environmental Measure 2.5.1: Prepare and Implement a Water Quality Control Plan. (See Section 2.5, "Protective Environmental Measures.")

Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities. (See Section 3.3, "Biological Resources.")

Mitigation Measure BIO-9: Prepare and Implement a Water Quality Monitoring Program. (See Section 3.3, "Biological Resources.")

Impact Significance after Mitigation: With implementation of Protective Environmental Measure 2.5.1 and Mitigation Measures BIO-8 and BIO-9, DWR would implement a water quality control plan and monitoring program, monitor turbidity levels, and adjust work if needed to ensure that turbidity levels do not exceed those conditions described in the CWA 401 water quality certification issued by the State Water Board. Therefore, the potential impact of temporary turbidity increases during barrier installation and removal and potential notch construction (under all three installation scenarios), potential to influence the presence of algal blooms, and potential to affect water quality would be reduced to a less-than-significant level. The impact would be **less than significant with mitigation**.

Impact 3.5-2: Implementation of the proposed project could 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.

Delta channel levees are composed of organic peat soil except where they have been upgraded with imported soil, and generally are stable under normal tidal flows and velocities. Tidal velocities are the result of tidal elevation gradients, and tidal velocities in most Delta channels range from 2 to 3 feet per second. Generally, tidal velocities of 2–3 feet per second do not cause channel scour (i.e., erosion), because nearby channel banks are likely already exposed to these velocities and fine sediments have already been transported to other locations. Bathymetric surveys used to review impacts of the 2015 EDB also indicate that scour near the barrier was not an issue and undercut levees did not show significant changes between pre- and post-project implementation of the 2015 EDB (California Department of Water Resources 2019).

The proposed project would block tidal flows (and velocities) in West False River, and tidal flows that otherwise would have flowed into or out from West False River would be redistributed to adjacent channels (e.g., Fisherman's Cut, Dutch Slough, and the mouth of Old River), which would experience greater tidal flows. Measured maximum tidal velocities in Fisherman's Cut in

2015 increased from about 0.5 to 1.0 foot per second with no EDB to about 3 to 3.5 feet per second with the EDB in place. These increased velocities, however, may be slightly greater than the range of tidal velocities typically observed in Delta channels, as the increase in channel velocity with the 2015 EDB adversely affected operation of the Delta Ferry Authority's *Victory II* ferry between Jersey Island and Webb Tract and Bradford Island. DWR entered into a damage agreement that included further mitigation for the *Victory II* ferry, repowering the ferry with replacement engines and propellers such that it could fully operate for the remainder of the 2015 EDB installation as well as future installations (California Department of Water Resources 2019).

The increase in tidal velocities in Fisherman's Cut after installation of the 2015 and 2021–2022 EDBs resulted in erosion around the northern remnant Little Franks Tract levee. Therefore, the increased velocities resulting from previous EDB installations and the subsequent erosion currently observed near the northern remnant Little Franks Tract levee would likely also occur after installation of the proposed West False River drought salinity barrier (under all three installation scenarios). Immediate damage to the northern remnant Little Franks Tract levees has not occurred. The Jersey and Bradford island levees were further strengthened in 2015, suggesting that less erosion is likely.

Additional data collected by DWR during the notching of the 2021–2022 EDB indicate that the notch caused extensive scouring of the West False River streambed on the western side of the barrier, along the northern edge of the notch. The direction of scour was away from the north and south river levees and approximately centering immediately downstream of the notch. Prior to notching, modeling suggested that the increased velocities and turbulence would not likely result in substantial scour as a result of construction of the notch, but the observed velocities and turbulence in that area were much greater than predicted. The largest velocities developed at the surface and on the sides, near the slope at the side of the notch. Velocities were elevated upstream and downstream, but less severe than over the notch itself.

The riverbed at the West False River project site is approximately 28 feet of poorly graded sand with almost no fines or plasticity and is relatively erodible. The sand is underlain by approximately 15 feet of clay materials; plasticity, stiffness, and sand content vary but the material is less erodible. The scour depth with the notch was constrained by this clay layer.

DWR conducted bathymetric surveys of the riverbed to monitor progression of the scour after it appeared, collected inclinometer measurements on Bradford Island to monitor any potential movement, and tracked velocity measurements. Based on this information, DWR's Geotechnical Engineering Section determined that there does not appear to be an immediate threat of internal erosion, new seepage, or slope instability of the north or south river levees due to the scour. However, without design modifications, similar scour may occur with Installation Scenario 2 (although this is uncertain given that the scour depth with the notch was constrained by the clay layer).

Impact Conclusion

Changes in erosion and siltation levels resulting from temporary construction and removal of the drought salinity barrier (under all three installation scenarios) are anticipated to be minimal.

However, data collected after the 2015 EDB and notching of the 2021–2022 EDB indicate that erosion, siltation, and scour occurred, and would likely occur with presence of the drought salinity barrier (under all three installation scenarios) and with the notch (Installation Scenario 2). If increased erosion and siltation resulting from the barrier were to cause existing levees to fail, or if scour were to cause levee damage or the barrier to fail by undermining its foundation, this would be a **significant** impact.

Mitigation Measure HYDRO-1: Monitor Water Velocity near Existing Levees and the Stability of Levees, and Monitor Scour in the Vicinity of the Barrier with the Notch in Place.

DWR shall monitor tidal velocities in Fisherman's Cut and the Franks Tract levees while the West False River drought salinity barrier is in place (under all three installation scenarios).

Under Installation Scenario 2, DWR shall regularly conduct bathymetric surveys to monitor for potential scour at the riverbed, collect inclinometer measurements on Bradford Island to ensure there is no observed movement of the adjacent levee, and monitor velocity measurements around the barrier while the notch is in place. Corrective measures, such as early filling of the notch, shall be immediately implemented if the stability of the barrier or levees may be compromised by the scour.

Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities. (See Section 3.3, "Biological Resources.")

Impact Significance after Mitigation: With implementation of Mitigation Measures HYDRO-1 and BIO-8, this impact would be reduced to a less-than-significant level because DWR would monitor turbidity levels, water velocity and levee stability, and scour conditions to ensure that the levees and barrier are not compromised. The impact would be **less than significant with mitigation**.

Impact 3.5-3: Implementation of the proposed project could 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 impede or redirect flood flows.

Installation of the barrier would be triggered by drought conditions and would take place no earlier than April 1. Depending on the chosen installment scenario, the barrier either would be removed by November 30 of the same year in which it is installed (8 months; Installation Scenario 3), or would be removed by November 30 of the following year (20 months; Installation Scenarios 1 and 2). Because of low Sierra Nevada snowpack and excess storage capacity in upstream reservoirs during drought conditions, and the lack of historic flooding from high flows before November 30 under such conditions, the chance that flood flows would occur in the Delta before removal of the proposed barrier would be minimal.

In case an extremely unlikely high-flow event in the Delta were to occur before November 30—an event that has never occurred in recorded history (more than 150 years)—the following discussion is presented.

During significant flood events, about one-third of the San Joaquin River's maximum flood flow entering the Delta (60,000 cfs in January 1997) moves down the river channel past Stockton. About two-thirds flows into the South Delta to the Grant Line and Victoria canals, and moves down the Middle River channel (15,000 cfs) to the San Joaquin River and subsequently down the Old River channel (25,000 cfs) to Franks Tract. Modeling of such a flood event performed with the Delta Simulation Model II (DSM2) shows that the portion of the San Joaquin River flood flow that moves from Franks Tract through False River is about 10,000 cfs (California Department of Water Resources 2019). If a major flood flow were to occur in the San Joaquin River while the barrier was in place, this portion of the flood flow would be redirected to the mouth of Old River, Fisherman's Cut, and Dutch Slough.

Impact Conclusion

Under major flood conditions, the barrier could be inundated such that flows would not pass through the barrier, and rather would overtop the barrier and/or the barrier could be washed downstream. However, West False River is a wide channel capable of dispersing flows, with minimal damage to the barrier itself anticipated. West False River is a tidal channel, and its water elevation changes predominantly with tides rather than large storm and inflow events (California Department of Water Resources 2021). Thus, downstream tidal cycling, storm surges, and sea level rise may be more influential than flooding from upstream riverine inflows (see Chapter 4, "Climate Change and Resiliency," for additional discussion regarding flooding). Therefore, the change to water surface elevations in False River would be minor, and the 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 hydrology and water quality. The area of analysis for these cumulative impacts includes two levee strengthening projects conducted in 2014–2015 on Bradford and Jersey islands adjacent to the project site by Reclamation Districts 2059 and 830, respectively, and DWR's temporary EDBs installed at the location of the proposed project in 2015 and 2021–2022.

Impact 3.5-4: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

The cumulative context for impacts on hydrology and water quality includes the West False River project site and surrounding waters, and considers how implementation of the proposed project with past, present, and potential future development could violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality. Installing a drought salinity barrier as part of the proposed project, along with DWR's other temporary EDBs, would mitigate salinity intrusion into the Delta and protect water delivery, water quality, and aquatic habitat (see Sections 2.2.1 through 2.2.3 for additional description of these benefits). The intent of the proposed project is to protect water quality, rather than to improve it. Construction activities for future projects such as levee improvements would be more substantial than those for the proposed project (as assessed in this EIR). Given the nature of the design of those projects, an increased risk of on-site pollution exists, which could result in a cumulatively considerable impact.

Continued development in the region runs the inherent risk of violating water quality standards and waste discharge requirements, and degrading surface or groundwater quality. All projects in the area of analysis for cumulative impacts would be subject to a measure similar to Protective Environmental Measure 2.5.1, "Prepare and Implement a Water Quality Control Plan," to prepare and implement a water quality control plan, and Mitigation Measure BIO-8 through the permitting process.

Impact Conclusion

Implementing the proposed project (under all three mitigation scenarios) could contribute to significant direct or indirect cumulative changes to water quality. Overall, the cumulative impact of the proposed project on water quality would be **potentially significant**.

> **Protective Environmental Measure 2.5.1: Prepare and Implement a Water Quality Control Plan.** (See Section 2.5, "Protective Environmental Measures.")
>
> **Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities.** (See Section 3.3, "Biological Resources.")
>
> **Mitigation Measure BIO-9: Prepare and Implement a Water Quality Monitoring Program.** (See Section 3.3, "Biological Resources.")
>
> **Impact Significance after Mitigation:** Implementing Protective Environmental Measure 2.5.1 and Mitigation Measures BIO-8 and BIO-9 would reduce the proposed project's contribution to cumulative impacts on water quality to a **less-than-considerable** level. The impact would be **less than significant with mitigation**.

Impact 3.5-5: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 offsite.

The cumulative context for impacts on hydrology and water quality includes the West False River project site and surrounding waters, and considers how implementation of the proposed project with other past, present, and potential future development could result in substantial erosion or siltation on- or offsite. As discussed in Impact 3.5-2, a review of monitoring data from the 2015 EDB and 2021–2022 EDB (specifically the notching) revealed increased tidal velocities in Fisherman's Cut that resulted in erosion around the northern remnant Little Franks Tract levee and substantial scouring of the West False River streambed on the western side of the barrier, along the northern edge of the notch from construction of the notch. Therefore, it is likely that the proposed project, paired with implementation of other drought salinity barriers and levee improvements, could result in a significant impact.

Continued development in the region runs the inherent risk of increasing erosion, siltation and scour. For example, the two levee strengthening projects conducted in 2014–2015 on Bradford and Jersey islands adjacent to the project site by Reclamation Districts 2059 and 830, respectively, could have resulted the release of fine sediments into the waterway.

Impact Conclusion

Implementing the proposed project (under all three mitigation scenarios) could contribute to significant direct or indirect cumulative changes to levels of erosion and siltation. Overall, the cumulative effect of the proposed project on erosion and siltation would be **potentially significant**.

> **Mitigation Measure HYDRO-1: Monitor Water Velocity near Existing Levees and the Stability of Levees, and Monitor Scour in the Vicinity of the Barrier with the Notch in Place.** (See Impact 3.5-2.)
>
> **Mitigation Measure BIO-8: Conduct Turbidity Monitoring during In-Water Activities.** (See Section 3.3, “Biological Resources.”)
>
> **Impact Significance after Mitigation:** With implementation of Mitigation Measures HYDRO-1 and BIO-8, the proposed project’s contribution to cumulative impacts on erosion and siltation would be reduced to a **less-than-considerable** level. The impact would be **less than significant with mitigation**.

Impact 3.5-6: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 impede or redirect flood flows.

The cumulative context for impacts on hydrology and water quality includes the West False River project site and surrounding waters, and considers how implementation of the proposed project with other past, present, and potential future development could alter the existing drainage pattern of the river in a manner that would impede or redirect flood flows. As discussed in Impact 3.5-3, the proposed project would result in a less-than-significant impact because the barrier would be installed during drought years, indicative of low Sierra Nevada snowpack and lack of excess storage capacity in upstream reservoirs during the drought conditions. Paired with the lack of historic flooding from high flows before November 30 under such conditions, implementation of the proposed project in conjunction with potential future development would result in a less-than-significant impact.

Continued development in the region runs the inherent risk of reducing the natural floodplain that inherently impedes or redirect flood flows. However, as described in Section 3.5.2, "Environmental Setting," the Delta's numerous channels provide multiple paths for flood flows, and thus the proposed project would not contribute to additional flood risk. Therefore, the cumulative impact would be less than significant.

Impact Conclusion

Implementing the proposed project (under all three installation scenarios) would not contribute to significant direct or indirect cumulative changes on flood flows. Therefore, the cumulative impact of the proposed project related to alteration of existing drainage patterns that would impede or redirect flood flows would be **less than significant**.

Mitigation Measures: None required.

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3.6 Recreation

3.6.1 Introduction

This section describes existing recreational uses within the project area and surrounding region, details the associated regulatory framework, and presents an analysis of potential impacts of the proposed project on recreation. A discussion of aquatic algal blooms is included in Section 3.3, "Biological Resources," and Section 3.5, "Hydrology and Water Quality."

DWR received a comment letter regarding recreation from the Delta Protection Commission on March 24, 2022, in response to the notice of preparation (see **Appendix A**).

3.6.2 Environmental Setting

This section describes recreational resources at the project site and in the surrounding area. The project site is located on West False River approximately 0.4 mile east of its confluence with the San Joaquin River, in Contra Costa County between Jersey and Bradford islands, approximately 4.8 miles northeast of the city of Oakley (Figures 2-1 and 2-2 in Chapter 2). The Delta waterways and surrounding areas support a wide variety of recreational uses.

Franks Tract, as mentioned in Section 1.2.3, *Importance of the West False River Location,* in Chapter 1, is a flooded former agricultural island located east of the project site. Franks Tract provides a majority of the recreational opportunities within the project area; therefore, recreational uses within and adjacent to the project site are discussed relative to recreational resources within Franks Tract.

Franks Tract (State Recreation Area)

Franks Tract is dominated by shallow open water, with little tidal marsh, and is a popular recreational and fishing destination in the Central Delta region. The majority of the open-water area is less than 10 feet deep (6–8 feet below mean lower low water) and is filled with dense submerged aquatic vegetation. The substrate is relatively uniform, composed of silt, sand, and peat. Tules and submerged aquatic vegetation grow in the open-water areas and along the shoreline of Franks Tract.

Franks Tract supports a variety of native and non-native wildlife, including fish, birds, mammals, as well as plants. Most of the fish currently found in Franks Tract are non-native species (e.g., largemouth bass, striped bass, and sunfishes).

Franks Tract encompasses Franks Tract State Recreation Area (SRA), owned and managed by the California Department of Parks and Recreation (California State Parks). Classification as an SRA indicates that the area was selected and developed, and is now operated, to provide outdoor recreation opportunities (Public Resources Code Section 5019.56). The area supports a variety of recreation uses, including fishing, waterfowl hunting, and various motorized and nonmotorized boating activities (California Department of Fish and Wildlife 2020). Because Franks Tract SRA is accessible only by boat, recreational users are primarily boaters, anglers, and waterfowl hunters

(California Department of Parks and Recreation 2022; California Department of Fish and Wildlife 2020). Fishing tournaments and other recreational events are often based in marinas along the Bethel Island waterfront.

Navigation

One of the key navigation routes for local boaters and recreational users includes West False River, as it provides direct access from Franks Tract to the San Joaquin River and Old River (**Figure 3.6-1**).

Marinas

Nine marinas operate on the southwest side of Franks Tract, approximately 1.5 to 4.5 miles east of the project site. Three other marinas exist along Taylor Slough, approximately 1.5 to 2.1 miles to the south. All of the marinas support recreational opportunities, including boating, swimming, fishing, golfing, and hiking. In addition, dozens of other marinas and other facilities are accessible from the San Joaquin and Sacramento rivers and other channels in the project vicinity (Delta Recreation 2022).

Fishing

Franks Tract and other areas surrounding the project site support fishing, including annual bass fishing tournaments for species such as striped bass, largemouth bass, and other black basses. Other recreational fish species that can be found in the area include salmon, catfish, perch, and sunfish/panfish.

Motorized Boating

Water sports in the project area occur primarily in Franks Tract, because its large open body of water is sheltered from the waves.

Nonmotorized Boating

Boats without motors, including kayaks, stand-up paddleboards, canoes, and sailboards, are used in the project area. Many sports enthusiasts enjoy combining motorized boating with nonmotorized boating (i.e., paddleboarding while moored) and nonmotorized boating with nature viewing.

Shoreline Recreation

Limited access to shoreline activities (e.g., hikes, picnics, or shoreline fishing) is available in the project area, including Franks Tract.

Hunting

Waterfowl hunters have historically visited Franks Tract in the project area. Hunting blinds—small structures that hide hunters from wildlife—are available in part of the open water within Franks Tract. Waterfowl hunting in this area is subject to California Department of Fish and Wildlife regulations. California State Parks administers the permit process for 54 hunting blind locations within Franks Tract SRA, and patrols and conducts enforcement during the hunting

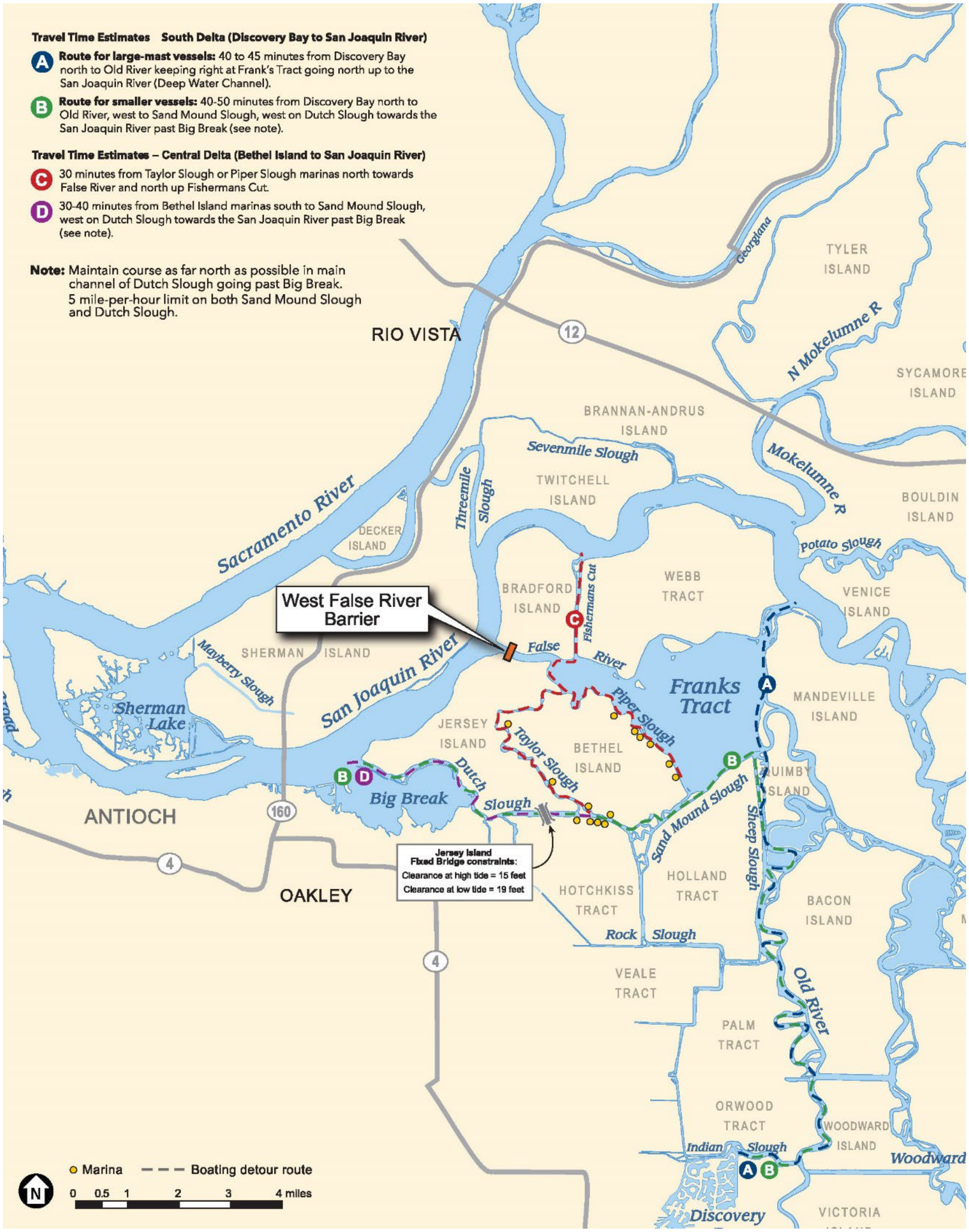

Figure 3.6-1
Boating Detours around the West False River Barrier

season. Typically, waterfowl hunting season in the area opens on October 23 and closes on January 31 of the following year.

3.6.3 Regulatory Setting

Federal

North American Waterfowl Management Plan

The *North American Waterfowl Management Plan* was adopted in 1986 and amended in 2012 and 2018. This 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 the U.S. Fish and Wildlife Service (USFWS) and provides a broad framework for waterfowl conservation and management. The plan identifies population objectives for key species and establishes habitat goals to sustain these populations. The plan sets forth three overarching goals for waterfowl conservation (North American Waterfowl Management Plan 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 Recreational Fisheries Policy

USFWS's Recreational Fisheries Policy (U.S. Fish and Wildlife Service 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 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.

State

Delta Reform Act of 2009 and Delta Plan

The mission of the Delta Stewardship Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (Water Code Section 85054). The 2009 Delta Reform Act states that the coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies best available science to further the coequal goals.

The Delta Stewardship Council was granted specific regulatory and appellate authority by the California Legislature under the 2009 Delta Reform Act over certain actions that take place in the Delta or Suisun Marsh, in whole or in part. The council exercises that authority by developing and implementing the Delta Plan and its accompanying regulations.

According to the Delta Reform Act, State or local agencies approving, funding, or carrying out projects, plans, or programs, upon determining that their project is a “permitted action” subject to regulations of the Delta Plan, must certify the consistency of the project with the Delta Plan policies (Water Code Section 85225).

State Lands Commission

The California State Lands Commission was established in 1938 and provides stewardship of the lands and waterways of California (California State Lands Commission 2022). The State of California owns nearly 4 million acres of “sovereign lands,” which include the beds of navigable rivers, lakes, and streams, tidal waterways, and tidelands up to the ordinary high-water mark and submerged lands along the coastline extending from the shoreline out to 3 miles offshore. The State Lands Commission may lease sovereign lands for any public trust purpose, including recreation, navigation, fisheries, commerce, and open space. For instance, a public or private entity must lease sites for marinas and recreational piers that fall within sovereign lands. In addition, the State Lands Commission issues permits for dredging lands that fall under its jurisdiction.

California Division of Boating and Waterways

The California Division of Boating and Waterways, part of California State Parks, has a mission to provide safe and convenient public access to California’s waterways and leadership in promoting the public’s right to safe, enjoyable, and environmentally sound recreational boating. The California Division of Boating and Waterways endorses boating safety and education, assists local boating law enforcement agencies, ensures uniformity in boating regulations, and licenses boat operators and brokers. The division is also responsible for reviewing, updating, and adopting State boating regulations to reflect changes in federal and State boating laws, and planning and designing State boating facilities. The California Division of Boating and Waterways has been the lead agency for controlling water hyacinth since 1982 and *Egeria densa* since 1997 (California Department of Parks and Recreation 2020).

California Department of Parks and Recreation

The mission of California State Parks is to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. In addition to the lands it directly owns, California State Parks has certain jurisdiction over granted or ungranted tidelands or submerged lands abutting State Park System lands (Public Resources Code Section 5003.5).

Local

The Contra Costa County General Plan (2020) 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 Contra Costa County's residents. Although 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 Contra Costa County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

3.6.4 Impacts and Mitigation Measures

Methods of Analysis

Impacts on recreational resources within the project area were evaluated to assess temporary and permanent changes that could result from the proposed project. This evaluation included a review of the plans and policies referenced in Section 3.6.3, "Regulatory Setting"; a review of the proposed project's installation and removal activities described in Chapter 2, "Project Description"; and the use of geographic information system data available for existing public recreation areas and project components.

Thresholds of Significance

An impact would be 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, for this analysis, an impact would be 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 (including through the temporary closure of West False River).

Project-Specific Impacts and Mitigation Measures

Table 3.6-1 summarizes the impact conclusions presented in this section.

TABLE 3.6-1
SUMMARY OF IMPACT CONCLUSIONS—RECREATION

Impact Statement	Impact Conclusion
3.6-1: 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.	LTS
3.6-2: Implementation of the proposed project could include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	LTS
3.6-3: 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.	LTS
3.6-4: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	LTS

NOTES: LTS = Less than Significant

SOURCE: Data compiled by ICF/ESA in 2022

Impact 3.6-1: 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.

The project site is located west of Franks Tract SRA; no portion of the project site lies within the SRA. Existing recreational activities available in the general project area include fishing, hunting, and motorized and nonmotorized boating.

The proposed project (under all three installation scenarios) is not anticipated to increase the use of existing neighborhood and regional parks or other recreational facilities. However, the Delta waterways themselves are recreational areas, and implementation of the proposed project would affect West False River and the area around the project site temporarily during installation and removal of the barrier (Installation Scenarios 1 and 3) and during installation and removal of the notch (Installation Scenario 2), as described below.

The proposed project would involve construction activities in West False River and the presence of the drought salinity barrier in West False River up to two times in 10 years, potentially April 1 to November 30 of the same year (with Installation Scenario 3), or April 1 to November 30 of the subsequent year (with Installation Scenarios 1 and 2). The presence of the barrier would result in the temporary closure of boat traffic through West False River, and also would temporarily change navigation access routes to and from the San Joaquin River, and to nearby marinas and Franks Tract SRA.

Although West False River access would be temporarily restricted, alternative routes are available (Figure 3.6-1). For example, from the South Delta, access to the San Joaquin River is available through Discovery Bay north to Old River, to the San Joaquin River. From the Central Delta, access to the San Joaquin River is available from Bethel Island via False River and north up Fisherman's Cut, or through Dutch Slough. The use of these alternative routes is not anticipated to result in increased use of existing neighborhood and regional parks or other recreational facilities. During construction, transport of rock by barge also would not significantly affect boat traffic, given the availability of multiple access routes that could be used; therefore, rock transport would not result in increased use of existing neighborhood and regional parks or other recreational facilities.

While the drought salinity barrier is in place, signs would be posted at both entrances to False River, informing boaters of the closure and availability of alternative routes (e.g., the Stockton Deep Water Ship Channel in the San Joaquin River for navigation between Antioch and eastern Delta locations, or via Fisherman's Cut to South Delta destinations), and information would be posted on DWR's website. DWR would also install signs on each side of the barrier and float lines with orange ball floats across the width of the channel to deter boaters from approaching the barrier. Solar-powered warning buoys with flashing lights would be installed on the barrier crest to prevent nighttime accidents.

Navigation signage would comply with requirements set forth by the U.S. Aids to Navigation System and the California Waterway Marker System, as appropriate. DWR would coordinate with U.S. Coast Guard District 11 and the California State Parks Division of Boating and Waterways regarding safe vessel passage procedures. DWR or the contractor would also post a notice to mariners, which would include information on the location, date, and duration of channel closure. See also Protective Environmental Measure 2.5.4 in Chapter 2, "Project Description." After removal of the drought salinity barrier, full recreational boat access would resume in the waterway.

With Installation Scenario 2, DWR may construct a notch (or partial opening) in the drought salinity barrier that would be 400 feet wide, which would allow for boat navigation through West False River between January and March. Backfilling of the notch would begin as early as the first week in April. With the notch in place, boats could travel through West False River between January and March and would not be required to follow alternative routes around the project site, as under Installation Scenarios 1 and 3.

Impact Conclusion

Potential temporary impacts on recreational resources in the project area would be short term during construction activities and temporary while the barrier is in place. The proposed project (under all three installation scenarios) is not anticipated to cause an increase in the use of existing neighborhood and regional parks or other recreational facilities. The project would cause a minimal reduction in access to regional recreational areas, given the availability of multiple alternative routes in the project area. Additionally, a variety of recreational areas are available within the project area and region, so no one recreational facility would become overloaded as a result of changes in boat navigation with the barrier in place. Therefore, this impact would be **less than significant**.

Mitigation Measures: None required.

Impact 3.6-2: Implementation of the proposed project could 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 (under all three installation scenarios) as described in Chapter 2, "Project Description," would not include the construction of any recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. As part of the design review process, and in response to comments received on the notice of preparation (Appendix A) to minimize travel delays associated with the use of alternative routes, DWR engineers investigated the potential for construction of a portage facility under the proposed project that would allow boats to pass through West False River while the barrier is in place. The extensive depth of the water at the barrier location has constrained DWR from offering a portage facility at this location during previous emergency installations of the barrier.

DWR investigated the potential for constructing a boat portage facility that would transport boats in West False River from one side of the barrier to the other. The portage facility would increase the proposed project's footprint by approximately 0.5 acre. The investigation considered operation of the boat portage facility from dusk to dawn. Facility operation would require a DWR boat tender to hook up the boats to a universal boat trailer and transfer them to the other side of the barrier. The estimated time to transfer boats would be 10 minutes per trip, or a total of 20 minutes round trip. Considering the alternative routes available around West False River, the extra distance that boaters would need to travel around West False River without a portage facility would be approximately 4.5 miles in each direction, or a total of 9 miles round trip. This amounts to approximately 14 minutes of extra time traveled per direction using alternative routes, or a total of 28 minutes round trip (assuming that a boat travels at 20 miles an hour). The net difference in time saved or gained as a result of boat portage would only be approximately eight minutes per round trip (i.e., 28 round-trip minutes using alternative routes minus 20 minutes round trip with boat portage in West False River), which is not considered a significant delay. DWR therefore determined that the time saved or gained (i.e., eight minutes) and substantial additional project costs for constructing a portage facility made such a facility infeasible. Therefore, a boat portage facility is not being considered further in this DEIR.

As stated in Impact 3.6-1, the proposed project (under all three installation scenarios) would not cause a reduction in access to regional recreational areas. Construction activities would be short term, the barrier would be temporary, and alternative routes around the project site are available (Figure 3.6-1). Therefore, the proposed project would not include the construction of any recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. DWR would maintain the navigational aids in West False River with the barrier in place (e.g., signage and warning buoy lines), and after removal of the barrier, full recreational boat access would resume in the waterway.

Impact Conclusion

The proposed project (under all three installation scenarios) would not include or require the construction or expansion of recreational facilities which might have an adverse effect on the environment. Public notices would be posted, alternative routes would be available, and the proposed project would be temporary and of a limited size. The temporary closure of West False River to boat traffic would not induce the construction or expansion of recreational facilities. Therefore, 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 recreational resources. The area of analysis for these cumulative impacts includes two levee strengthening projects conducted in 2014–2015 on Bradford and Jersey islands adjacent to the project site by Reclamation Districts 2059 and 830, respectively, and DWR's temporary emergency drought barriers installed in 2015 and 2021–2022 at the location of the proposed West False River drought salinity barrier.

Impact 3.6-3: 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.

The identified cumulative projects did not adversely affect recreational resources by increasing the use of existing parks and recreational facilities. The proposed project (under all three installation scenarios) also would not substantially contribute to cumulative effects, given the availability and variety of other recreational areas in the project area and region.

Impact Conclusion

The incremental contributions of the proposed project (under all three installation scenarios) to the cumulative effects on recreational resources would not be cumulatively considerable. This impact would be **less than significant**.

Mitigation Measures: None required.

Impact 3.6-4: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 (under all three installation scenarios) as described in Chapter 2, "Project Description," would not include the construction of any recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. The identified cumulative projects also did not include the construction of any recreational facilities or require the construction or expansion of recreational facilities.

Impact Conclusion

The incremental contributions of the proposed project (under all three installation scenarios) to cumulative effects on recreational resources would not be cumulatively considerable. This impact would be **less than significant**.

Mitigation Measures: None required.

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3.7 Tribal Cultural Resources

3.7.1 Introduction

This section examines the potential impacts of the proposed project on tribal cultural resources (TCRs). Much of the background context and methods used for the analysis of potential impacts of the proposed project on TCRs are the same as for cultural resources (Section 3.4). 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 [National Register of Historic Places], California Register [California Register of Historical Resources], or a local register of historical resources.

This section relies on the information and findings presented in West False River Drought Salinity Barrier Project, Contra Costa and San Joaquin Counties, California: Archaeological and Architectural Resources Inventory Report (Hoffman 2022). That report (confidential **Appendix E**) 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.

DWR received a comment letter regarding tribal cultural resources from the California Native American Heritage Commission (NAHC) on February 24, 2022, in response to the notice of preparation (NOP) (see **Appendix A**).

3.7.2 Environmental Setting

The environmental setting for TCRs is encompassed by that presented for cultural resources in the Cultural Resources section of this DEIR (Section 3.4). Therefore, only select, focused portions of the environmental setting are repeated in this section.

Environmental

The main hydrologic unit of the project area and vicinity is the San Joaquin River, which, along with its tributaries, is the principal watershed for Central and Southern California. The project area and vicinity are rural in character and the natural environment has been heavily influenced by agricultural development and water control and conveyance systems (e.g., levees, canals).

Before Euroamerican settlement of the area, the project area would have consisted of tidal freshwater emergent wetlands, which are wetlands that supported abundant freshwater rooted vegetation (Whipple et al. 2012). Large populations of tule elk, pronghorn, and black-tailed deer would have been found in the project area and vicinity before Euroamerican settlement, in addition to a wide variety of other fauna. The arrival of Euroamericans to the area led to a dramatic decrease in the populations of the faunal species caused by overhunting and habitat loss (Rosenthal et al. 2007; Bartolome et al. 2007).

Ethnography

Beginning in the early 16th century, but primarily during the late 19th and early 20th centuries, Native American lifeways and languages were documented throughout California. Whether by professional ethnographers or anthropologists, field personnel from government agencies such as the U.S. Bureau of Indian Affairs, soldiers, merchants, settlers, or travelers, ethnographic accounts partly illuminate the traditions, beliefs, and cultures of Native American groups during specific points in time.

Synthesized narratives such as the *Handbook of North American Indians* (Heizer 1978) categorize Native traditions and practices; however, the complexity of regional diversity should not be overlooked. Depopulation and relocation of Central Valley Native Americans in the 19th century resulted in conflicting and incomplete information about tribal locations. Although cultural descriptions of these groups in the English language are known from as early as 1849, most current cultural knowledge comes from various early-20th-century anthropologists (Levy 1978:413).

The uncertainty regarding the territorial boundaries of the Native American groups that occupied the project area and vicinity derives from the fact that ethnographies historically demarcated contact-period tribal boundaries in various and conflicting ways. The drought salinity barrier portion of the project area is in a location historically attributed to the Plains Miwok, a subgroup of the Eastern Miwok (Levy 1978:398–399), while the water quality monitoring stations portion of the project area is in an area historically attributed to the Northern Valley Yokuts (Wallace 1978:462). Before Euroamerican settlement in the region, the Plains Miwok and Northern Valley Yokuts had similar cultural practices; therefore, they are discussed together in the following sections.

Native Americans typically situated their larger, permanent settlements on high ground along the region’s major rivers, such as the Sacramento River and its tributaries (Kroeber 1925 [1976]:351; Levy 1978). The Plains Miwok are part of the larger Eastern Miwok group, who form one of the two major divisions of the Miwokan subgroup of Utian speakers. The Plains Miwok lived in the Central Valley along the Sacramento, Cosumnes, and Mokelumne rivers (Levy 1978). The traditional territory of the Northern Valley Yokuts, a Penutian-speaking people (Heizer and Elsasser 1980:15), encompassed much of the north end of the southern San Joaquin Valley, including the area extending from the northward bend of the San Joaquin River, northward almost to the Mokelumne River, and from the crest of the Coast Ranges eastward to the foothills of the Sierra Nevada (Wallace 1978). Both groups typically built their homes on high ground, with principal villages concentrated along major drainages. The Plains Miwok had two forms of house construction: conical-shaped houses constructed with poles and thatching of brush, grass, or tule, and semi-subterranean earth-covered houses. Larger villages had an assembly house, a 40- to 50-foot-diameter semi-subterranean structure, in addition to a sweathouse, a smaller version of the assembly house (Levy 1978; Wallace 1978).

Seasonality defined the subsistence strategies of these groups, and their economy was based principally on the use of natural resources from the grasslands and riparian corridors adjacent to the area’s many drainages. Like the majority of California Native American groups, these groups relied heavily on the acorn for food. Other non-animal foods consisted of nuts, seeds, roots, greens, berries, and mushrooms. Animal foods included tule elk, pronghorn antelope, jackrabbit, squirrel, beaver, quail, and waterfowl. Salmon was the principal animal food for these groups, ranking above other river resources such as sturgeon. Salt, nuts, basketry, and obsidian were obtained through trade with groups to the east for shells, basketry, and bows obtained in turn through trade from the west (Levy 1978; Wallace 1978).

Wooden digging sticks, poles, and baskets were used for gathering vegetal resources, while stone mortars, pestles, and cooking stones were used for processing foods. Items used for obtaining animal resources included nets, snares, seines, bows, and arrows. Arrow points were made primarily of basalt and obsidian (Levy 1978; Wallace 1978).

The Plains Miwok avoided most contact with the Spanish until the 1800s. The Book of Baptisms from Mission San José, dating to 1811, contains the first recording of Plains Miwok converts. The Plains Miwok, like other neighboring indigenous groups, were heavily disrupted by missionization and epidemics. With the annexation of California, several Plains Miwok signed treaties with the U.S. government for land acquisitions and provisions that were never realized. Disease and prejudice by fur trappers, gold miners, and settlers created a hostile environment, with many Plains Miwok subsequently being driven to the Sierra Nevada foothills. Some Plains Miwok found residence within rancherias while still moderately practicing a traditional hunting-gathering subsistence. In the early 1900s, the U.S. government issued reservation lands to Plains Miwok; however, many Plains Miwok still occupied areas of the Sierra Nevada foothills well into the 1970s (Levy 1978:401).

The Plains Miwok have found membership amongst several federally recognized tribes, including the Wilton Rancheria, Buena Vista Rancheria of Me-Wuk Indians, California Valley Miwok Tribe, and United Auburn Indian Community of the Auburn Rancheria (UAIC). Several other California Native American Tribes that are not federally recognized also represent the Plains Miwok. The Wilton Rancheria, with which DWR has formally consulted on the proposed project, acquired federal recognition and 38.77 acres of land in 1928 for the Plains Miwok living in the Sacramento area. Federal recognition was lost in 1964 due to termination, but was restored in 2009, after 10 years of court proceedings. The Wilton Rancheria has plans to develop the Wilton Resort Casino and Spa, which would provide economic independence and stability, and would fund the Tribe's economic, social, and cultural programs (Wilton Rancheria 2020).

A review of ethnographic literature for the current investigation did not result in the identification of any documented Native American villages in or near any portion of the project area (Levy 1978; Kroeber 1925 [1976]; Wallace 1978). However, as mentioned above, most of these ethnographic accounts date to the early 20th century and, given the rapid decimation of the Plains Miwok and Northern Valley Yokuts soon after 19th-century Euroamerican settlement in the area, the lack of Native American settlements described in the vicinity of the current project area should not be taken as definitive evidence of their absence.

Existing Cultural Environment

California Historical Resources Information System Records Search

In 2019, Environmental Science Associates (ESA), one of DWR's environmental consultants for the proposed project, conducted a cultural resources records search for the project area and vicinity at the Northwest Information Center at Sonoma State University, in Rohnert Park, and the Central California Information Center at California State University, Stanislaus, in Turlock. The Northwest Information Center maintains the official California Historical Resources Information System (CHRIS) records of previous cultural resources studies and recorded cultural resources for the drought salinity barrier portion of the project area, and the Central California Information Center maintains the official CHRIS records for the water quality monitoring stations portion of the project area. The study area for the records searches consisted of the project area with a 0.25-mile buffer. The CHRIS has no record of any cultural resources with Native American association within or within 0.25 mile of the project area.

Field Survey

In December 2019, ESA conducted an intensive cultural resources pedestrian survey of non-inundated areas of the drought salinity barrier portion of the project area on Jersey Island. No cultural resources with Native American association were identified during the survey.

Native American Correspondence

ESA contacted the NAHC on December 24, 2019, 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 to ESA on December 27, 2019, stating that the Sacred Lands File has no record of sacred sites in the project area; the reply also included a list of Native American representatives to contact who may be interested in the proposed project. To obtain current information, on November 25, 2020, ESA contacted the NAHC requesting a search of the Sacred Lands File and a list of Native American representatives who may have interest in the proposed project. The NAHC replied to ESA on December 12, 2020, stating that the Sacred Lands File has no record of sacred sites in the project area, and provided a list of Native American representatives to contact who may be interested in the proposed project.

In support of required Native American notification for the proposed project pursuant to Public Resources Code (PRC) Section 21080.3.1, and in accordance with the California Natural Resources Agency's Final Tribal Consultation Policy and DWR's Tribal Engagement Policy, DWR sent letters via certified mail on March 25, 2021, to the following Native American representatives:

- Herbert (Lou) Griffith, Wilton Rancheria
- Katherine Perez, North Valley Yokuts Tribe
- Anthony Roberts, Yocha Dehe Wintun Nation (YDWN)
- Sara Dutschke Setshwaelo, Ione Band of Miwok Indians
- Gene Whitehouse, UAIC

These letters provided information on the proposed project and requested that the recipients notify DWR if they would like to consult pursuant to PRC Section 21080.3.1. The only response to these letters came in a letter to DWR from Isaac Bojorquez (YDWN) dated April 8, 2021, which stated that the proposed project is not within YDWN's aboriginal territory and that YDWN declines to comment on the proposed project.

On April 12, 2021, DWR sent follow-up emails to the four Native American representatives listed above who did not reply to the initial letter; the email included the original outreach letters and maps. DWR followed up again with a similar email on April 16, 2021. DWR received one reply to the emails, from Anna Starkey (UAIC) on April 13, 2021, stating that the proposed project is outside UAIC's tribal territory and that UAIC declines to consult on the proposed project. Ms. Starkey contacted DWR again, via email on April 30, 2021, asking whether any other Native American tribes had requested to consult on the proposed project. DWR responded to the email the same day, stating that no other tribes had requested consultation.

In support of required Native American notification for the proposed project pursuant to PRC Section 21080.3.1, and in accordance with the Tribal Consultation Policy and Tribal Engagement Policy, DWR sent letters via certified mail on January 27, 2022, to the same five Native American representatives listed above; these letters provided information regarding revisions to the proposed project and requested that DWR be contacted if the Tribes would like to consult pursuant to PRC Section 21080.3.1. Only one Tribe, the Wilton Rancheria, responded, on February 15, 2022, stating that they would like to consult on the proposed project pursuant to PRC Section 21080.3.1. Between February and March 2022, DWR and the Wilton Rancheria consulted on the proposed project through emails and conference calls, including DWR's invitation to the Tribe to the EIR scoping meeting, which occurred on March 9, 2022, and additional project details. The Wilton Rancheria did not state that they had any specific concerns regarding the proposed project's potential to affect cultural resources or tribal cultural resources.

In accordance with the Tribal Consultation Policy and Tribal Engagement Policy, DWR sent letters on March 25, 2021, to the following Native American representatives:

- Donal Duncan, Guidiville Indian Rancheria
- Andrew Galvan, The Ohlone Indian Tribe
- Corrina Gould, The Confederated Villages of Lisjan
- Lloyd Mathiesen, Chicken Ranch Rancheria of Me-Wuk Indians
- Charlene Nijmeh, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
- Neil Peyron, Tule River Indian Tribe
- Rhonda Morningstar Pope, Buena Vista Rancheria of Me-Wuk Indians
- Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan
- Cosme Valdez, Nashville Enterprise Miwok-Maidu-Nishinam Tribe
- Charlie Wright, Cortina Rancheria-Kletsel Dehe Band of Wintun Indians
- Irene Zwierlein, Amah Mutsun Tribal Band of Mission San Juan Bautista

These letters provided information regarding the proposed project and requested that the recipients notify DWR if they had any concerns regarding the proposed project and effects on cultural resources.

On April 16, 2021, DWR sent a follow-up email to the above-listed contacts requesting that they notify DWR if they had any concerns regarding the proposed project and effects on cultural resources. On April 21, 2021, DWR left or attempted to leave voice mails for Mr. Galvan, Ms. Gould, Ms. Sayers, and Ms. Zwierlein, as a follow-up to the letters and emails; note that the NAHC contacts list did not provide phone numbers for the other above-listed contacts. DWR did not receive any replies from these individuals.

In accordance with the Tribal Consultation Policy and Tribal Engagement Policy, DWR sent emails on January 27, 2022, to the same 11 Native American representatives listed above. These letters provided information regarding revisions to the proposed project and requested that DWR be contacted if the Tribes had any concerns regarding the proposed project. DWR did not receive any response from these Tribes.

Confidential Appendix E provides documentation of the proposed project correspondence with Native American representatives to date.

Summary of Existing Cultural Environment

Through archival research, records searches, correspondence with Native American representatives, and pedestrian surveys, no TCRs or potential TCRs were identified in the project area, nor were any such resources that could be affected by the proposed project identified.

3.7.3 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 TCRs. Under CEQA (PRC Section 21084.1), a project that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment.

Assembly Bill 52 and Tribal Cultural Resources

California Assembly Bill (AB) 52, enacted in September 2014, recognizes that California Native American Tribes have expertise with regard to their tribal history and practices. AB 52 established a new category of cultural resources in CEQA, “tribal cultural resources” or TCRs, to consider tribal cultural values when determining the impacts of projects on cultural resources (PRC Sections 21080.3.1, 21084.2, and 21084.3). The law also requires that CEQA lead agencies consult with California Native American Tribes to identify, evaluate, and assess potential project impacts on TCRs (PRC Sections 21080.3.1, 21080.3.2, and 21082.3).

PRC Section 21074(a) defines a TCR 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 TCR if the landscape is geographically defined in terms of the size and scope. An 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 TCR 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 TCRs separately from impacts on archaeological resources (PRC Sections 21074 and 21083.09) because TCRs that are also archaeological resources may also have cultural values beyond their ability to yield data important to prehistory or history. 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. Because the NOP for the proposed project was filed on February 23, 2022, 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]). The criteria for eligibility for the California Register are based upon the criteria for listing in the National Register (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register. The following overview of the California Register focuses on its applicability to TCRs.

To be eligible for the California Register, a cultural resource must be significant at the local, State, and/or federal 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; or

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.

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 Edmund G. Brown Jr.'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."

California Department of Water Resources 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.

Delta Reform Act of 2009 and Delta Plan

The mission of the Delta Stewardship Council is to promote the coequal goals of water supply reliability and ecosystem restoration in a manner that protects and enhances the unique values of the Delta as an evolving place (California Water Code Section 85054). The 2009 Delta Reform Act states that the coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The Delta Stewardship Council has a legally enforceable management framework for the Delta and Suisun Marsh called the Delta Plan, which applies best available science to further the coequal goals.

The Delta Stewardship Council was granted specific regulatory and appellate authority by the California Legislature under the 2009 Delta Reform Act over certain actions that take place in the Delta or Suisun Marsh, in whole or in part. The Delta Stewardship Council exercises that authority by developing and implementing the Delta Plan and its accompanying regulations.

According to the Delta Reform Act, State or local agencies approving, funding, or carrying out projects, plans, or programs, upon determining that their project is a “permitted action” subject to regulations of the Delta Plan, must certify the consistency of the project with the Delta Plan policies (Water Code Section 85225).

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 California 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.

3.7.4 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 TCRs 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 resource as a TCR is assessed by evaluating all of the following:

- Its eligibility for listing in the California Register.
- Its eligibility as a unique archaeological resource pursuant to PRC Section 21083.2.
- Its listing status in the NAHC’s Sacred Lands File.

In addition, a lead agency can independently determine a resource to be a TCR.

California Native American Tribes are considered experts with respect to TCRs. Thus, the analysis of whether project impacts may result in a substantial adverse change to the significance of a TCR depends heavily on consultation between the lead agency and culturally affiliated California Native American Tribes during the CEQA process.

Thresholds of Significance

An impact on TCRs would be 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 3.7-1 summarizes the impact conclusions presented in this section.

TABLE 3.7-1
SUMMARY OF IMPACT CONCLUSIONS—TRIBAL CULTURAL RESOURCES

Impact Statement	Impact Conclusion
3.7-1: 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
3.7-2: 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

NOTES: LSM = Less than Significant with Mitigation

SOURCE: Data compiled by ICF/ESA in 2022

Impact 3.7-1: 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.

No TCRs, as defined in PRC Section 21074, have been identified in the project area through archival research, a field survey, or Native American consultation. Therefore, there is no substantial evidence of the presence of any TCRs in the project area. As a result, the proposed project (under all three installation scenarios) is not expected to result in an impact on any TCRs, as defined in PRC Section 21074.

Impact Conclusion

There is no substantial evidence of the presence of TCRs, as defined under PRC Section 21074, in the project area; however, the proposed project (under all three installation scenarios) would involve ground-disturbing activities that may extend into undisturbed soil. It is possible that such activities could unearth, expose, or disturb subsurface TCRs that were not identified on the surface. Any impacts of the proposed project on TCRs, as defined in PRC Section 21074, would be **potentially significant**.

Mitigation Measure CUL-1: Conduct Preconstruction Cultural Resources Awareness and Sensitivity Training. (See Section 3.4, "Cultural Resources.")

Mitigation Measure CUL-2: Implement Unanticipated-Discovery Protocol for Native American or Historic-Era Archaeological Resources. (See Section 3.4, "Cultural Resources.")

Mitigation Measure CUL-3: Implement Unanticipated-Discovery Protocol for Submerged Cultural Resources. (See Section 3.4, "Cultural Resources.")

Mitigation Measure CUL-4: Implement Unanticipated-Discovery Protocol for Human Remains. (See Section 3.4, "Cultural Resources.")

Impact Significance after Mitigation: Implementing Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 would reduce this potentially significant impact to a **less-than-significant** level because worker awareness training would be conducted and, if a potential TCR is inadvertently discovered, DWR and its qualified archaeologist would assess it. If the resource is determined to be potentially significant, pursuant to State CEQA Guidelines Section 15064, the resource would be avoided if feasible; or, if avoidance is not feasible, culturally affiliated Native American Tribes would be consulted with and culturally appropriate treatment measures would be determined and implemented, including through the development of a treatment plan and subsequent professional-level technical report documenting the results of the treatment plan implementation. Because details on any currently unidentified potential TCRs that could be affected by the project are unknown, by nature, specific mitigation for such resources relies on future consultation with culturally affiliated California Native American Tribes. If human remains are discovered, work in the area would cease and appropriate state law would be followed. The impact would be **less than significant with mitigation**.

Cumulative Impacts and Mitigation Measures

The 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 TCRs. The area of analysis for these cumulative impacts includes the West False River project site and surrounding vicinity.

Other projects considered include two levee strengthening projects conducted in 2014–2015 on Bradford and Jersey islands adjacent to the project site by Reclamation Districts 2059 and 830, respectively, and DWR's temporary emergency drought barriers installed at the location of the proposed project in 2015 and 2021–2022. This area of analysis considers the traditional territory of the local Native American community.

Impact 3.7-2: 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.

The cumulative context for impacts on TCRs includes the West False River project site and surrounding vicinity, considering the traditional territory of the local Native American community.

Although there is no current evidence of such resources, based on the analyses conducted for the current EIR, 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 TCRs. 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 TCRs. Implementation of the proposed project (under all three installation scenarios), in conjunction with the separately considered projects, has the potential to affect such TCRs, resulting in a potentially cumulative significant impact on those resources.

Impact Conclusion

Implementation of the proposed project (under all three installation scenarios) could contribute to significant direct or indirect cumulative changes to the significance of a TCR, as defined in PRC Section 21074. Overall, the cumulative effect of the proposed project on TCRs would be **potentially significant**.

> **Mitigation Measures: Implement Mitigation Measures CUL-1 to CUL-4.**
>
> **Impact Significance after Mitigation:** Implementation of Mitigation Measures CUL-1 to CUL-4 would reduce the proposed project's contribution to cumulative impacts on TCRs to a less-than-considerable level, and the impact would be **less than significant with mitigation**.

CHAPTER 4
Climate Change and Resiliency

4.1 Introduction

Managing climate change and its impact on water supply is one of DWR's core values and objectives. DWR's climate change program implements climate mitigation and adaptation measures to ensure that Californians have an adequate water supply, reliable flood control, and healthy ecosystems, now and in the future (California Department of Water Resources 2022). To mitigate future climate impacts, DWR has developed a climate action plan (CAP). As part of the plan, DWR established a policy of including information about climate change resiliency and adaptation in all EIRs for which DWR acts as the lead agency (California Department of Water Resources 2018).

This chapter of the EIR is organized differently than the resource topic sections in DEIR Chapter 3, in that it does not analyze the environmental effects of the proposed project in response to the thresholds of significance presented in Appendix G of the State CEQA Guidelines. Instead, this chapter addresses three fundamental topics related to climate change:

1. *Climate Change Mitigation:* Could the proposed project provide any carbon sequestration benefits that are not already accounted for under compliance with the inventory in DWR's *Climate Action Plan Phase 1: Greenhouse Gas Emissions Reduction Plan Update 2020*?
2. *Climate Change Adaptation:* Are any climate change adaptation strategies built into the proposed project? Would the benefits of the proposed project be maintained under future climate change projections?
3. *Climate Change Resiliency:* How could the proposed project increase the resiliency of the project area to the effects of climate change? Could the proposed project strengthen the project area's ability to rebound from climate change impacts?

This chapter also evaluates the following alternatives (discussed in Chapter 6, "Alternatives") relative to the three questions asked above:

- No Project Alternative
- Barge-Mounted Operable Barrier Alternative

4.2 Environmental Setting

This section defines key terms and describes recent and future climate change trends and associated effects at global and regional scales, as relevant to the proposed project.

4.2.1 Definitions

"Climate" is the average weather over many years, measured most often in terms of temperature, precipitation, and wind. Most of California experiences a Mediterranean weather pattern, with cool, wet winters and hot, dry summers. Precipitation occurs mostly in the winter months. Climate is unique to a particular location, changing on time scales ranging from decades to centuries or millennia.

"Climate change" generally refers to a change in the state of the climate that can be identified by changes in the mean and/or variability of its properties and that persists for an extended period, typically decades or longer (Intergovernmental Panel on Climate Change 2021).

"Climate change mitigation" can be summarized as reducing climate change. It involves reducing the flow of heat-trapping greenhouse gases (GHGs) into the atmosphere, either by reducing the sources of these gases or by enhancing carbon sequestration (National Aeronautics and Space Administration 2017). The goal of mitigation is to avoid significant impacts from climate change. Mitigating climate change in the water sector could include actions such as increasing energy efficiency, conserving water, and ecosystem restoration.

"Climate change adaptation" is the process of adjusting behavior, built environment, or ecological habitats to reduce the harm caused by climate impacts such as drought or flood. Adapting to climate change may also involve taking advantage of any potential benefits from climate change, such as a longer growing season (National Aeronautics and Space Administration 2017).

"Climate change resilience" is the ability of a system to resist or "bounce back" after being affected by climate change stressors. Climate adaptation, when successful, creates climate resilience.

4.2.2 Global Climate Trends and Impacts

International climate change predictions are consistently being met or exceeded by measured climate change–related events. The United Nations' Intergovernmental Panel on Climate Change (IPCC), the largest and most respected group of climate scientists globally, recently released *Climate Change 2021: The Physical Science Basis*, the IPCC's most recent climate update. The Summary for Policymakers (Intergovernmental Panel on Climate Change 2021) states that "it is unequivocal that human influence has warmed the atmosphere, oceans and land."

Key findings relevant to the proposed project include:

- Each of the last four decades has been successively warmer than any decade that preceded it since 1850. The past five years have been the hottest on record since 1850.
- The recent rate of sea level rise has nearly tripled compared with 1901–1971.

- It is "virtually certain" that hot extremes, including heat waves, have become more frequent and more intense since the 1950s, while cold events have become less frequent and less severe.
- The frequency and intensity of heavy-precipitation events have increased since the 1950s over most of the land area for which observational data are sufficient for trend analysis.
- Human influence has likely increased the chance of compound extreme events since the 1950s. This includes increases in the frequency of concurrent heat waves and droughts; fire weather; and compound flooding.

The National Oceanographic and Atmospheric Association (NOAA) reports that high-tide flooding in the United States broke records in the past year and predicts that damaging flooding will be common along most coastlines in the United States by 2030 (National Oceanic and Atmospheric Administration 2017). As unprecedented extreme heat rocked the western United States and Death Valley recorded the hottest temperatures ever documented on earth, NOAA confirmed that globally, July 2019 was the hottest month in 142 years of recordkeeping (Blunden and Boyer 2020).

4.2.3 California Climate Trends and Associated Effects

The climate changes experienced in California are consistent with those observed nationally and globally. California agencies, academic institutions, scientists, and planners have contributed a wealth of climate data and predictions for the state in the last few decades. However, many specifics of the climate's future remain uncertain. This section briefly summarizes existing measured climate data and future predictions relevant to the proposed project. The following quote from *California's Fourth Climate Change Assessment, San Francisco Bay Area Region Report* (Ackerly et al. 2018) provides a clear introduction to the topics discussed herein:

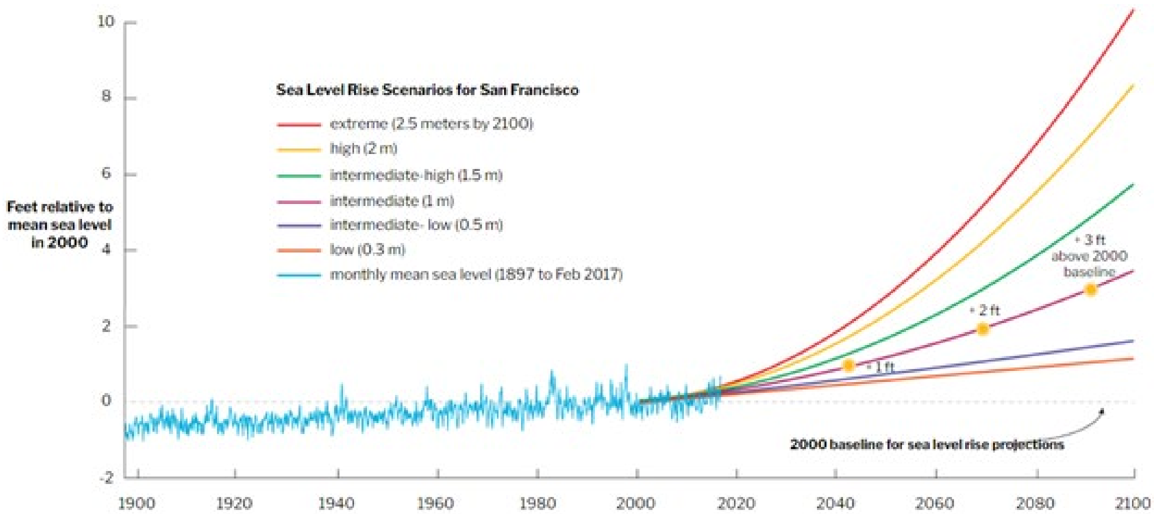
> Nearly every aspect of Bay-Delta ecosystems is likely to be affected by climate change, including physical, chemical, and biological elements. Effects that will stem from increasing sea levels include: changes in precipitation patterns (including storm intensity and timing of runoff); changes in freshwater supply and management of that supply; changes in sediment supply; increases in air temperature; more severe drought; and infrastructure adjustments in response to climate change. Across the elevation gradient from shallow subtidal to the tidal-terrestrial transition zone, natural areas of the shore will necessarily adapt or transform.

The following discussion repeatedly references the abbreviation "RCP," for "representative concentration pathway." These are the specific GHG concentrations considered within a given climate model. A lower RCP value indicates a lower concentration of GHGs simulated in the model. Both RCP 4.5 and RCP 8.5 are commonly used to represent a range of different climate futures. RCP 4.5 is considered an intermediate scenario, with GHG emissions declining after 2045. RCP 8.5 represents "business as usual" with no decline in emissions throughout this century. The higher the RCP value, the more extreme the climate repercussions.

Sea Level Rise

Delta water is a combination of seawater from San Francisco Bay and riverine inputs. As sea levels rise, bay waters will be pushed farther inland into the Delta, raising daily tidal elevations, pushing saline water farther upstream, and affecting sedimentation and erosion levels in complex ways. Additional sea level rise–associated impacts include potential regional increases in groundwater salinity and elevation, increases in storm surge elevations and associated damage, and reduced drainage after inland flooding.

A 2017 NOAA technical report projecting San Francisco sea level rise for several global scenarios shows the range of possible sea-level-rise rates for the San Francisco Bay Area (Bay Area) (National Oceanic and Atmospheric Administration 2017: Figure 1; see **Figure 4-1**). These correspond closely to projections of sea-level-rise rates for most of the state.



Source: National Oceanic and Atmospheric Administration 2017

Figure 4-1
Sea-Level-Rise Scenarios for the San Francisco Bay Area

The *California Fourth Climate Change Assessment, San Francisco Bay Area Region Report* (Ackerly et al. 2018) provides the following overview of sea level rise for San Francisco Bay through the end of the century:

- Sea level in the Bay Area has already risen more than 8 inches in the last 100 years.
- The regional signal of sea level rise is complicated at the local level by highly variable rates of vertical land movement across the Bay Area caused by seismic effects, sediment compaction, marsh accretion, and groundwater fluctuations.
- Current projections along the California coast show median rates of sea level rise of 29 inches (RCP 4.5) and 54 inches (RCP 8.5) for 2100. The full range of projections indicates that sea level rise by 2100 could be from a mere 18 inches (extreme best case) to 9.4 feet (plausible but very low probability) or more.

- The 113-inch rise discussed above would require extensive loss from Antarctic ice sheets. Loss of Greenland ice sheets would produce a slightly smaller, though still extensive, increase.

The Delta is a transition zone from fresh water to saltwater. Salinity within the Delta fluctuates both seasonally and daily, as fresh riverine flows meet salty bay tides. Salinity targets within the Delta are set to maintain appropriate water quality for municipal, industrial, agricultural, and fish and wildlife aquatic uses. When salinity exceeds those standards, negative impacts can range from crop damage to reduced State Water Project exports to ecological impacts on species such as the listed delta smelt.

Delta Water Levels, Floods, and Droughts

Delta water levels are a product of tidal flow and upstream riverine inflow. Riverine inflow is a product of precipitation, snowmelt, and anthropogenic water inputs and diversions. As such, seasonal inputs to the Delta are tightly linked to the Sierra Nevada snowpack. Generally, much of California's precipitation falls as winter snow, which melts slowly throughout the spring, providing a prolonged period of runoff throughout spring and early summer. Infrequently, a faster snowmelt coincides with warm spring rain, and Delta flooding. The Sierra Nevada snowpack acts as the state's largest reservoir, increasing dry-season water storage by 72 percent above that of human-made reservoirs (Ackerly et al. 2018), and historically provides 40 percent of the annual inflow of water to San Francisco Bay (Cloern et al. 2011). As the snowpack gradually melts, it either flows to rivers and the Delta, is diverted to meet human demand, or is stored in human-made reservoirs for use during the dry months.

- *More Rainfall, Less Snowpack:* As the climate warms, more winter precipitation is falling as rain rather than snow, filling reservoirs in winter, and leaving less available volume to buffer flood events or store spring snowmelt. Warmer air also holds more water, which allows for larger storms. Already, the largest California storms, called "atmospheric rivers," are becoming more frequent. Atmospheric rivers contribute, on average, 40 percent of the Sierra Nevada snowpack and produce heavy rainfall and substantial flood risk, described in more detail below. Under a high-emissions scenario, average Sierra Nevada snowpack is projected to decline by nearly 20 percent in the next two to three decades, 30–60 percent in mid-century, and by more than 80 percent in the late century (Ackerly et al. 2018).

- *Shifts in Snowmelt Timing:* Warmer springs and less insulation of snow from a smaller snowpack forces earlier, faster snowmelt of the remaining snowpack.

- *Higher Spring Delta Outflow:* When human-made reservoirs are filled with winter rain, the spring storage capacity for snowmelt runoff is reduced, and spring reservoir releases increase, leading to a higher spring Delta outflow.

- *More Frequent Large Floods and Storm Events:* The combination of warmer, wetter, rainier storms with faster snowmelt and reduced spring reservoir storage capacity leads to an increased frequency of large spring floods. In California, nearly all major historic flood events have been associated with the presence of atmospheric rivers along the Pacific coast. It is estimated that future changes in the climate will increase the frequency of years with atmospheric river storms, but the number of storms per year is not likely to be affected. More importantly, occasional extreme-precipitation events with intensities greater than historically observed are projected to occur under most warming scenarios. Changes in the frequency and magnitude of atmospheric rivers may result in increases in major flood and storm events (Ralph and Dettinger 2011). High-water events in the Delta coinciding with high-tide events could result in increased widespread lowland flooding (California Natural Resources Agency 2009).

- *Overall Higher Wet/Dry Variability:* Climate projections indicate that precipitation will increasingly exhibit high year-to-year variability—"booms and busts"—with very wet and very dry years (Ackerly et al. 2018). Northern California's largest winter storms will become more intense and potentially more damaging. The exact change to storm periodicity is unclear, but small storms, such as historic one-year, five-year, and 10-year storms, may become less frequent, while larger storms, such as historic 100-year and larger storms, may become more frequent. This pattern is consistent with recent, precipitous increases globally in 100-year and larger storm events.

- *Longer, Dryer Droughts:* Warmer summers lead to more soil evaporation, higher water demand, and longer annual dry seasons. These conditions combine with longer intervals between wet years to force an overall increase in multi-year intense drought events, as well as more frequent and longer drought-induced deficits in annual flows through the Delta. *California's Fourth Climate Change Assessment, San Francisco Bay Area Region Report* (Ackerly et al. 2018) states that "future increases in temperature, regardless of whether total precipitation goes up or down, will likely cause longer and deeper California droughts, posing major problems for water supplies, natural ecosystems, and agriculture."

The 2012–2016 California drought led to the most severe moisture deficits in the last 1,200 years and a 1-in-500-year low in Sierra Nevada snowpack (Ackerly et al. 2018). Continued warming temperatures along with reduced runoff and precipitation had a negative effect on drought conditions. In more recent years, the wet seasons in the northern Sierra Nevada were among the driest on record, and snow surveys conducted in 2021 found Sierra snowpack to be well below average. On April 21, 2021, Governor Gavin Newsom proclaimed a state of emergency in select counties because of drought conditions and directed State agencies to take immediate action to bolster drought resilience (Newsom 2021).

Extreme Heat Events

Across California, extreme heat waves increasing. In July 2021, Death Valley reached 130 degrees Fahrenheit (°F), a global heat record. Climate predictions indicate that Northern California will continue to see higher average temperatures year-round, during both daytime and nighttime, with a larger increase in summer than in winter (with July–September increases of 2.7°F to 10.8°F by year 2100). Heat waves are expected to be more extreme and to have longer durations and larger geographic extents than historical averages (Houlton and Lund 2018). The Sacramento region will likely see average daily maximum temperatures increase by 10°F by the end of the century, while extreme-heat days, with temperatures above 103.9°F, will increase from historic averages of zero to five days per year to approximately 40 days per year.

Heat is one of the main drivers of climate migration, a documented phenomenon in which both plants and animals shift their range either northward or higher in altitude in response to climate drivers. Heat extremes and longer heat waves within the project area may affect habitat restoration efforts, decrease recruitment of preferred native species, and increase recruitment of non-native species. However, improving habitat connectivity and refugia (i.e., habitats with reduced vulnerability) within Sacramento Valley landscapes is expected to promote climate resiliency among species, habitats, and ecosystems (Houlton and Lund 2018).

Sedimentation Patterns

In general, Delta sediment deposits preserve and restore wetlands, provide habitat, protect against erosion, and help offset sea level rise. Sedimentation and erosion patterns in the Delta are controlled by upstream sediment input and complex fluvial and tidal hydrologic dynamics. Sediment supply from the Sacramento and San Joaquin rivers has been declining since at least the mid-1950s, as a result of the trapping of sediment in reservoirs and legacy effects of hydraulic mining. In the future, both sediment input and Delta hydrodynamics will shift as the climate changes. Future sediment input is generally expected to increase (Stern et al. 2020) as a result of the following factors:

- Drought-caused increases in soil erosion.
- Flood mobilization of soils to waters, as sediment supply is strongly dependent on peak river flows.
- Wildfire-caused vegetation loss, erosion, and post-fire debris flow. Burned watersheds can export as much as 10 times as much suspended sediment as unburned watersheds (Coombs and Melack 2012; Donohue and Molinos 2009).

Delta Water Temperatures

Water temperatures in the Delta are influenced by fluvial inputs from the east, tidal waters from San Francisco Bay, and local temperature conditions. Increased average air temperatures and the occurrence of extreme-heat events are increasing regionally, which will raise water temperatures locally in the Delta. Also, water temperature is rising, on average, in both Delta inflow and tidal waters.

Even without air temperature increases, reduced snowfall and decreased riverine flow volumes lead to higher riverine water temperatures (Ackerly et al. 2018). Increased air and soil temperatures exacerbate this rise. By the end of the century, Sacramento River water temperatures could warm by as much as 5.4°F to 10.8°F (Wagner et al. 2011). Wagner modeled future Sacramento River temperatures in the Delta using a range of climate models, all of which projected that water temperatures will increase year-round over the next 100 years.

The temperature of global oceans has also been rising, as the oceans have had to store the majority of the increased heat content to date from climate change (Lindsey and Dahlman 2020). Warmer oceans correspond to increased temperatures in San Francisco Bay. In 2015, the U.S. Geological Survey monitoring network, which included 19 stations throughout San Francisco Bay, recorded instantaneous values of water temperature at several stations that exceeded all previous records (Work et al. 2017).

Increased water temperatures have a direct impact on many aquatic species by directly inducing stress and/or decreasing dissolved oxygen levels. This is especially acute when experienced cumulatively with other climate change consequences such as decreased water levels, changes in hydrology, the occurrence of harmful algal blooms, and alterations in food source availability or predator-prey dynamics. One species particularly susceptible to temperature increases is the delta smelt (federally listed as threatened), which has high mortality above 25 degrees Celsius (°C). Throughout the Delta, the number of days projected above this threshold are: 0 to less than 10 annually (historically); to 10–80 days annually (by 2030); and to 30–90 days annually (by 2090) (Wagner et al. 2011).

Changes in Ecological Sensitivity

Climate change causes ecological stress in a wide variety of ways. Heat, wildfire, drought, and floods can directly harm or injure both flora and fauna, or can indirectly cause stress by destroying habitat, reducing food sources, or disrupting critical seasonal signals, such as those that trigger migration or leaf fall. Climate change may also favor the spread of new diseases and invasive species within the project area. The ability of wildlife and vegetation to respond to rapidly changing conditions is still poorly understood and best discussed on a species or family level, rather than broadly. The exact role the proposed project may provide in mitigating such impacts is dependent on many currently unclear factors (see Section 4.4.3, "Question 2: Climate Change Adaptation"). However, it is hoped that regional conservation efforts, including the protection and restoration of open space and refugia habitats, when paired with climate-smart practices, will enhance regional ecological resilience (Ackerly et al. 2018).

4.3 Regulatory Setting

The following text summarizes federal, State, and local laws, executive orders, policy initiatives, and planning requirements pertinent to the evaluation of climate change effects on the proposed project.

4.3.1 Federal

On January 20, 2021, President Joe Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis." The executive order rescinded the Council on Environmental Quality's 2019 draft guidance on GHGs and climate change related to the National Environmental Policy Act. Further, the executive order establishes a program for accounting for the benefits of reducing climate pollution, emphasizing that it is essential for agencies to capture the full costs of GHG emissions as accurately as possible, including by taking global damages into account (The White House 2021).

4.3.2 State

The major components of California's climate change initiative are described below.

Assembly Bill 1482

Assembly Bill 1482 (Chapter 603, Statutes of 2015), signed by Governor Edmund G. Brown Jr. on October 8, 2015, required the California Natural Resources Agency (CNRA) to update the State's climate adaptation strategy by July 1, 2017, and every three years thereafter. The bill requires State agencies to maximize specified objectives, such as the following:

- Promoting the use of the climate adaptation strategy to inform planning decisions.
- Ensuring that State investments consider climate change impacts.
- Using natural systems and natural infrastructure when developing physical infrastructure to address adaptation.

Executive Order S-13-08

Executive Order S-13-08, signed by Governor Arnold Schwarzenegger on November 14, 2008, required the CNRA to develop California's first climate adaptation strategy in coordination with federal, State, regional, and local public and private entities. The executive order instructed the National Academy of Sciences to issue a report on sea level rise to advise California planning efforts; the report was released in June 2012. The order also directed the Governor's Office of Planning and Research (OPR) to provide State land-use planning guidance related to sea level rise and other climate change impacts. The Interim Guidance Document was released in November 2008, with an update released in 2013.

Executive Order B-30-15

On April 20, 2015, Governor Brown signed Executive Order B-30-15 to establish a new California GHG emissions reduction target of 40 percent below 1990 levels by 2030, and to increase statewide efforts to address the need for increased climate change adaptation measures by State agencies. These measures do all of the following:

- Incorporate climate change impacts into the State's Five-Year Infrastructure Plan.
- Update the *Safeguarding California* plan to identify how climate change will affect California infrastructure and industry, and what actions the State can take to reduce the risks posed by climate change.
- Factor climate change into State agencies' planning and investment decisions.
- Require OPR to establish a technical advisory group to help State agencies incorporate climate change impacts into planning and investment decisions.
- Implement measures under existing agency and departmental authority to reduce GHG emissions.

Executive Order B-55-18

In September 2018, Governor Brown signed Executive Order B-55-18, which established a statewide goal to achieve carbon neutrality as soon as possible and no later than 2045, and to achieve and maintain net negative emissions after that.

California Senate Bill 379, Climate Change Adaptation in General Plan Safety Elements

California Senate Bill (SB) 379 (Chapter 608, Statutes of 2015) requires all cities and counties to include climate adaptation and resiliency strategies in the safety elements of their general plans. The general plan update must include the following information:

- A climate change vulnerability assessment.
- Adaptation and resilience goals, policies, and objectives.
- Feasible implementation measures.
- Reference to or attachment of a separate adaptation plan, if it fulfills these requirements.

California Senate Bill 246, Integrated Climate Adaptation and Resilience Program

California SB 246 (Chapter 606, Statutes of 2015) established the Integrated Climate Adaptation and Resilience Program, administered by OPR. The program coordinates regional and local adaptation planning efforts with statewide climate adaptation strategies. The legislation also requires the California Governor's Office of Emergency Services to review the Adaptation Planning Guide, in coordination with the CNRA, OPR, and relevant public and private entities, and to update the guide as necessary, within one year of an update to the *Safeguarding California* plan.

2018 Safeguarding California: Reducing Climate Risk

Required by Public Resources Code Section 71150 et seq., *Safeguarding California* is California's overall plan for climate adaptation (California Natural Resources Agency 2018). The plan provides policy guidance for State decision-makers, and is part of continuing efforts to reduce impacts and prepare for climate risks. The 2018 plan update identifies ongoing actions and recommendations that protect infrastructure, communities, services, and the natural environment from climate change. It lays out the next steps to achieve the State's goals and determine how those objectives will be achieved and describes overarching strategies recommended by the CNRA. The plan also outlines ongoing actions and cost-effective, achievable next steps to make California more resilient to climate change (California Natural Resources Agency 2018).

California Department of Water Resources Climate Action Plan

The CAP is DWR's guide to addressing climate change in the programs, projects, and activities over which it has authority. The CAP is divided into three phases to address mitigation, adaptation, and consistency in the analysis of climate change:

- *Phase 1: Greenhouse Gas Emissions Reduction Plan*—This plan (California Department of Water Resources 2020) lays out DWR's GHG emissions reduction goals and strategies for the near term (present to 2030) and long term (2045).
- *Phase 2: Climate Change Analysis Guidance*—This phase of planning develops a framework and guidance for consistent incorporation and alignment of analyses of climate change impacts in DWR's project and program planning activities.

- *Phase 3: Climate Change Vulnerability Assessment*—This phase describes, evaluates, and quantifies the vulnerabilities of DWR's assets and business to potential climate change impacts. The Phase 3 Adaptation Plan will help prioritize DWR resiliency efforts such as infrastructure improvements, enhanced operation and maintenance procedures, revised health and safety procedures, and improved habitat management.

4.3.3 Local

Contra Costa County General Plan

Contra Costa County is in the process of updating its general plan. *Envision Contra Costa 2040* is the County's plan to address climate change and encourage sustainability and resiliency over the next 20 years (Contra Costa County 2020). 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 Contra Costa County regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

Contra Costa County Climate Action Plan

Adopted in December 2015, the Contra Costa County CAP presents the County's strategic approach to reduce GHG emissions from sources throughout the unincorporated area (Contra Costa County 2015). The Contra Costa County CAP reflects the County's programs and actions to decrease energy use, improve energy efficiency, develop renewable energy, reduce vehicle miles traveled, increase multimodal travel options, expand green infrastructure, reduce waste, and improve the efficiency of government operations. The CAP also forecasts Contra Costa County's GHG emissions and sets reduction targets and strategies.

The Contra Costa County CAP will be updated in parallel with the *Envision Contra Costa 2040,* the County's general plan. The general plan will provide the long-term resiliency framework of goals and policies; the CAP will provide strategic implementation programs showing how Contra Costa County will reduce GHG emissions in support of the State's adopted reduction targets for 2030 and 2050, reducing GHG emissions 40 percent below 1990 levels by 2030, with consideration of the State's long-term goal to reduce GHG emissions to 80 percent below 1990 levels by 2050.

4.4 Impact Analysis

4.4.1 Methods

This analysis is based on publicly available climate data for the project region. The measured climate impacts and future climate projections described in this chapter primarily cite *California's Fourth Climate Change Assessment, San Francisco Bay Area Region Report* (Ackerly et al. 2018). A fifth Climate Change Assessment, currently underway, is expected to include information that is currently unavailable and updated climate projections that together may alter the current understanding of the specific timing or magnitude of climate impacts on the Delta and its watersheds. However, the scientific community has high confidence regarding the general character of those impacts—sea level rise, increased flood magnitudes, and changes to the seasonality of Delta flow—meaning that the character of the impacts will remain generally as described. The alternatives analysis compares the alternatives to the proposed project to determine whether the effect of climate change related to mitigation, adaptation, and resilience differs.

4.4.2 Question 1: Climate Change Mitigation

Could the proposed project provide any carbon sequestration benefits that are not accounted for under compliance with the inventory in DWR's *Climate Action Plan Phase 1: Greenhouse Gas Emissions Reduction Plan Update 2020*?

The proposed project would not provide any carbon sequestration benefits because it does not propose land conversion that would alter carbon sequestration by creating a carbon sink (i.e., new vegetation that could sequester carbon and create a net reduction in project-related GHG emissions). The proposed project is located near Franks Tract, a flooded former agricultural island that is particularly important with respect to potential salinity intrusion from several channels connected to it, predominantly the San Joaquin River and West False River. The proposed project does not propose to change the existing land use and Franks Tract would remain inundated by Delta waters. Therefore, the proposed project would not propose carbon sequestration benefits that are not accounted for under compliance with the DWR CAP.

No Project Alternative

Under the No Project Alternative, DWR would not install a temporary drought salinity barrier, made of rock, in West False River. As under the proposed project, no land conversion would occur that would alter carbon sequestration. Therefore, the No Project Alternative would have negligible carbon sequestration benefits—the same as the proposed project.

Barge-Mounted Operable Barrier Alternative

As described in Chapter 6, "Alternatives," under the Barge-Mounted Operable Barrier Alternative, DWR would install a temporary barge-mounted operable barrier in West False River instead of a full barrier made of rock. Like the proposed project, this alternative would not propose land conversion that would alter carbon sequestration. Therefore, the Barge-Mounted Operable Barrier Alternative would have negligible carbon sequestration benefits—the same as the proposed project.

Single-Tube Inflatable Rubber Dam Alternative

As described in Chapter 6, "Alternatives," under the Single-Tube Inflatable Rubber Dam Alternative, DWR would install a single-tube inflatable rubber dam, consisting of cylindrical rubber fabric filled with water, across West False River. The tube would be bolted into a rock foundation on the riverbed and levee. The lower portion of the barrier would be rock, as under the proposed project (approximately 800 feet spanning the Jersey Island levee on the south side to the Bradford Island levee on the north side). Instead of using the top layer of rock like the proposed project, the single-tube inflatable rubber dam proposed by this alternative would be installed on top of a rock base that would be constructed underwater up to an elevation high enough to utilize the largest single-tube rubber dam. Like the proposed project, this alternative would not propose land conversion that would alter carbon sequestration. Therefore, the Single-Tube Inflatable Rubber Dam Alternative would have negligible carbon sequestration benefits—the same as the proposed project.

4.4.3 Question 2: Climate Change Adaptation

Are any climate change adaptation strategies built into the proposed project? Will the benefits of the proposed project be maintained under future climate change projections?

Climate adaptation is the process of adjusting behavior, built environment, or ecological habitats to reduce the harm caused by climate impacts. The proposed project is inherently a climate adaptation project; the primary objective is to minimize the impacts of salinity intrusion on the beneficial uses of Delta water during persistent drought conditions (see Table 3.5-1 in Section 3.5, "Hydrology and Water Quality," for a complete list of beneficial uses for the Delta). Without the protection of the drought salinity barrier, saltwater intrusions could affect more than 27 million Californians who rely on the Delta for at least a portion of their water supply, render Delta water unusable for agricultural needs, and reduce habitat value for aquatic species. Therefore, installation of the barrier itself is a climate change adaptation strategy,

Future climate change projections for the project area present a complex set of challenges for the Delta's water quality. Expected climate change effects include warming temperatures and more extreme-heat days; sea level rise; drier conditions with more severe droughts; a longer fire season; increased variability in precipitation with more extreme storms; and a smaller snowpack in the Sierra Nevada that melts earlier in the season, and potentially more rapidly. A shift to precipitation falling as rain rather than snow may also lead to increased wet-season flows in rivers and streams after storms, with increased potential for floods and erosion. Water that normally would be held as snow and ice until spring or early summer could flow into the Sacramento and San Joaquin valleys concurrently with winter storm events. Changes in the timing or amounts of rainfall and snowfall may lead to changes in water supply and increase the severity and frequency of flooding risks.

Additional considerations include:

- The proposed project may provide ecological adaptive capacity or resilience to mitigate some impacts of climate change on regional water quality.
- The proposed project may provide flood protection benefits against large floods, and may increase or decrease local project flood impacts from small (10-year) floods.
- Persistent drought conditions projected under climate change may alter the timing of barrier installation and removal, requiring more frequent installations and leaving the barrier in place for a longer duration.

- Increased flood events, resulting in increased riverine inflows, could affect the functionality or effectiveness of the proposed project.
- High-water events in the Delta that coincide with high-tide events exacerbated by sea level rise could also result in increased widespread lowland flooding, thereby affecting the functionality and effectiveness of the proposed project.
- Extreme heat and increased evaporation could exacerbate drought conditions, challenging the ecological resiliency of West False River.

Fluctuations between these extremes result in potentially compounding impacts, necessitating adaptation projects like the proposed drought salinity barrier. The proposed project's implementation would be triggered by several "drought factors": forecasted multiyear consecutive drought conditions with below-average runoff, rainfall, and/or snowpack; a drop in Northern California reservoir storage levels; risks to Water Right Decision 1641 water quality objectives; and the results of drought modeling and monitoring. Therefore, as part of the project design, it is assumed that the water quality benefits of the proposed project would be maintained under these drier than normal drought conditions.

> Under wetter than normal conditions, including the occurrence of a flood event, the barrier could be inundated, causing flows not to pass through the barrier, but rather to overtop it. However, West False River is a wide channel that can disperse flows with minimal damage to the barrier itself. Downstream tidal cycling, storm surges, and sea level rise may be more influential than flooding from upstream riverine inflows. Additionally, wet-weather patterns that generate sufficient winter and spring freshwater river flows to displace higher salinity water may potentially trigger removal of the barrier. However, because West False River is a tidal channel, its water elevation changes primarily with the tides rather than during large storm and inflow events (California Department of Water Resources 2021). See Section 3.5, "Hydrology and Water Quality," for additional discussion of potential flood impacts.

Overall, it is anticipated that the proposed project would be able to withstand fluctuations in water levels resulting from sea level rise, flooding, and/or drought conditions, and to continue providing water quality benefits to beneficial uses. Given that the project proposes installation up to two times within a 10-year period (2023–2032) with each installation lasting up to 20 months, DWR engineers would conduct a design review before mobilization to install the drought salinity barrier to ensure that any changes in hydrologic conditions or new flood events are considered.

No Project Alternative

Under the No Project Alternative, DWR would not install a temporary drought salinity barrier, made of rock, in West False River. Without the drought salinity barrier, the Delta's water quality would be more vulnerable to climate-induced impacts. Water would move through the river similar to existing conditions. Therefore, the No Project Alternative would be less adaptable to climate change than the proposed project.

Barge-Mounted Operable Barrier Alternative

As described in Chapter 6, “Alternatives,” under the Barge-Mounted Operable Barrier Alternative, DWR would install a temporary barge-mounted operable barrier in West False River. The gates would be operated to manage flows to reduce seawater intrusion and, when open, would provide a navigational opening to accommodate commercial and large public vessel traffic and fish passage.

Like the proposed project, installation of the barge-mounted operable barrier would be a climate change adaptation strategy to make the Delta’s water quality less vulnerable to climate-induced impacts. Additionally, being able to open the gates would allow flood flows to move through the river, in contrast with the overtopping through the notch proposed under Installation Scenario 2 for the proposed project. Therefore, the Barge-Mounted Operable Barrier Alternative would be equally as adaptable to climate change as the proposed project.

Single-Tube Inflatable Rubber Dam Alternative

As described in Chapter 6, “Alternatives,” under the Single-Tube Inflatable Rubber Dam Alternative, DWR would install a single-tube inflatable rubber dam across West False River. The tube would be bolted into a rock foundation on the riverbed and levee. Like the proposed project, installation of the single-tube inflatable rubber dam would be a climate change adaptation strategy to make the Delta’s water quality less vulnerable to climate-induced impacts. Therefore, the Single-Tube Inflatable Rubber Dam Alternative would be equally as adaptable to climate change as the proposed project.

4.4.4 Question 3: Climate Change Resiliency

How could the proposed project increase the resiliency of the project area to the effects of climate change? Could the proposed project strengthen the project area’s ability to rebound from climate change impacts?

Climate resilience is the ability of a system to resist or quickly rebound from the harm caused by climate change. Successful climate adaptation creates climate resilience. Because the proposed project is inherently a climate adaptation project, construction and operations are anticipated to increase the project area’s resiliency to the effects of climate change. Installing a drought salinity barrier mitigates salinity intrusion into the Delta and protects water quality, water delivery, and aquatic habitat (see Sections 2.2.1 through 2.2.3 in Chapter 2, “Project Description,” for additional description of these benefits). Installation of the notch as proposed under Installation Scenario 2 would further increase the resiliency of the project area by allowing for the passage of fish during drought years.

Building Resiliency to Drought

The proposed project would build resiliency to drought in the Delta over the project’s period (2023–2032), leading to enhanced resiliency over the long term by protecting beneficial uses. The timing of barrier installation is important, as the intent is to protect water quality rather than improve it. Therefore, the proposed project would strengthen the project area's ability to rebound to long-term effects of climate change. The water delivery, water quality, and aquatic habitat elements of the proposed project are discussed in more detail below in the context of resiliency.

- *Water delivery protection:* Salinity intrusion into the interior Delta would cause portions of the Delta to exceed water quality objectives. High salinity levels (with associated bromide levels) would compromise the use of Delta water for municipal and irrigation water supplies, reducing the amount of water available for downstream delivery to communities that rely on this water source. This would pose a hardship for communities without alternative water supplies, including Contra Costa Water District and agricultural water users that may not have access to alternative water supplies. Installation of the drought salinity barrier would enhance the project area's resiliency by ensuring that these users could sustain their water supply.

- *Water quality protection:* Installing a temporary drought salinity barrier in West False River would help block higher salinity waters from entering the interior Delta, thus maintaining water quality objectives while reducing demand on reservoir releases. If Delta salinity objectives were to be maintained with reduced reservoir releases, more water in upstream reservoirs could be released later for beneficial uses, such as upstream fisheries and community needs. This would ultimately enhance the project area's resiliency to the effects of climate change.

- *Aquatic habitat protection:* Constructing a temporary drought salinity barrier in West False River would conserve coldwater pools in upstream reservoirs because these already limited water supplies would not have to be released. The barrier would protect natural resource values later in the year because less water would need to be released from the reservoirs to maintain water quality earlier in the year. This would promote the enhanced resiliency of the project area, as well as the upper watersheds, because the barrier would provide temporary protection of the Delta's water quality for suitable aquatic habitat and would not affect operations elsewhere.

In summary, the proposed project would increase the project area's resiliency by protecting water delivery, water quality, and aquatic habitat from the effects of climate change. By protecting these beneficial uses, the proposed project would strengthen the project area's ability to resist and/or rebound from inter-annual variability and the compounding impacts of multiyear droughts. Therefore, through drought resiliency building, the benefits of the proposed project would likely be maintained under future climate change projections.

No Project Alternative

Under the No Project Alternative, DWR would not install a temporary drought salinity barrier, made of rock, in West False River. The ability to protect water delivery, water quality, and aquatic habitat would be affected by extreme fluctuations in water supply, resulting in decreased resiliency in the project area. Therefore, the No Project Alternative would be less resilient to climate change than the proposed project.

Barge-Mounted Operable Barrier Alternative

As described in Chapter 6, “Alternatives,” under the Barge-Mounted Operable Barrier Alternative, DWR would install a temporary barge-mounted operable barrier in West False River to manage flows to reduce seawater intrusion and provide a navigational opening to accommodate commercial and large public vessel traffic and fish passage. Like the proposed project, installation of the barge-mounted operable barrier would protect water delivery, water quality, and aquatic habitat in the project area from the effects of climate change. Preventing water quality conditions from worsening would enable the river to resist and/or rebound from climate-induced changes. Therefore, the Barge-Mounted Operable Barrier Alternative would be equally as resilient to climate change as the proposed project.

Single-Tube Inflatable Rubber Dam Alternative

As described in Chapter 6, “Alternatives,” under the Single-Tube Inflatable Rubber Dam Alternative, DWR would install a single-tube inflatable rubber dam across West False River. The tube would be bolted into a rock foundation on the riverbed and levee. Like the proposed project, installation of the single-tube inflatable rubber dam would protect water delivery, water quality, and aquatic habitat in the project area from the effects of climate change. Preventing water quality conditions from worsening would enable the river to resist and/or rebound from climate-induced changes. Therefore, the Single-Tube Inflatable Rubber Dam Alternative would be equally as resilient to climate change as the proposed project.

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CHAPTER 5
Other CEQA Considerations

Section 15126 of the State CEQA Guidelines requires that all phases 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 5.1 presents the assessment of cumulative impacts 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 5.2.

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 5.3 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 5.4.

5.1 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.

5.1.1 Cumulative Context and Approach

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 West False River project site and surrounding vicinity, which includes the barrier features described in Chapter 2, "Project Description," and shown in Figures 2-1 through 2-4. The West False River drought salinity barrier location is in the Central Delta in West False River, which is a main channel to the west that connects to Franks Tract, the central hub of the Delta. By hydraulically blocking the West False River corridor, the barrier protects against the intrusion of saltwater from San Francisco Bay into Franks Tract. This prevents the fresh water from other channels including the Mokelumne River and Old River flowing into Franks Tract from other directions from mixing with the more saline water that otherwise would flow through West False River during flood tides. Without the barrier in place at this critical location, the saltier water carried through West False River would gradually contaminate the water in Franks Tract and the interior Delta with salts, a condition that cannot be reversed during drought conditions, and thus would affect the beneficial uses of water. The importance of the West False River location for this purpose is explained in Section 1.2.3 in Chapter 1, "Introduction."

The evaluation of cumulative impacts considers the location 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 activities would not combine with noise impacts from other projects located beyond the distance at which construction noise can be measured above ambient levels.

As noted, the geographic scope for the cumulative impact assessment includes the West False River project site and surrounding vicinity as defined in Chapter 2, "Project Description." The project site is within the boundaries of Contra Costa County. Contra Costa 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 5.1.3.

5.1.2 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.

5.1.3 List of Related Projects in the Project Area

The following projects were determined to meet the four criteria listed in Section 5.1.2 for past, present, and reasonably foreseeable future projects and were selected for inclusion in the cumulative impact analysis:

- Levee strengthening on Bradford Island, adjacent to the project site, by Reclamation District 2059 in 2014–2015.
- Levee strengthening on Jersey Island, adjacent to the project site, by Reclamation District 830 in 2014–2015.
- Temporary emergency drought barriers installed in West False River in 2015 and 2021–2022 by DWR at the location of the proposed drought salinity barrier.

5.1.4 Summary of Cumulative Impacts

The cumulative impact analysis considers whether the projects identified in Section 5.1.3, "List of Related Projects in the Project Area," in combination with the proposed project, would have the potential to affect the same resources. The analysis involves making the following findings and determinations:

- If a combined effect would not occur, a finding of no cumulative impact is made.
- If a combined effect would occur, a determination is made as to whether (1) that combined effect would result in a significant cumulative impact and (2) the proposed project's contribution to the effect would be considerable.
- 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 for each technical issue area is presented in the respective Chapter 3 sections under "Impacts and Mitigation Measures." For a complete discussion of cumulative impacts, see Chapter 3, Sections 3.2 through 3.7.

Air Quality and Greenhouse Gas Emissions

The geographic context for changes to the air quality environment attributable to the proposed project is the jurisdictional area of the Bay Area Air Quality Management District (BAAQMD). When they develop 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.

The proposed project (under all three installation scenarios) would exceed BAAQMD thresholds of significance for construction-related emissions. Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 would be implemented to reduce construction-related emissions to a less-than-significant level relative to the BAAQMD thresholds of significance. Therefore, with mitigation, emissions associated with the proposed project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact.

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.

The proposed project is consistent with DWR's *Climate Action Plan Phase 1: Greenhouse Gas Emissions Reduction Plan Update 2020* (California Department of Water Resources 2020) and GHG emissions from construction of the proposed project would be less than significant. 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.

Biological Resources

The geographic context for changes to biological resources attributable to the proposed project is the local project area. The project area includes aquatic habitat associated with West False River and terrestrial habitat associated with the adjacent channel slopes, levee roads, and landside berms along Bradford and Jersey islands. 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 BIO-1 through BIO-11 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. This cumulative impact would be less than significant.

Cultural Resources

The geographic context for changes to cultural resources attributable to the proposed project includes the West False River project site and surrounding vicinity, 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 (under all three installation scenarios) 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. Implementation of the proposed project (under all three installation scenarios) 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 CUL-1, CUL-2, CUL-3, and CUL-4 would reduce the contribution of the proposed project (under all three installation scenarios) to cumulative impacts on archaeological resources. Adhering to State laws regarding human remains and implementing Mitigation Measure CUL-3 would reduce the contribution of the proposed project (under all three installation scenarios) to cumulative impacts on human remains to a less-than-considerable level. This cumulative 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 West False River project site and surrounding waters. Implementing the proposed project in conjunction with the separately considered projects in the project vicinity could contribute to significant direct or indirect cumulative changes to water quality. Implementing Protective Environmental Measure 2.5.1 and Mitigation Measures BIO-8 and BIO-9 would reduce the proposed project's contribution to cumulative impacts on water quality to a less-than-considerable level because these measures would avoid and minimize the degradation of water quality.

Implementing the proposed project (under all three mitigation scenarios) could contribute to significant direct or indirect cumulative changes related to erosion and siltation. With Mitigation Measures HYDRO-1 and BIO-8, DWR would monitor turbidity levels, water velocity and levee stability, and levee conditions so that they would not be compromised. Implementing these measures would thus reduce the proposed project's contribution to cumulative impacts related to erosion and siltation to a less-than-considerable level.

Implementing the proposed project (under all three installation scenarios) would not contribute to additional flood risk. Therefore, the cumulative effect of the proposed project on existing drainage patterns that would impede or redirect flood flows and this cumulative impact 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. The proposed project (under all three installation scenarios) would not substantially contribute to cumulative effects because it would limit access to West False River only temporarily and because a variety of other recreational areas are available in the project vicinity. The proposed project (under all three installation scenarios) also would not include the construction of any recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. 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 West False River project site and surrounding vicinity, 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 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 (under all three installation scenarios) in conjunction with the separately considered projects could affect such tribal cultural resources, resulting in a cumulative potentially significant impact. Implementing Mitigation Measures CUL-1 through CUL-4 would reduce the contribution of the proposed project (under all three installation scenarios) to cumulative impacts on tribal cultural resources to a less-than-considerable level and the impact would be less than significant.

5.2 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. Irretrievable 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 types of resources, both natural and built, would be expended during construction and operation of the proposed project. Construction activities would use equipment, vessels, and vehicles, which 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, to construct the barrier.

The proposed project would adhere to DWR's Climate Action Plan and GHG emissions reduction policies for increasing the replacement of vehicles and equipment with those that are more energy efficient. In this way, the project would reduce its energy requirements and reduce future consumption of fossil fuels and electricity. 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 conserve natural resources 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.

5.3 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 DEIR 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.

5.4 Growth-Inducing Impacts

The State CEQA Guidelines require that an EIR evaluate the growth-inducing impacts of a proposed project (Section 15126.2[e]). The State CEQA Guidelines describe a growth-inducing impact as:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water 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 to induce growth either directly or indirectly, or both:

- Direct growth inducement would result if a project were to establish new demand for public services, facilities, or infrastructure, such as the construction of new housing.

- Indirect or secondary growth inducement may occur if a project would do any of the following:
  - Establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises).
  - 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.
  - 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, in and of itself, is not 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., would conflict 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 a temporary barrier in West False River that DWR may install up to two times during the 2023–2032 period, including consecutive years, if drought conditions occur, for a period of up to 20 months. Depending on drought conditions, if the barrier is left in for a subsequent year, a notch may be constructed in the middle portion of the barrier in January after the installation year, and the notch would be refilled as early as the first week of April. DWR would also install a total of three water quality monitoring stations—one in Woodward Cut and two in Railroad Cut—with the next installation of the drought salinity barrier.

Construction of the proposed project is anticipated to involve up to 21 workers and would occur over 45–60 days twice in one year (with two installations that could last up to two years each). These temporary employees would likely come from the region's existing labor pool. Therefore, the number of new jobs created (if any) would be minimal, 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 Contra Costa County. Contra Costa County has adopted a general plan consistent with State law that provides a framework for growth and development. 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," DWR is not subject to local regulations without legislative consent, but would implement the proposed project in a manner that would not conflict with applicable local regulations and general plan policies adopted for the purpose of avoiding or mitigating environmental effects.

The proposed project would not increase the area available for development over existing conditions, and thus 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.

CHAPTER 6
Alternatives

6.1 Introduction

State CEQA Guidelines Section 15126.6 requires that an EIR evaluate "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 the alternatives analysis is to determine whether a variation on the proposed project would reduce or eliminate significant project impacts in the basic framework of the proposed project's objectives. The alternatives analysis should also discuss the comparative merits of the alternatives.

The focus and definition of the alternatives evaluated in this EIR is governed by the "rule of reason" in accordance with State CEQA Guidelines Section 15126.6(f), which requires the evaluation of only those alternatives "necessary to permit a reasoned choice." The lead agency ultimately determines an alternative's feasibility based on a variety of 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]).

This chapter includes the following information:

- The objective of the proposed project.
- Alternatives considered but rejected from further consideration.
- The alternatives selected for evaluation (i.e., the No Project Alternative, the Barge-Mounted Operable Barrier Alternative, and the Single-Tube Inflatable Rubber Dam Alternative), a comparison of the environmental effects of the alternatives to the effects of the proposed project, and a discussion of the ability of the alternatives to achieve the proposed project's objectives.
- As required by State CEQA Guidelines Section 15126.6(e)(2), an identified environmentally superior alternative.

6.2 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 EIR.

6.2.1 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 by DWR before the 2015 and 2021–2022 emergency drought barriers (EDBs) were installed in West False River, and during the DEIR scoping process for the proposed project.

The West False River drought salinity barrier location is in the Central Delta in West False River, which is a main channel to the west that connects to Franks Tract, the central hub of the Delta. By hydraulically blocking the West False River corridor, the barrier protects against the intrusion of saltwater from San Francisco Bay into Franks Tract. This prevents the fresh water from other channels including the Mokelumne River and Old River flowing into Franks Tract from other directions from mixing with the more saline water that otherwise would flow through West False River during flood tides. Without the barrier in place at this critical location, the saltier water carried through West False River would gradually contaminate the water in Franks Tract and the interior Delta with salts, a condition that cannot be reversed during drought conditions, and thus would affect the beneficial uses of water. The importance of the West False River location for this purpose is explained in Section 1.2.3 in Chapter 1, "Introduction." When developing the proposed project, DWR considered various ways to temporarily restrict flows in West False River when warranted by drought conditions, to provide an effective solution for protecting the Delta's beneficial uses.

Comments on project alternatives were also received during scoping of the DEIR in response to the notice of preparation (NOP). See **Appendix A** for the NOP comment letters.

6.2.2 Method Used to Screen CEQA Alternatives

Potential alternatives were screened based on their ability to feasibly attain the basic project objectives and to reduce or eliminate any of the significant effects.

Meeting Project Objectives

As stated in Section 2.2, "Project Objectives," the primary objectives of the proposed project are as follows:

- Install a drought salinity barrier to protect water quality in the Central and South Delta, based on need demonstrated by drought conditions and low upstream reservoir storage.

- Install a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the period from 2023 to 2032.
- Minimize the impacts of salinity intrusion on the beneficial uses of interior Delta water during persistent drought conditions through the installation of a drought salinity barrier in the Central or South Delta.

Installing a drought salinity barrier in West False River has been shown to be an effective tool for reducing the intrusion of saltwater into the Central and South Delta based on previous installations (see Section 1.2, "Project Background," in Chapter 1; California Department of Water Resources 2019). The importance of the West False River location is explained in Chapter 1, Section 1.2.3. Given the cyclical nature of drought, the need to install a drought salinity barrier in West False River is anticipated over the next 10 years.

The proposed project would help protect the beneficial uses of water in the Delta during drought periods, including the beneficial uses described in Water Right Decision 1641 (D-1641). Table 3.5-1 in DEIR Section 3.5, "Hydrology and Water Quality," summarizes the beneficial uses designated for the Delta in *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin* (Central Valley Regional Water Quality Control Board 2019). During drought conditions, water stored in upstream reservoirs may be insufficient to repel salinity moving upstream from San Francisco Bay. Without the protection of the drought salinity barrier in West False River, saltwater intrusions could affect more than 27 million Californians who rely on the Delta for at least a portion of their water supply; could render Delta water unusable for agricultural needs; and could reduce the value of habitat for aquatic species.

Section 6.3, "Comparison of Alternatives to the Proposed Project," presents an evaluation of the ability of each alternative to meet the project objectives.

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.

Section 6.3, "Comparison of Alternatives to the Proposed Project," presents an evaluation of the ability of each alternative to avoid or lessen any potentially adverse environmental effects as compared to the proposed project.

6.2.3 Alternatives Considered but Rejected from Further Consideration

The alternatives described below were rejected from further consideration and analysis because they would not avoid or substantially lessen significant environmental impacts, failed to meet the basic project objective, and/or were determined to be infeasible.

Reduced Rock Alternative

Reducing the length of the drought salinity barrier (from bank to bank) or its height (from streambed to water surface) would allow water to bypass the barrier. Thus, this alternative would not achieve the basic project objective of minimizing the impacts of salinity intrusion on the beneficial uses of Delta water because water would flow through West False River. Moreover, reducing the barrier's width (compared to the proposed wide base tapering up to a 12-foot-wide top width) could undermine the barrier's structural integrity, thereby causing it to fail, which would result in widespread environmental effects.

Similarly, installing a temporary rock barrier that contains a notch to provide fish passage for the duration of barrier installation would not achieve the basic project objective of minimizing the impacts of salinity intrusion on the beneficial uses of Delta water, because water would flow through West False River throughout the barrier's placement. Based on findings from the installation of the 2021–2022 EDB, and similar to the proposed project, without design modifications the notching also may lead to scouring of the channel bottom (although the scour depth with the notch was constrained by the clay layer). If the notch were in place throughout the barrier's placement, such scouring could eventually lead to safety concerns related to undercutting of the barrier or the adjacent levees, as discussed in Section 3.5, "Hydrology and Water Quality." Measures similar to Mitigation Measure HYDRO-1 in Section 3.5 would need to be implemented to monitor scour near the barrier while the notch is in place.

With the proposed project, DWR selected the minimum construction footprint for rock necessary to achieve the project's purpose of preventing salinity intrusion into the Delta.

Other Materials Alternative

DWR examined the potential use of other materials, including a combi-wall system, steel cofferdam, and concrete cofferdam, to construct the barrier in West False River, as described below.

- A *combi-wall system* would be composed of interlocking king piles (beam or pipe) connected (welded or interlocked) to sheet piles in West False River. Securing the combi-wall materials would require more extensive labor than reusing the rock and stabilized levees available for the proposed project.
- A *steel cofferdam* would be similar to a combi-wall system but would not include the interconnected king piles. Pile driving would require more extensive labor than the proposed project.

- A *concrete cofferdam* would require pouring concrete within a structural bracing frame, most likely with steel, in West False River. Temporary cofferdams would need to be installed and the area between the cofferdams would be dewatered before construction. This would also require installing falsework and abutments below the ordinary high-water mark along the levees. The project footprint would be greater than for the proposed project, and pouring concrete in the channel would increase the risk of an inadvertent spill, which may substantially degrade downstream water quality.

Given the steel and concrete materials needed for these options, they would provide minimal construction flexibility for creating a notch in the barrier.

Before the COVID-19 pandemic, DWR projected that the time required to procure the steel needed for the combi-wall system and steel cofferdam alternatives would have been approximately six months. With ongoing widespread supply chain issues, it is anticipated that the timeline for securing the materials would be substantially longer. Unlike the other options, the concrete cofferdam alternative would require a combination of materials, including steel for the structural bracing frame; concrete; culverts and pumps for dewatering; and lumber for the falsework. Consequently, the concrete cofferdam option also would require at least six months to procure the necessary materials. As stated in Section 2.3, “Potential Barrier Installation Factors,” in Chapter 2, the environmental conditions that may contribute to an upcoming drought scenario may be highly variable, and the drought salinity barrier would be constructed only if DWR, in cooperation with other State and federal agencies, determines that the barrier is needed. Therefore, insufficient time may be available to source the materials needed for construction under the Other Materials Alternative once a decision to install the barrier is made, particularly if it is needed in 2023.

Further, under expedited conditions, the proposed project could be installed in approximately five weeks and removed in approximately six weeks. The timeline for installation of the concrete or steel cofferdam or the combi-wall system would greatly exceed five weeks, given the amount of preparation required (i.e., to install the cofferdams and dewatering) and the curing time for concrete (one row of structure-bracing frames with concrete would need be completed before another row could be added). A concrete cofferdam would also require much more than six weeks for removal, given that it would be a concrete structure.

DWR engineers selected rock as the material for the proposed project because it meets the specifications necessary to dam water and ensures a certain level of environmental benefit, while also giving DWR design and construction flexibility, depending on specific site conditions. Rock barriers require minimal foundation preparation and have a simple design. Rock barriers require shorter construction times than operable gates. At the end of the season, the embankment material can be removed using conventional construction equipment (California Department of Water Resources 2009).

Off-Site Alternatives

Alternative Locations in the Central and South Delta

Several rock barriers were installed at locations in the Central and South Delta during 1976 and 1977 to help mitigate drought conditions. A barrier was installed at the Head of Old River in 1976 (along with one in Sutter Slough in the North Delta). As drought conditions continued, barriers were installed at six different locations in the Central and South Delta in 1977: Old River east of Clifton Court Forebay, the San Joaquin River near Mossdale, Rock Slough, Indian Slough, Dutch Slough, and the Head of Old River. The barriers served different purposes such as increasing water circulation and quality, reducing salinity, allowing water users to pump at a constant rate, and protecting fishery resources (California Department of Water Resources 2009).

Several studies that consider the use of barriers or gates to address water quality and fishery impacts in the Delta are underway, including the Franks Tract Project as a programmatic action under the CALFED Ecosystem Restoration Program and the 2-Gate Project identified by several State water contractors for possible implementation by DWR.[1] Threemile Slough and the West False River barrier site were evaluated under the Franks Tract Project. Studies were conducted by DWR and the U.S. Bureau of Reclamation to evaluate the feasibility of modifying hydrodynamic conditions near Franks Tract to improve Delta water quality and enhance fish protection. These studies identified alternatives that included an operable gate in Threemile Slough, an operable gate in West False River, and combined operable gates in both West False River and Threemile Slough. A study for the 2-Gate Project analyzed the installation and operation of removable gates in two key channels in the Central Delta: Old River and Connection Slough. (California Department of Water Resources 2009.)

In 2009, DWR identified 14 potential locations, or alternatives that included combinations of individual locations in the Central and South Delta (in addition to two in the North Delta), where barriers could be installed to reduce seawater intrusion at State Water Project (SWP) and Central Valley Project (CVP) pumps during drought conditions (California Department of Water Resources 2009). The following locations were identified:

(1) Threemile Slough

(2) Dutch Slough

(3) West False River

(4) Dutch Slough and West False River

(5) West False River and Fisherman’s Cut

(6) Old River near Franks Tract

[1] The Franks Tract Project and the 2-Gate Project are not included in the cumulative project list (Section 5.1.3) for several reasons: They are not actively under development; notices of preparation or notices of intent have not been released and/or environmental clearance documentation has not been completed; and the projects are not yet reasonably foreseeable given other considerations, such as site suitability, funding availability and economic viability, and regulatory limitations (see also Section 5.1.2).

(7) 2-Gate (Old River and Connection Slough)

(8) Sutter Slough, Steamboat Slough, and West False River

(9) Sutter Slough, Steamboat Slough, and 2-Gate

(10) Threemile Slough and West False River

(11) Threemile Slough and 2-Gate

(12) Old River at Bacon Island

(13) Old River Upstream of Indian Slough

(14) San Joaquin River below Head of Old River

A modeling analysis was conducted of all of the barrier locations and alternatives. Of these, seven alternatives in the Central and South Delta (in addition to two in the North Delta) that provided substantial reductions in electrical conductivity (EC) at the Banks Pumping Plant (SWP) and Jones Pumping Plant (CVP) export pumps were carried forward into a more detailed analysis, which investigated the benefits and costs of installing a rock barrier or operable gate at the locations for the alternatives. (California Department of Water Resources 2009.)

In 2014 and 2015, before installing the 2015 EDB in West False River, DWR conducted hydrodynamic modeling of salinity patterns in the Delta for each of the alternatives analyzed in more detail in the 2009 study. The West False River location was ultimately selected in 2015 based on the modeling's anticipated salinity effects with a barrier in that location (California Department of Water Resources 2019). DWR ran updated hydrodynamic modeling of salinity patterns in the Delta before installing the 2021–2022 EDB, and again, the West False River location was selected for the placement of the EDB based on the results of the modeling. The West False River location optimizes salinity management through the installation of a single barrier, and it has been proven through past installations in that location to be effective in the complex Delta channel system (California Department of Water Resources 2022; see also Section 1.2.3 in Chapter 1, "Introduction").

Additional Water Release from Upstream Reservoirs

In lieu of a rock barrier, DWR could release as much cold water as necessary from upstream reservoirs to meet salinity conditions similar to those established by construction of the West False River drought salinity barrier. (For context, the 2015 EDB conserved approximately 100,000 acre-feet of water [California Department of Water Resources 2019]; and water savings with the 2021–EDB were estimated at 144,000 acre-feet in June 2021, 110,000 acre-feet in July 2021, and 26,000 acre-feet in August 2021, although it is not clear whether the full water savings would have occurred without the 2021–2022 EDB [California Department of Water Resources 2022].)

Although this alternative would not result in direct impacts on waters of the United States like the proposed project, it would have greater potential negative effects on fish than the proposed project. Releasing stored water when the water supplies stored in upstream reservoirs are limited could negatively affect aquatic habitat in late spring and summer if the reservoirs' coldwater resources were depleted and flows were insufficient to protect salmon eggs incubating in the gravels, as well as rearing habitat for juvenile salmon below Keswick, Oroville, and other dams. With less reservoir storage preserved, less water would be available to meet water quality objectives related to electrical conductivity that exist to protect the Delta's beneficial uses for fish and wildlife.

The West False River barrier would protect water quality in the Central and South Delta. To meet salinity conditions in the Central and South Delta similar to those established by construction of the West False River barrier, DWR would need to release additional water from upstream reservoirs. Reducing California's water storage would drastically increase the risk that future reservoir releases would not be able to support both special-status fish and recreational/commercial fish habitat (and its associated economy) in subsequent years.

For instance, the Sacramento River Temperature Task Group has established a temperature compliance point of 56 degrees Fahrenheit. The objectives of the temperature compliance point are to manage coldwater storage within Shasta Reservoir and release cold water from Shasta Reservoir to provide suitable habitat temperatures for winter-run Chinook salmon *(Oncorhynchus tshawytscha)*, spring-run Chinook salmon, California Central Valley steelhead (*O. mykiss*), and the Southern Distinct Population Segment of North American green sturgeon (*Acipenser medirostris*) in the Sacramento River between Keswick Dam and Bend Bridge, while retaining sufficient carryover storage to manage for the following year's winter-run Chinook salmon cohort. The Sacramento River Temperature Task Group has noted that during drought conditions (without a barrier designed to control salinity), insufficient cold water is available to both protect federally listed fish species and simultaneously release a sufficient volume of water for salinity control, while planning for carryover storage needs (Sacramento River Temperature Task Group 2015). In addition to special-status species, water temperature increases would affect habitat that supports recreational/commercial fish and its associated economy. The proposed project is intended to avoid the risks and potentially dire consequences associated with this off-site alternative.

Another way that DWR could release as much cold water as necessary from upstream reservoirs to meet salinity conditions similar to those established by construction of the West False River drought salinity barrier would be if upstream reservoir storage capacities were increased or new upstream reservoirs were constructed. Capturing and storing additional runoff during above-average water years would help protect water quality by allowing more water to be released during a drought. This off-site alternative would not likely be available during the 2023–2032 time frame identified for the proposed project, given the longer term logistics (including non-drought conditions to store extra water) and permitting needs required for increasing upstream reservoir storage capacities or constructing new reservoirs (which could also have their own environmental impacts).

6.2.4 CEQA Project Alternatives Carried Forward for Analysis

This section presents the alternatives that were selected for an analysis based on their ability to achieve the project objectives (presented in Chapter 2, “Project Description,” and repeated in Section 6.2.2, “Method Used to Screen CEQA Alternatives”) and to avoid or lessen one or more of the potentially significant effects of the proposed alternative.

This section presents evaluations of the following alternatives:

- No Project Alternative
- Barge-Mounted Operable Barrier Alternative
- Single-Tube Inflatable Rubber Dam Alternative

As described above, the alternatives were developed with consideration of the need to temporarily restrict flows in West False River when drought conditions warrant, of opportunities and constraints, and of the project’s objectives. The following subsections describe each alternative considered in the analysis.

6.2.5 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 install a temporary drought salinity barrier, made of rock, in West False River (at the same location as the 2015 and 2021–2022 EDB installations) no sooner than April 1 and remove the barrier by November 30 of either the same year or the subsequent year.

6.2.6 Barge-Mounted Operable Barrier Alternative

Under the Barge-Mounted Operable Barrier Alternative, DWR would install a barge-mounted operable barrier, consisting of butterfly gates installed on top of two commercially available cargo barges, in West False River. Based on a barge length of 250 feet, two barges would be installed to regulate flows. The converted barges would be floated to the site and ballasted at the prepared site on the river bottom. Before installation of the barge-mounted gate system, the channel bottom would be dredged to remove unstable material, and a gravel sub-base foundation would be installed to provide a uniform foundation. Depending on the hydrodynamic forces associated with head differences across the gate when it is operational, piles might be needed to support the barges and prevent them from sliding or overturning. After installation of the barges, a rock embankment would be placed in the remaining portions of the river channel (approximately 400 feet of the channel’s total width of approximately 900 feet).

The gates would be operated to manage flows to reduce seawater intrusion. When open, the gates would provide a navigational opening to accommodate normal traffic by commercial and large public vessels that is typical in the Delta, and would provide fish passage. **Figures 6-1 and 6-2** illustrate conceptual layouts of a barge-mounted operable barrier in the closed and open positions, respectively. **Table 6-1** provides preliminary design parameters.

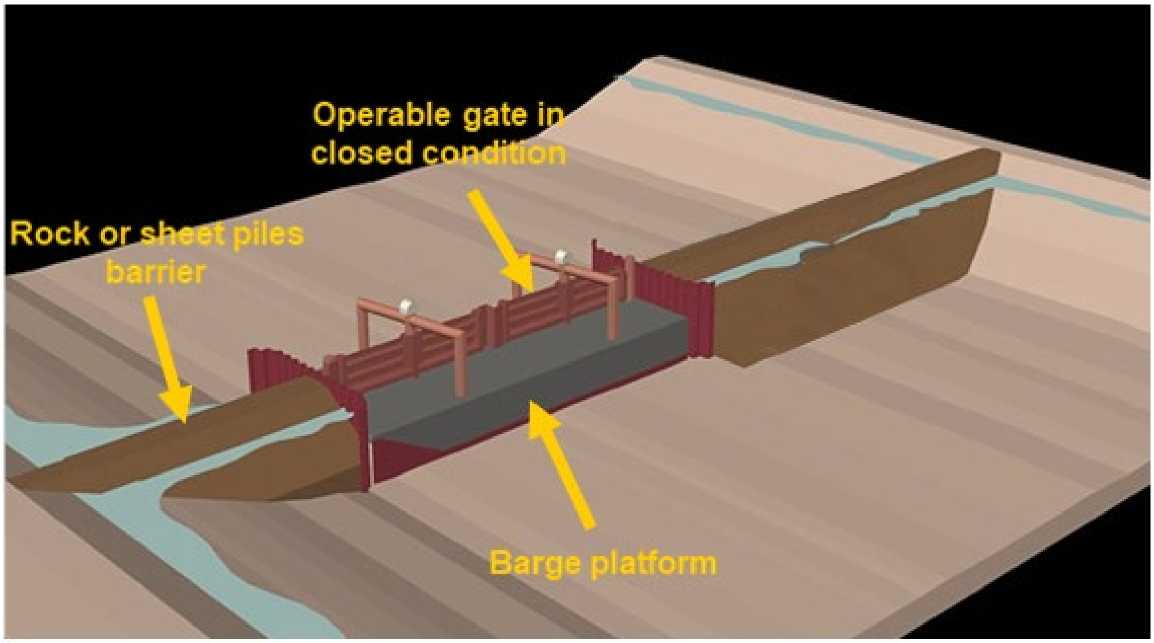


Figure 6-1
Conceptual Illustration of Barge-Mounted Operable Barrier—Closed Condition

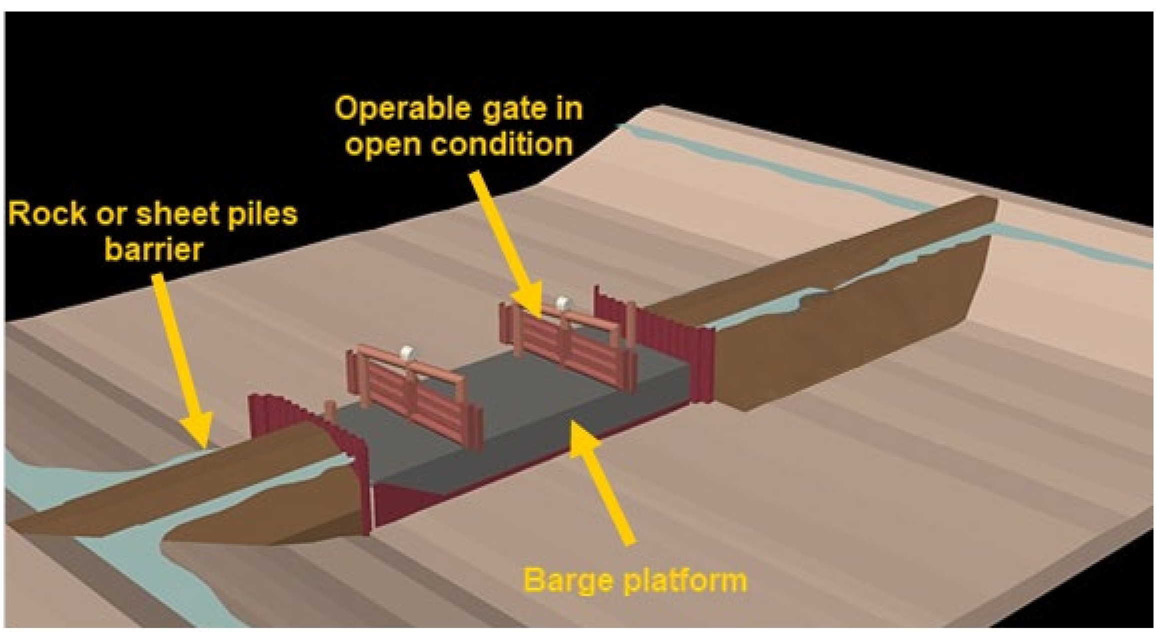


Figure 6-2
Conceptual Illustration of Barge-Mounted Operable Barrier—Open Condition

TABLE 6-1
PRELIMINARY PARAMETERS FOR THE WEST FALSE RIVER BARGE-MOUNTED GATES

Parameters[1]	Feet
Minimum channel bed elevation[2]	-25
Total width of channel	900
Length of temporary rock fill	400
Thickness of bedding rock	7
Length of each barge	250
Width of each barge	50
Thickness of each barge deck	12
Barge sill elevation[2]	-13
Top of gate[2]	6.5
Height of gate[2]	19.5
Bottom of barge[2]	-25

NOTES:
1 The barge-mounted barrier would consist of gates installed on top of two cargo barges.
2 North American Vertical Datum of 1988.
SOURCE: California Department of Water Resources 2009

As under the proposed project, the drought barrier under the Barge-Mounted Operable Barrier Alternative may be installed in West False River (at the same location as the 2015 and 2021–2022 EDBs) no sooner than April 1 and would be removed by November 30 of either the same year or the subsequent year. Under the Barge-Mounted Operable Barrier Alternative, the barrier may be installed up to two times over 10 years, including consecutive years, should a drought occur during the 2023–2032 period and drought conditions and low upstream reservoir storage indicate that a barrier in West False River is an effective tool for reducing saltwater intrusion into the Delta. Concurrent with the first installation under the Barge-Mounted Operable Barrier Alternative, a total of three new water quality monitoring stations would be installed in Woodward Cut and Railroad Cut in San Joaquin County.

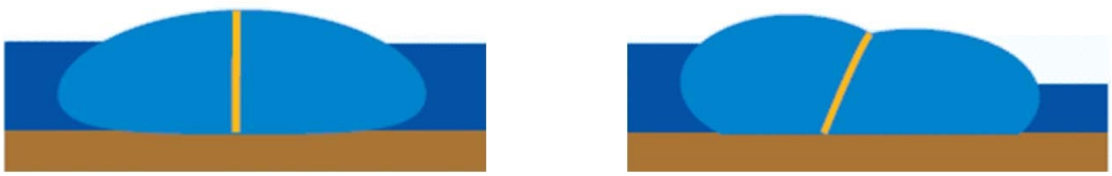
Single-Tube Inflatable Rubber Dam Alternative

Under the Single-Tube Inflatable Rubber Dam Alternative, DWR would install a single-tube inflatable rubber dam, consisting of cylindrical rubber fabric filled with water, in West False River.[2] The tube would be bolted into a rock foundation on the riverbed and levee. The lower portion of the barrier would be rock, as under the proposed project (approximately 800 feet spanning the Jersey Island levee on the south side to the Bradford Island levee on the north side). Instead of using the top layer of rock like the proposed project, the single-tube inflatable rubber

2 A single-tube rubber dam was determined to be the only rubber dam barrier feasible for DWR's use as a temporary barrier, based on the DWR Department of Engineering's investigation of manufacturers worldwide that make several different types of rubber dams: moveable framework barriers, rubber dams anchored to concrete foundations, bottom-hinged gates, and single-tube rubber dams not anchored to concrete foundations (California Department of Water Resources 2015).

dam proposed by this alternative would be installed on top of a rock base that would be constructed underwater up to an elevation high enough to utilize the largest single-tube rubber dam. The single-tube rubber dam would be approximately 33 feet wide by 16 feet tall to retain 11 feet of water.

Single-tube rubber dams work by filling a bladder with water to an elevation higher than the surrounding water. When the water elevation in the bladder exceeds the elevation of the surrounding water, the weight of the water in the bladder and the hydrostatic pressure are great enough to hold the rubber dam in place. If the bladder were to empty to an elevation at or near the surrounding water level, the single-tube rubber dam would have no weight or hydrostatic ballast against the surrounding water, and thus no ability to withstand hydrostatic or hydrodynamic pressures. **Figure 6-3** illustrates a conceptual layout of the Single-Tube Inflatable Rubber Dam Alternative.



Tube placed in the West False River channel

Tube with partial differential head

Figure 6-3
Conceptual Illustration of Single-Tube Inflatable Rubber Dam Alternative

The rubber dam would need to be manufactured to meet precise design specifications. None of the single-tube systems available are able to incorporate culverts with flap or slide gates supported above the channel invert. Therefore, unlike the proposed project, an option to notch the barrier would not be feasible under the Single-Tube Inflatable Rubber Dam Alternative.

The rubber bladder would be exposed at all times, with no automatic leak detection system (leaks must be detected by visual means), and would be susceptible to fabric damage. A slow leak could be repaired and would require removal for repair should fabric on a submerged portion of the dam become damaged. However, if a rubber dam were damaged in place beyond repair (because of either vandalism or unintentional damage resulting from an accident), or if a flood flow were to overtop the rubber dam, the dam could be washed off the rock foundation. Such an event could lead to downstream damage caused by flood flows and the loss of an effective barrier until the rubber dam could be replaced.

The design for the proposed project includes warning signage on the crest of the barrier to warn boaters and the public of the obstruction and to stay off. Installing a single-tube rubber dam on top of the rock would not allow for signage on the barrier crest. The single-tube rubber dam system is also not designed for people to walk on top of it: It has no handles, safety bars, or nets, and could pose a danger to the public. Some measures for reducing safety risks from the single-tube rubber dam would include adding additional fencing, gates, and a 24-hour security guard at the site.

The inflatable rubber dam would require at least 6 months for procurement because it must be manufactured to meet precise design specifications. DWR would also need to keep spare single-tube rubber bladders in inventory to allow for replacement if a catastrophic failure were to occur.

Using a single-tube rubber dam to replace the top layer of rock proposed by the project could save on total construction time during installation and removal, as compared to the proposed project's rock barrier design. The Single-Tube Inflatable Rubber Dam Alternative would use approximately 6,000 cubic yards of rock less than the proposed project (approximately 7 percent less; the single-tube rubber dam would take the place of the rock), which would save approximately 3 days of installation time and 8 days of removal time.

As under the proposed project, the drought barrier under the Single-Tube Inflatable Rubber Dam Alternative may be installed in West False River (at the same location as the 2015 and 2021–2022 EDBs) no sooner than April 1 and would be removed by November 30 of either the same year or the subsequent year. Under the Single-Tube Inflatable Rubber Dam Alternative, the barrier may be installed up to two times over 10 years, including consecutive years, should a drought occur during the 2023–2032 period and drought conditions and low upstream reservoir storage indicate that a barrier in West False River is an effective tool for reducing saltwater intrusion into the Delta. Concurrent with the first installation under the Single-Tube Inflatable Rubber Dam Alternative, a total of three new water quality monitoring stations would be installed in Woodward Cut and Railroad Cut in San Joaquin County.

6.3 Comparison of Alternatives to the Proposed Project

6.3.1 No Project Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

None of the impacts of the No Project Alternative would be the same as or similar to the corresponding impacts of the proposed project.

Impacts Identified as Less Severe than Impacts of the Proposed Project

Air Quality and Greenhouse Gas Emissions

The No Project Alternative would not include construction activities, so it would not result in daily average construction emissions that would exceed the Bay Area Air Quality Management District's (BAAQMD's) threshold for oxides of nitrogen (NOx), as the proposed project would (Impact 3.2-1). It also would not generate fugitive dust emissions or result in a cumulatively considerable net increase in emissions of a criteria pollutant, as the proposed project would (Impacts 3.2-1 and 3.2-2). Therefore, the No Project Alternative would not require the implementation of Mitigation Measures AQ-1, AQ-2, AQ-3 and AQ-4 as identified for the proposed project to reduce air quality impacts to less-than-significant levels. Because no construction activities would occur, air quality impacts of the No Project Alternative would be less severe than those of the proposed project and would be less than significant.

The No Project Alternative would not involve any construction activities; therefore, this alternative would not generate greenhouse gas (GHG) emissions that would have a significant impact on the environment or conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.2-3). Because no construction activities would occur, impacts of the No Project Alternative related to GHG emissions would be less severe than those of the proposed project and would be less than significant.

Biological Resources

The No Project Alternative would not involve any construction activities; therefore, this alternative would result in no impacts related to the disturbance, mortality, or loss or modification of habitat of special-status terrestrial species (Impacts 3.3-1 through 3.3-5), and no impacts on fish species or their habitat (Impacts 3.3-6 through 3.3-10). Because no construction activities would occur, no waters of the United States would be lost and species movement would not change (Impacts 3.3-11 and 3.3-12). Thus, the No Project Alternative would not require the implementation of Mitigation Measures BIO-1 through BIO-11 as identified for the proposed project to reduce impacts on biological resources to less-than-significant levels. For these reasons, impacts of the No Project Alternative on biological resources would be less severe than those of the proposed project and 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 3.4-1), disturb human remains (Impact 3.4-2), or result in cumulative impacts on cultural resources (Impacts 3.4-3 and 3.4-4). The No Project Alternative also would not result in substantial impacts on tribal cultural resources (Impacts 3.7-1 and 3.7-2).

The No Project Alternative would not involve construction activities 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 CUL-1 through CUL-4). 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 CUL-1 through CUL-4 to reduce such 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 would be less than significant.

Recreation

Unlike the proposed project, the No Project Alternative would not involve construction activities in the vicinity of West False River or result in the presence of a barrier. Boat traffic would not be restricted under this alternative. Like the proposed project, the No Project Alternative would not cause an increase in the use of existing neighborhood and regional parks or other recreational facilities, nor would it cause a reduction in access to regional recreational areas (Impact 3.6-1). The No Project Alternative also would not require the construction or expansion of recreational facilities which might have an adverse effect on the environment, like the proposed project (Impact 3.6-2).

Overall, recreation impacts of the No Project Alternative would be less severe than those of the proposed project because boat traffic would not be restricted under the No Project Alternative, and impacts would be less than significant.

Impacts Identified as More Severe than Impacts of the Proposed Project

Hydrology and Water Quality

Unlike the proposed project, the No Project Alternative would not involve any construction activities that could cause the release of fuels, lubricants, and/or other pollutants that could substantially degrade receiving water quality (Impact 3.5-1). Therefore, this alternative would not require implementation of Protective Environmental Measure 2.5.1, “Prepare and Implement a Water Quality Control Plan,” as identified in Chapter 2, “Project Description,” to reduce construction-related impacts on receiving water quality. The No Project Alternative would not increase turbidity or influence the presence of algal blooms (Impact 3.5-1); therefore, mitigation measures identified for the proposed project to minimize these potential impacts (Mitigation Measures BIO-8 and BIO-9) would not apply. However, the No Project Alternative would not minimize the impacts of salinity intrusion on the beneficial uses of Delta water like the proposed project. Saltwater intrusions would occur with the No Project Alternative, which could affect more than 27 million Californians who rely on the Delta for at least a portion of their water supply; could render Delta water unusable for agricultural needs; and could reduce the value of habitat for aquatic species.

Existing scour and erosion in West False River would continue under the No Project Alternative (Impact 3.5-2). However, DWR would not monitor turbidity levels, water velocity and levee stability, and scour conditions under the No Project Alternative, as it would with Mitigation Measures HYDRO-1 and BIO-8 as identified for the proposed project.

Like the proposed project, the No Project Alternative would not impede or redirect flood flows (Impact 3.5-3).

Overall, impacts of the No Project Alternative on hydrology and water quality would be more severe than those of the proposed project because the No Project Alternative would not minimize the impacts of salinity intrusion on the beneficial uses of the Delta, and impacts would be less than significant with mitigation incorporated.

Ability to Meet the Project Objectives

Under the No Project Alternative, DWR would not install a temporary drought salinity barrier to protect water quality in the Central and South Delta, based on need demonstrated by drought conditions and low upstream reservoir storage. The No Project Alternative would not involve installation of a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the period from 2023 to 2032, and would not minimize the impacts of salinity intrusion on the beneficial uses of Delta water during persistent drought conditions through the installation of a drought salinity barrier in the Central or South Delta. Drought conditions would continue to reduce water storage in SWP and the CVP facilities to critical levels; as a result, projected Delta outflow would be insufficient to control increased salinity in the Delta, thereby worsening water quality and threatening the drinking and irrigation water supply. Therefore, the No Project Alternative would not meet any of the project objectives.

6.3.2 Barge-Mounted Operable Barrier Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Biological Resources

The Barge-Mounted Operable Barrier Alternative would involve construction activities similar to those of the proposed project. Additional foundation preparation in West False River would be required with this alternative, but gates would be included so that the alternative would not require the construction of a notch like Installation Scenario 2 for the proposed project. Because construction activities would be similar, impacts of this alternative on biological resources would also be similar to those of the proposed project.

Like the proposed project, the Barge-Mounted Operable Barrier Alternative would have the potential to affect special-status terrestrial species or their habitats (Impacts 3.3-1 through 3.3-5) and fish species or their habitats (Impacts 3.3-6 through 3.3-10). With the presence of the operable gates, the alternative would result in similar impacts on fish species as Installation Scenario 2 under the proposed project. The Barge-Mounted Operable Barrier Alternative would also result in the temporary filling of West False River and associated potential adverse effects on water quality (Impact 3.3-11). Implementing Mitigation Measures BIO-1 through BIO-11 as identified for the proposed project would reduce impacts on biological resources to a less-than-significant level. Like the proposed project, the Barge-Mounted Operable Barrier Alternative would not interfere with the movement of native resident or migratory terrestrial wildlife species (Impact 3.3-12).

For these reasons, impacts of the Barge-Mounted Operable Barrier Alternative on biological resources would be similar to those of the proposed project and would be less than significant with mitigation incorporated.

Cultural and Tribal Cultural Resources

Like the proposed project, the Barge-Mounted Operable Barrier 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 3.4-1, 3.4-2, and 3.7-1). Because impacts on cultural and tribal cultural resources could occur, the Barge-Mounted Operable Barrier Alternative could contribute to significant direct or indirect cumulative changes to archaeological resources, human remains, and tribal cultural resources (Impacts 3.4-3, 3.4-4, and 3.7-2) 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 CUL-1 through CUL-4 as identified for the proposed project would be implemented for the Barge-Mounted Operable Barrier Alternative. Implementing these mitigation measures would reduce these impacts to less-than-significant levels.

For these reasons, impacts of the Barge-Mounted Operable Barrier Alternative on cultural and tribal cultural resources would be similar to those of the proposed project and would be less than significant with mitigation incorporated.

Hydrology and Water Quality

Like the proposed project, the Barge-Mounted Operable Barrier Alternative would involve construction activities that could cause the release of fuels, lubricants, and/or other pollutants that could substantially degrade receiving water quality (Impact 3.5-1). This alternative would require implementation of Protective Environmental Measure 2.5.1, like the proposed project. Water quality monitoring would also be required through implementation of Mitigation Measure BIO-9, as under the proposed project. Installation of the barge-mounted gate system for the Barge-Mounted Operable Barrier Alternative would require dredging of the channel bottom and installation of a gravel sub-base foundation. These activities may result in greater turbidity than under the proposed project (Impact 3.5-1), and Mitigation Measure BIO-8 as identified for the proposed project to minimize this potential impact would apply. Under the Barge-Mounted Operable Barrier Alternative, the gates would be operated to manage flows to reduce seawater intrusion, like Installation Scenario 2 with the proposed project. The potential for the Barge-Mounted Operable Barrier Alternative to influence the presence of algal blooms (Impact 3.5-1) would be similar to the potential under the proposed project; therefore, Mitigation Measure BIO-9 as identified for the proposed project would apply.

The Barge-Mounted Operable Barrier Alternative has the potential to increase erosion and siltation, which could cause existing levees to fail, and the barrier’s presence with the gates open could lead to scour that could cause the barrier to fail (Impact 3.5-2). Mitigation Measures HYDRO-1 and BIO-8 as identified for the proposed project would apply, to ensure that the levees and barrier are not compromised.

Like the proposed project, the Barge-Mounted Operable Barrier Alternative would not impede or redirect flood flows (Impact 3.5-3).

For these reasons, impacts of the Barge-Mounted Operable Barrier Alternative on hydrology and water quality would be similar to those of the proposed project and would be less than significant with mitigation incorporated.

Recreation

The Barge-Mounted Operable Barrier Alternative, like the proposed project, would result in temporary boat access restrictions when construction activities occur. However, the Barge-Mounted Operable Barrier Alternative would include gates that could be opened in the winter like the proposed project (Installation Scenario 2) to accommodate normal traffic by commercial and large public vessels. Like the proposed project, the Barge-Mounted Operable Barrier Alternative would not cause an increase in the use of existing neighborhood and regional parks or other recreational facilities or cause a reduction in access to regional recreational areas (Impact 3.6-1). Access to regional recreational areas would not be significantly affected. The Barge-Mounted Operable Barrier Alternative also would not require the construction or expansion of recreational facilities which might have an adverse effect on the environment, like the proposed project (Impact 3.6-2).

Overall, recreation impacts of the Barge-Mounted Operable Barrier Alternative would be similar to those of the proposed project and would be less than significant.

Impacts Identified as Less Severe than Impacts of the Proposed Project

Air Quality and Greenhouse Gas Emissions

The Barge-Mounted Operable Barrier Alternative would require the transport of approximately 55 percent less rock to the project site for construction than the proposed project, so this alternative would result in fewer emissions from tugboats pulling the barges and from the equipment used to place the rock in position. Preparing the channel bottom for the barge-mounted gate system and pile driving (if determined necessary to support the barge) under this alternative would generate emissions. Construction activities for the Barge-Mounted Operable Barrier Alternative would also generate fugitive dust emissions, like the proposed project. Overall, the Barge-Mounted Operable Barrier Alternative would generate fewer emissions (particularly more unmitigated NO_X emissions) than the proposed project; however, this alternative likely would still generate construction-related emissions that would be significant relative to the BAAQMD thresholds of significance (Impact 3.2-1), like the proposed project. Implementing Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 as identified for the proposed project would reduce emissions levels to a less-than-significant level relative to the BAAQMD thresholds of significance, and thus would reduce the impact to a less-than-significant level.

Because the Barge-Mounted Operable Barrier Alternative would require the transport of less rock to the project site for construction than the proposed project, it could result in less GHG emissions than estimated for the proposed project (Impact 3.2-3). The proposed project has demonstrated consistency with the Greenhouse Gas Emissions Reduction Plan Update 2020 (as shown in the Consistency Determination Checklist in Appendix C) and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Therefore, the Barge-Mounted Operable Barrier Alternative would not generate GHG emissions that would have a significant impact on the environment or conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.2-3).

For these reasons, air quality and GHG emissions impacts of the Barge-Mounted Operable Barrier Alternative would be less severe than those of the proposed project and would be less than significant with mitigation incorporated.

Impacts Identified as More Severe than Impacts of the Proposed Project

None of the impacts of the Barge-Mounted Operable Barrier Alternative would be more severe than the corresponding impacts of the proposed project.

Ability to Meet the Project Objectives

Like the drought salinity barrier under the proposed project, the barge-mounted operable barrier could be installed and removed in a short period of time. After the end of the installation season, the barrier could be removed and stored for future use. Rock barriers, like the barrier that would be installed under the proposed project, require minimal foundation preparation and have a simple design. The Barge-Mounted Operable Barrier Alternative would require a longer construction time than the proposed project because of the need to prepare a foundation. The gates included in the Barge-Mounted Operable Barrier Alternative would provide additional operational flexibility and passage for migratory fish and boats, compared to the proposed project.

The Barge-Mounted Operable Barrier Alternative would achieve the project objective to install a drought salinity barrier to protect water quality in the Central and South Delta, based on need demonstrated by drought conditions and low upstream reservoir storage. It would also involve installation of a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the period from 2023 to 2032, and minimize the impacts of salinity intrusion on the beneficial uses of Delta water during persistent drought conditions through the installation of a drought salinity barrier in the Central or South Delta. With this alternative, DWR would install the barrier in West False River no sooner than April 1 and remove it by November 30 of either the same year or the subsequent year. The barge-mounted operable barrier may be installed up to two times over 10 years, including consecutive years, should a drought occur during the 2023–2032 period and drought conditions and low upstream reservoir storage indicate that a barrier in West False River would be an effective tool for reducing saltwater intrusion into the Delta, as described for the proposed project in Chapter 2. Therefore, this alternative would meet all of the project's objectives.

6.3.3 Single-Tube Inflatable Rubber Dam Alternative

Impact Analysis

Impacts Identified as the Same as or Similar to Impacts of the Proposed Project

Biological Resources

The Single-Tube Inflatable Rubber Dam Alternative would involve construction activities similar to those of the proposed project. This alternative would not include the construction of a notch like Installation Scenario 2 for the proposed project. Because construction activities would be similar (particularly under Installation Scenarios 1 and 3), impacts of this alternative on biological resources would also be similar to those of the proposed project.

Like the proposed project, the Single-Tube Inflatable Rubber Dam Alternative would have the potential to affect special-status terrestrial species or their habitats (Impacts 3.3-1 through 3.3-5) and fish species or their habitats (Impacts 3.3-6 through 3.3-10). Without the presence of a notch, this alternative may result in more severe impacts on fish species than Installation Scenario 2 under the proposed project, but would result in impacts similar to those under Installation Scenario 1. The Single-Tube Inflatable Rubber Dam Alternative would also result in the temporary filling of West False River and associated potential adverse effects on water quality (Impact 3.3-11). Implementing Mitigation Measures BIO-1 through BIO-11 as identified for the proposed project would reduce impacts on biological resources to a less-than-significant level. Like the proposed project, the Single-Tube Inflatable Rubber Dam Alternative would not interfere with the movement of native resident or migratory terrestrial wildlife species (Impact 3.3-12).

For these reasons, impacts of the Single-Tube Inflatable Rubber Dam Alternative on biological resources would be similar to those of the proposed project and would be less than significant with mitigation incorporated.

Cultural and Tribal Cultural Resources

Like the proposed project, the Single-Tube Inflatable Rubber Dam 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 3.4-1, 3.4-2, and 3.7-1). Because impacts on cultural and tribal cultural resources could occur, the Single-Tube Inflatable Rubber Dam Alternative could contribute to significant direct or indirect cumulative changes to archaeological resources, human remains, and tribal cultural resources (Impacts 3.4-3, 3.4-4, and 3.7-2) 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 CUL-1 through CUL-4 as identified for the proposed project would be implemented under the Single-Tube Inflatable Rubber Dam Alternative. Implementing these mitigation measures would reduce these impacts to less-than-significant levels.

For these reasons, impacts of the Single-Tube Inflatable Rubber Dam Alternative on cultural and tribal cultural resources would be similar to those of the proposed project and would be less than significant with mitigation incorporated.

Recreation

The Single-Tube Inflatable Rubber Dam Alternative, like the proposed project, would result in temporary boat access restrictions during construction activities. Unlike Installation Scenario 2 under the proposed project, the Single-Tube Inflatable Rubber Dam Alternative would not include a notch that could be opened in the winter to accommodate normal traffic by commercial and large public vessels. However, like the proposed project, the Single-Tube Inflatable Rubber Dam Alternative would not cause an increase in the use of existing neighborhood and regional parks or other recreational facilities or cause a reduction in access to regional recreational areas (Impact 3.6-1).

The Single-Tube Inflatable Rubber Dam Alternative would cause only a minimal reduction in access to regional recreational areas, given the availability of multiple alternative routes in the project area. Additionally, a variety of recreational areas are available within the project area and region, so no one recreational facility would become overloaded as a result of changes in boat navigation with the barrier in place. The Single-Tube Inflatable Rubber Dam Alternative also would not require the construction or expansion of recreational facilities which might have an adverse effect on the environment, like the proposed project (Impact 3.6-2).

Overall, recreation impacts of the Single-Tube Inflatable Rubber Dam Alternative would be similar to those of the proposed project (particularly Installation Scenarios 1 and 3) and would be less than significant.

Impacts Identified as Less Severe than Impacts of the Proposed Project

Air Quality and Greenhouse Gas Emissions

The Single-Tube Inflatable Rubber Dam Alternative would require the transport of the inflatable rubber dam to the project site and approximately 13 percent less rock for construction than the proposed project; thus, compared to the proposed project, this alternative would result in fewer emissions from tugboats pulling the barges and from the equipment used to place the rock in position.

Construction activities for the Single-Tube Inflatable Rubber Dam Alternative would also generate fugitive dust emissions, like the proposed project. Overall, the Single-Tube Inflatable Rubber Dam Alternative would generate fewer emissions (particularly more unmitigated NO_X emissions) than the proposed project; however, this alternative likely would still generate construction-related emissions that would be significant relative to the BAAQMD thresholds of significance (Impact 3.2-1), like the proposed project. Implementing Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 as identified for the proposed project would reduce emissions levels to a less-than-significant level relative to the BAAQMD thresholds of significance, and thus would reduce the impact to a less-than-significant level.

Because the Single-Tube Inflatable Rubber Dam Alternative would require the transport of less rock to the project site for construction than the proposed project, it could result in less GHG emissions than estimated for the proposed project (Impact 3.2-3). The proposed project has demonstrated consistency with the Greenhouse Gas Emissions Reduction Plan Update 2020 (as shown in the Consistency Determination Checklist in Appendix C) and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Therefore, the Single-Tube Inflatable Rubber Dam Alternative would not generate GHG emissions that would have a significant impact on the environment or conflict with an applicable plan, policy, or regulation adopted for reducing GHGs (Impact 3.2-3).

For these reasons, air quality and GHG emissions impacts of the Single-Tube Inflatable Rubber Dam Alternative would be less severe than those of the proposed project and would be less than significant with mitigation incorporated.

Impacts Identified as More Severe than Impacts of the Proposed Project

Hydrology and Water Quality

Like the proposed project, the Single-Tube Inflatable Rubber Dam Alternative would involve construction activities that could cause the release of fuels, lubricants, and/or other pollutants that could substantially degrade receiving water quality (Impact 3.5-1). This alternative would require implementation of Protective Environmental Measure 2.5.1, like the proposed project. Water quality monitoring would also be required through implementation of Mitigation Measure BIO-9, as under the proposed project.

Implementation of the Single-Tube Inflatable Rubber Dam Alternative may result in turbidity in West False River (Impact 3.5-1), including during the discharge of water back into West False River during removal of the inflatable rubber dam, and Mitigation Measure BIO-8 as identified for the proposed project to minimize this potential impact would apply. Under the Single-Tube Inflatable Rubber Dam Alternative, no notch or gates would be installed to manage flows to reduce seawater intrusion, like the notch that would be included under Installation Scenario 2 with the proposed project. Therefore, the potential for the Single-Tube Inflatable Rubber Dam Alternative to influence the presence of algal blooms (Impact 3.5-1) may be greater than the potential under the proposed project if it were installed for 20 months, and Mitigation Measure BIO-9 as identified for the proposed project would apply.

Given the potential for the Single-Tube Inflatable Rubber Dam Alternative to require removal for repair if fabric on a submerged portion of the dam were to become damaged, or the potential for the dam to be washed off the rock foundation and require replacement, the Single-Tube Inflatable Rubber Dam Alternative may not minimize the impacts of salinity intrusion on the beneficial uses of Delta water like the proposed project. Without the single-tube inflatable rubber dam in place, the potential may exist to lose control of Delta water quality.

The Single-Tube Inflatable Rubber Dam Alternative has the potential to increase erosion and siltation, which could cause existing levees to fail (Impact 3.5-2). Mitigation Measures

HYDRO-1 (the part related to monitoring tidal velocities while the barrier is in place) and BIO-8 as identified for the proposed project would apply, to prevent the levees and barrier from being compromised.

Because the barrier would be placed within existing channels, the failure of the rubber dam would not be likely to cause flooding above the channel banks. Therefore, like the proposed project, the Single-Tube Inflatable Rubber Dam Alternative would not impede or redirect flood flows (Impact 3.5-3).

For these reasons, overall impacts of the Single-Tube Inflatable Rubber Dam Alternative on hydrology and water quality would be more severe than those of the proposed project. This alternative may not minimize the impacts of salinity intrusion on the beneficial uses of the Delta and impacts would be less than significant with mitigation incorporated.

Ability to Meet the Project Objectives

Like the drought salinity barrier under the proposed project, the single-tube inflatable rubber dam could be installed and removed in a short period of time—potentially faster than under the proposed project. After the end of the installation season, the inflatable rubber dam could be removed and stored for future use.

The Single-Tube Inflatable Rubber Dam Alternative would achieve the project's objective to install a drought salinity barrier to protect water quality in the Central and South Delta, based on need demonstrated by drought conditions and low upstream reservoir storage. It would also involve installation of a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the 2023–2032 period. However, the Single-Tube Inflatable Rubber Dam Alternative may not minimize the impacts of salinity intrusion on the beneficial uses of Delta water during persistent drought conditions, given the potential for the single-tube inflatable rubber dam to require removal for repair if fabric on a submerged portion of the dam were to become damaged and the potential for the dam to be washed off the rock foundation and require replacement. Without the single-tube inflatable rubber dam in place during repairs and replacement, the potential may exist to lose control of Delta water quality.

With this alternative, DWR would install the barrier in West False River no sooner than April 1 and remove it by November 30 of either the same year or the subsequent year. The single-tube inflatable rubber dam may be installed up to two times over 10 years, including consecutive years, should a drought occur during the 2023–2032 period and drought conditions and low upstream reservoir storage indicate that a barrier in West False River would be an effective tool for reducing saltwater intrusion into the Delta, as described for the proposed project in Chapter 2. Therefore, this alternative would meet two of the three project objectives.

6.4 Environmentally Superior Alternative

State CEQA Guidelines Section 15126.6(e)(2) requires the identification of an environmentally superior alternative—the alternative that has the least significant impacts on the environment. If the No Project Alternative is the environmentally superior alternative, identification of an environmentally superior alternative among the other alternatives considered in the EIR is required. **Table 6-2** 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 the installation of a temporary barrier in West False River up to two times between 2023 to 2032, including consecutive years, if drought conditions occur, for a period of eight months under Installation Scenario 3 or up to 20 months under Installation Scenario 1. Under Installation Scenario 2, if the barrier were installed for up to 20 months, a notch may be constructed in the middle portion of the barrier in January after the installation year and the notch would be refilled as early as the first week of April. DWR would also install three water quality monitoring stations—one in Woodward Cut and two in Railroad Cut—with the next installation of the drought salinity barrier.

The No Project Alternative would not accomplish any of the objectives of the proposed project to protect water quality in the Central and South Delta, install a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the period from 2023 to 2032, or minimize the impacts of salinity intrusion on the beneficial uses of Delta water during persistent drought conditions through the installation of a drought salinity barrier in the Central or South Delta. Because the No Project Alternative would not include any construction activities, it would not result in the impacts on air quality and GHG emissions, biological resources, cultural and tribal cultural resources, and recreation identified for the proposed project. However, impacts of the No Project Alternative on hydrology and water quality would be more severe than those of the proposed project because the No Project Alternative would not minimize the impacts of salinity intrusion on the beneficial uses of the Delta.

The Barge-Mounted Operable Barrier Alternative would meet all of the project objectives and would help protect water quality and the beneficial uses of water in the Delta during drought periods. It could be installed and removed in a short period of time, but construction time would be longer under the Barge-Mounted Operable Barrier Alternative than under the proposed project because of the need to prepare a foundation. The gates that would be part of the Barge-Mounted Operable Barrier Alternative would provide additional operational flexibility and passage for migratory fish and boats, like Installation Scenario 2.

The Single-Tube Inflatable Rubber Dam Alternative would meet two of the three project objectives. It would achieve the project objective to install a drought salinity barrier to protect water quality in the Central and South Delta and would also involve installation of a drought salinity barrier in the Central or South Delta up to two times over 10 years, including consecutive years, should a drought occur during the 2023–2032 period. However, the Single-Tube Inflatable Rubber Dam Alternative may not minimize the impacts of salinity intrusion on the beneficial uses of Delta, given the potential for the single-tube inflatable rubber dam to require removal for repair or to be washed off the rock foundation and require replacement. The single-tube inflatable rubber dam could be installed and removed in a short period of time, potentially faster than the barrier under the proposed project.

Both the Barge-Mounted Operable Barrier Alternative and the Single-Tube Inflatable Rubber Dam Alternative would reduce the severity of air quality and greenhouse gas environmental impacts, as indicated in Table 6-2; however, only the and the Barge-Mounted Operable Barrier Alternative would meet all of the project objectives. Therefore, the Barge-Mounted Operable Barrier Alternative is identified as the environmentally superior alternative.

TABLE 6-2
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic and Impact	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier Alternative	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.2 Air Quality and Greenhouse Gas Emissions				
3.2-1: Implementation of the proposed project could conflict with or obstruct implementation of the applicable air quality plan.	LSM	NI	LSM-	LSM-
3.2-2: Implementation 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	NI	LSM-	LSM-
3.2-3: Implementation of the proposed project could generate greenhouse gas 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 greenhouse gases.	LTS	NI	LTS-	LTS-
3.3 Biological Resources				
3.3-1: Implementation of the proposed project could cause loss or modification of habitat for special-status plant species.	LSM	NI	LSM	LSM
3.3-2: Implementation of the proposed project could cause disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat (elderberry shrubs).	LSM	NI	LSM	LSM

TABLE 6-2
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic and Impact	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier Alternative	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.3 Biological Resources (cont.)				
3.3-3: Implementation of the proposed project could cause disturbance or mortality of and loss of suitable habitat for reptiles including giant garter snake and western pond turtle.	LSM	NI	LSM	LSM
3.3-4: Implementation of the proposed project could cause disturbance or mortality of and loss of suitable habitat for bird species.	LSM	NI	LSM	LSM
3.3-5: Implementation of the proposed project could cause disturbance or mortality of and loss of suitable roosting habitat for special-status bats.	LSM	NI	LSM	LSM
3.3-6: Implementation of the proposed project could cause disturbance to fish species or their habitat by causing changes in water quality.	LSM	NI	LSM	LSM
3.3-7: Implementation of the proposed project could cause disturbance to fish species or their habitat by modifying aquatic habitat.	LSM	NI	LSM	LSM
3.3-8: Construction of the proposed project could cause disturbance to fish species or their habitat by causing hydrostatic pressure waves, noise, and vibration.	LTS	NI	LTS	LTS
3.3-9: Implementation of the proposed project could increase the potential for predation on native fish from alterations in aquatic habitat structure.	LSM	NI	LSM	LSM
3.3-10: Implementation of the proposed project could cause disturbance to fish species or their habitat by affecting fish passage conditions.	LTS	NI	LTS	LTS
3.3-11: Construction of the proposed project could cause the loss or deterioration of wetlands and waters of the United States and State.	LSM	NI	LSM	LSM
3.3-12: Implementation of the proposed project could cause interference with the movement of native resident or migratory terrestrial wildlife species.	LTS	NI	LTS	LTS
3.3-13: Implementation of the proposed project could contribute to cumulative temporary and permanent loss of sensitive habitats and impacts on special-status species.	LSM	NI	LSM	LSM

TABLE 6-2
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic and Impact	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier Alternative	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.4 Cultural Resources				
3.4-1: Implementation of the proposed project could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.	LSM	NI	LSM	LSM
3.4-2: Implementation of the proposed project could disturb human remains, including those interred outside of dedicated cemeteries.	LSM	NI	LSM	LSM
3.4-3: Implementation of the proposed project could contribute to significant direct or indirect cumulative changes in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.	LSM	NI	LSM	LSM
3.4-4: Implementation of the proposed project could contribute to significant cumulative damage to unidentified human remains.	LSM	NI	LSM	LSM
3.5 Hydrology and Water Quality				
3.5-1: Implementation of the proposed project could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	LSM	LSM+	LSM	LSM+
3.5-2: Implementation of the proposed project could 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.	LSM	NI	LSM	LSM
3.5-3: Implementation of the proposed project could 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 impede or redirect flood flows.	LTS	NI	LTS	LTS
3.5-4: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.	LSM	LSM+	LSM	LSM+

TABLE 6-2
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic and Impact	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier Alternative	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.5 Hydrology and Water Quality (cont.)				
3.5-5: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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.	LSM	NI	LSM	LSM
3.5-6: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could 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 impede or redirect flood flows.	LTS	NI	LTS	LTS
3.6 Recreation				
3.6-1: 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.	LTS	NI	LTS	LTS
3.6-2: Implementation of the proposed project could include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	LTS	NI	LTS	LTS
3.6-3: 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.	LTS	NI	LTS	LTS
3.6-4: Implementation of the proposed project in conjunction with past, present, and potential future development in the surrounding region could include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	LTS	NI	LTS	LTS

TABLE 6-2
SUMMARY OF KEY IMPACTS BETWEEN ALTERNATIVES

Resource Topic and Impact	Significance After Mitigation: Proposed Project	Significance After Mitigation: No Project Alternative	Significance After Mitigation: Barge-Mounted Operable Barrier Alternative	Significance After Mitigation: Single-Tube Inflatable Rubber Dam Alternative
3.7 Tribal Cultural Resources				
3.7-1: 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	NI	LSM	LSM
3.7-2: 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	NI	LSM	LSM

NOTES: NI = no impact; LTS =less than significant; LSM = less than significant after application of feasible mitigation measure(s);
- = Impact would be less severe than under the proposed project; + = Impact would be more severe than under the proposed project

SOURCE: Data compiled by ICF/ESA in 2022

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CHAPTER 7
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CHAPTER 8
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Chapter 7: List of Preparers

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Appendix A
Notice of Preparation (NOP) and NOP Comments

DEPARTMENT OF WATER RESOURCES
1516 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

NOTICE OF PREPARATION

ENVIRONMENTAL IMPACT REPORT FOR WEST FALSE RIVER DROUGHT SALINITY BARRIER PROJECT

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Pursuant to the California Environmental Quality Act (CEQA), the Department of Water Resources (DWR) will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the West False River Drought Salinity Barrier project (proposed project).

Project Location: The drought salinity barrier would be located on West False River approximately 0.4 mile east of its confluence with the San Joaquin River, in Contra Costa County between Jersey and Bradford islands, approximately 4.8 miles northeast of the City of Oakley (Figures 1 through 3). The staging area would be located on the Jersey Island levee. Embankment rock used to construct the barrier may be sourced from a commercially operated rock quarry in San Rafael, DWR's Rio Vista stockpile in Solano County, or the Weber stockpile in San Joaquin County. The proposed project may use multiple stockpile sites and off-loading sites. With the installation of the barrier, three new water quality monitoring stations would also be installed in Woodward Cut and Railroad Cut in San Joaquin County (Figure 3).

Project Description: The proposed project consists of a temporary barrier in the West False River that DWR may install up to two times between 2023 to 2032, including consecutive years, if drought conditions occur, for a period of up to 20 months. In the years where the barrier is installed, DWR would construct the barrier no sooner than April 1 and remove the barrier by November 30 of the subsequent year or the same year, when DWR determines the barrier is no longer needed based on hydrologic conditions. A barrier in West False River would be an effective tool to protect the beneficial uses of the interior Sacramento-San Joaquin Delta (Delta) water by reducing saltwater intrusion while preserving the use of critically needed reservoir water. The proposed project would be constructed if DWR, in cooperation with other State and federal agencies including the U.S. Bureau of Reclamation, determines that drought conditions have reduced water storage in State Water Project (SWP) and Central Valley Project (CVP) facilities to critical levels, such that projected Delta outflow would not be sufficient to control increased salinity intrusion into the Delta, thereby worsening water quality and threatening the drinking and irrigation water supply and harming interior Delta agriculture.

The approximately 800-foot-long barrier would consist of approximately 84,000 cubic yards of well-graded 18-inch minus embankment rock extending from the Jersey Island levee on the south side of West False River to the Bradford Island levee on the north side. This is the same location where a drought salinity barrier was constructed in 2015 and 2021/22. Depending on drought conditions, if the barrier is left in a subsequent year a notch may be constructed in the middle portion of the barrier in January after the installation year to allow for fish passage and vessel navigation through West False River and the notch would be refilled as early as the first week of April.

DWR would also install three water quality monitoring stations in Woodward Cut (one monitoring station) and Railroad Cut (two monitoring stations) with the next installation of the drought salinity barrier. The stations would be installed on three new 12-inch-diameter steel pipe piles. The stations would be left in place after removal of the drought salinity barrier.

Project Objective: The objective of the proposed project is to minimize the impacts of salinity intrusion on the beneficial uses of Delta water, consistent with *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin* (May 2018), during persistent drought conditions.

Potential Environmental Effects: DWR as the Lead Agency will describe and analyze the potential environmental effects of the proposed project. The probable effects may include, but are not limited to: air quality from temporary increases in pollutant emissions during construction; biological resources from potential effects to special-status species or their habitat, migratory fish species, and state or federally protected wetlands during construction and presence of the barrier in West False River; potential effects to archeological and historical sites and tribal cultural resources during construction; hydrology and water quality from potential erosion, scour, siltation, and water quality effects during construction and presence of the barrier; and recreation from presence of the barrier in West False River.

Written Comments: DWR is circulating this notice to solicit the views of interested persons, organizations, and agencies regarding the scope and content of the environmental information in connection with the proposed project. The primary purpose of the scoping process is to identify important issues raised by the public and responsible and trustee public agencies related to the issuance of regulatory permits and authorizations and natural resource protection. Written comments from interested parties are invited to ensure that the full range of environmental issues related to the development of the EIR are identified.

As required by the CEQA Guidelines, within 30 days after receiving the Notice of Preparation, each responsible agency and trustee agency shall provide DWR with specific detail about the scope, significant environmental issues, reasonable alternatives, and mitigation measures related to each responsible or trustee agency's area of statutory responsibility that must be explored in the EIR. In their response, responsible and trustee agencies should indicate their respective level of responsibility for the project.

This NOP will be circulated for a 30-day public notice period beginning Wednesday, February 23, 2022, and ending Friday, March 25, 2022. At the end of the public notice period, DWR will consider all written comments received from interested persons, organizations, and agencies in preparing the environmental analysis.

Written comments on the scope of the EIR are due no later than 5 p.m. on Friday, March 25, 2022. Please submit your written comments via mail or email to:

California Department of Water Resources
Robert Trang, South Delta Branch
1516 9th Street, 2nd Floor
Sacramento, CA 95814

Email address: wfrdsb_ceqa@water.ca.gov

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

PLEASE NOTE: All comments received will be made available for public review in their entirety in the Final EIR, including the names and addresses of the respondents. Individual commenters may request that DWR withhold their name and/or home addresses, etc., but if you wish DWR to consider withholding this information you must state this prominently at the beginning of your comments.

CEQA Scoping Meeting: DWR will host a virtual public scoping meeting to provide a brief presentation on the project with time for public comments on the scope and content of the EIR. The scoping meeting will be held on Wednesday, March 9, 2022, at 6 p.m. Please register in advance of the meeting at the following link: https://us02web.zoom.us/webinar/register/WN_T6InxtY5Qhq9i46kmtp-6g. Registration will be open until the start of the meeting on March 9, 2022.

Ryan Reeves 2/18/2022

Ryan Reeves for:
Jacob McQuirk, PE
Branch Manager, Division of Operations and Maintenance South Delta Branch

Figure 1
Project Location

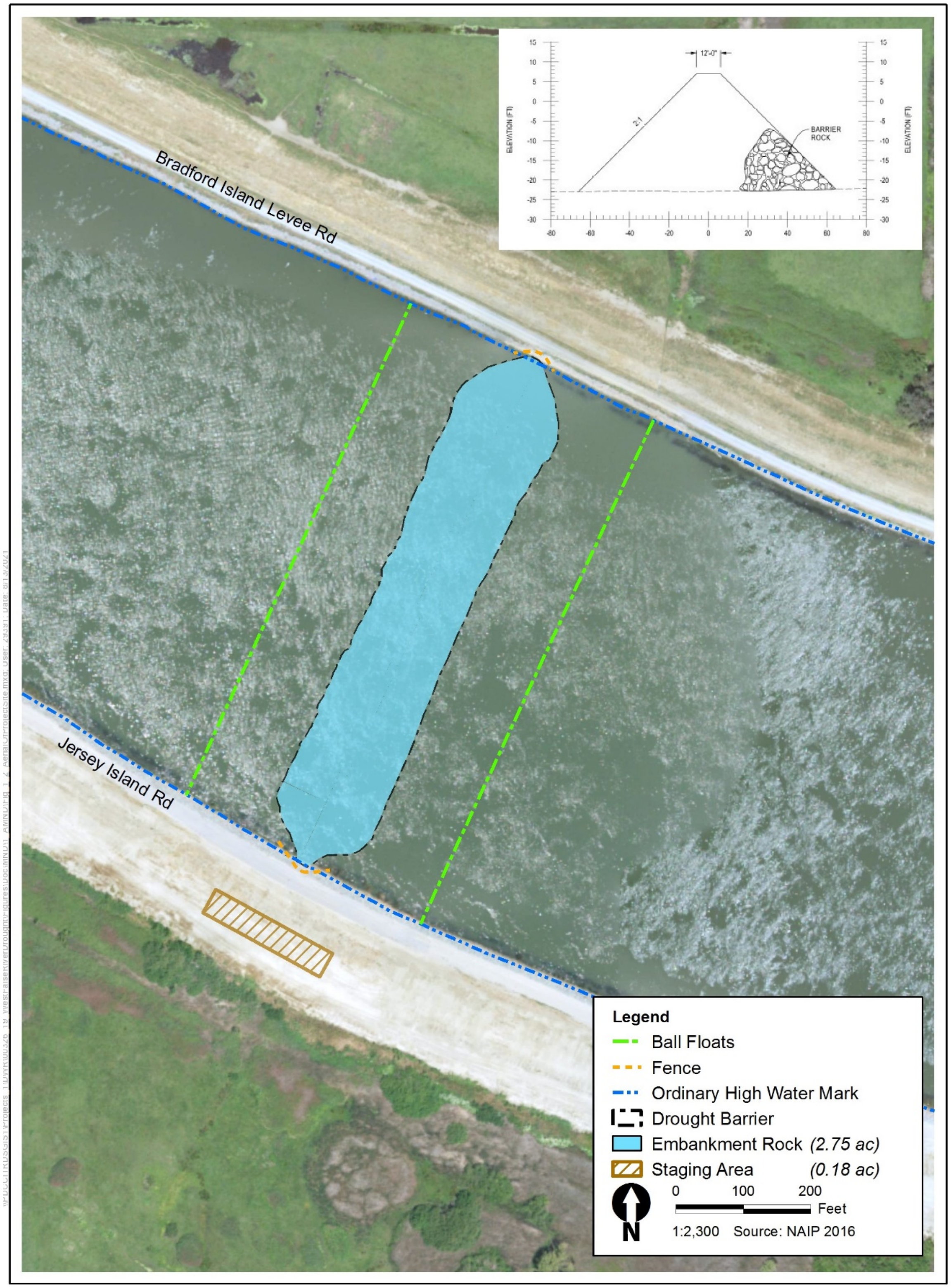

Figure 2
Aerial View of the Project Site and Project Design (without the Notch)

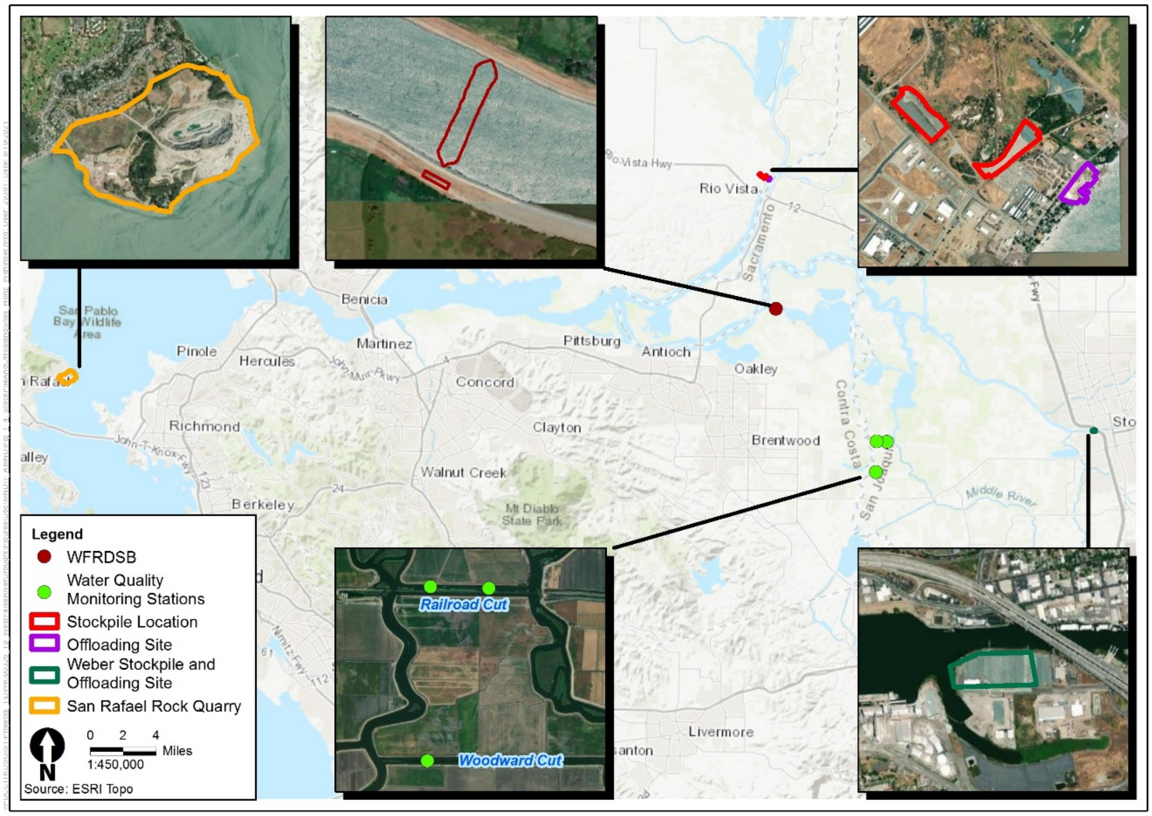

Figure 3
Project Features

State of California
Native American Heritage Commission
1550 Harbor Blvd., Ste. 100
West Sacramento, CA 95691

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NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
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West Sacramento,
California 95691
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NAHC.ca.gov

February 24, 2022

Robert Trang
California Department of Water Resources, Division of Operations and Maintenance
PO Box 942836
Sacramento, CA 94236-0001

Re: 2022020528, West False River Drought Salinity Barrier Project, Contra Costa County

Dear Mr. Trang:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of <u>portions</u> of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c))

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
- **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
- **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
- **a.** If part or all of the APE has been previously surveyed for cultural resources.
- **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
- **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
- **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
- **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
- **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Cody.Campagne@nahc.ca.gov.

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

cc: State Clearinghouse

Central Valley Regional Water Quality Control Board

23 March 2022

Robert Trang
California Department of Water Resources,
Division of Operations and Maintenance
1516 9th Street, 2nd Floor
Sacramento, CA 95814
robert.trang@water.ca.gov

COMMENTS TO REQUEST FOR REVIEW FOR THE NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, WEST FALSE RIVER DROUGHT SALINITY BARRIER PROJECT, SCH#2022020528, CONTRA COSTA AND SAN JOAQUIN COUNTIES

Pursuant to the State Clearinghouse's 23 February 2022 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Notice of Preparation for the Draft Environmental Impact Report* for the West False River Drought Salinity Barrier Project, located in Contra Costa and San Joaquin Counties.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as

required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:
https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention

Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]
The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit
Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ. For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml

Clean Water Act Section 404 Permit
If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean Water Act

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

Waste Discharge Requirements – Discharges to Waters of the State

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at:https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources Control Board website at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf

Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/help/permit/

If you have questions regarding these comments, please contact me at (916) 464-4709 or Greg.Hendricks@waterboards.ca.gov.

Greg Hendricks
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

Jared Blumenfeld
Secretary for
Environmental Protection

Department of Toxic Substances Control

Meredith Williams, Ph.D.
Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Gavin Newsom
Governor

March 23, 2022

Mr. Robert Trang
California Department of Water Resources
Division of Operations and Maintenance
PO Box 942836
Sacramento, CA 94236-0001
wfrdsb_ceqa@water.ca.gov

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR WEST FALSE RIVER DROUGHT SALINITY BARRIER PROJECT – DATED FEBRUARY 18, 2022 (STATE CLEARINGHOUSE NUMBER: 2022020528)

Mr. Trang:

The Department of Toxic Substances Control (DTSC) received a Notice of Preparation of an Environmental Impact Report (EIR) for the West False River Drought Salinity Barrier Project (Project). The California Department of Water Resources (DWR) is receiving this notice from DTSC because of the Project's proximity to the Antioch Bombing Target Site (Site). The former Antioch Bombing Target is located in an area known as Frank's Tract State Recreation Area, which is located upstream from the Project. The U.S. Government leased the Site property from 1944 until 1952. Floating targets were used by Navy aircraft pilots for dive-bombing practice that used air to ground rockets and miniature bombs. The ultimate disposition of the air to ground rockets and miniature bombs is unknown and it is possible that ordnance from practice activities remain at the Site. Per DTSC's Envirostor database, the Site has not been closed and action is required.

DTSC appreciates the opportunity to comment on the Project. If you have any questions, please contact me at (916) 255-3710 or via email at Gavin.McCreary@dtsc.ca.gov.

Sincerely,

Gavin McCreary

Gavin McCreary
Project Manager
Site Evaluation and Remediation Unit
Site Mitigation and Restoration Program
Department of Toxic Substances Control

cc: (via email)

Governor's Office of Planning and Research
State Clearinghouse
State.Clearinghouse@opr.ca.gov

Mr. Dave Kereazis
Office of Planning & Environmental Analysis
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

DELTA PROTECTION COMMISSION
2101 Stone Blvd., Suite 240
West Sacramento, CA 95691
(916) 375-4800
www.delta.ca.gov

March 24, 2022

California Department of Water Resources
Robert Trang, South Delta Branch
1516 9th Street, 2nd Floor
Sacramento, CA 95814

Re: Notice of Preparation, Draft Environmental Impact Report for the West False River Drought Salinity Barrier Project (SCH# 2022020528)

Dear Mr. Trang:

Thank you for providing the Delta Protection Commission (Commission) the opportunity to provide comments on the Notice of Preparation (NOP) for the Draft Environmental Impact Report (DEIR) for the proposed West False River Drought Salinity Barrier Project (Project).

The Commission is a state agency charged with ensuring orderly, balanced conservation and development of Delta land resources and improved flood protection. Proposed local government projects within the primary zone of the Legal Delta must be consistent with the Commission's Land Use and Resource Management Plan (LURMP). Proposed California Department of Water Resources (DWR) actions are not subject to consistency requirements with the LURMP since the Project is sponsored by a state agency. However, the Commission has reviewed the project for potential impacts on the resources of the primary zone and secondary zone.

In addition, the Commission reviews projects within the framework of the Delta Protection Act of 1992 and Delta Reform Act of 2009, both of which declare that the State's basic goals for the Delta are to provide a more reliable water supply for California and protect, restore and enhance the Delta ecosystem "in a manner that protects and enhances the unique cultural, recreational, natural resource and agricultural values of the Delta as an evolving place" (Public Resources Code section 29702(a) and Water Code section 85054).

We welcome the initiation of the environmental review process for installation of drought salinity barriers in the Delta which has now been undertaken, under emergency authorizations, two times since 2015. While extreme drought conditions prompted extraordinary action, it is now apparent that these conditions are increasingly frequent and predictable. Installation of the barriers under drought conditions has proved generally effective in reducing salinity in the interior Delta. It is now critical to identify and assess the full scope of known and potential impacts of doing so before the practice is considered for more routine implementation.

The Commission appreciates DWR's continued work to protect the Delta's water quality in consultation with affected parties and regulatory agencies. However, questions and concerns about the barriers' installation, operation, and decommissioning remain that we believe the DEIR should evaluate.

The NOP states that the Project DEIR will consider impacts to hydrology, water quality, and recreation in the Delta. The DEIR should discuss how the previous barriers impacted surface water elevations and increased water temperatures due to decreased flows and how lessons learned from previous barriers are being used to inform the Project. Increased water temperatures could increase the prevalence of harmful algal blooms and invasive aquatic weeds in the Delta. In addition, changes to flow and hydrology may impact neighboring levees, including those around Fisherman's Cut and remnant levees in Franks Tract. Each of these potential impacts should be considered in light of what has or has not been learned from previous barrier deployments and fully evaluated in the Project DEIR.

The previous drought barriers have had significant impacts on recreational boating in the popular West False River area. The NOP states that if the drought barrier is left in a subsequent year, a notch may be constructed in the middle portion of the barrier to allow for fish passage and vessel navigation. The notch would be installed in January after the installation year and would be refilled as early as the first week as April.

The Commission appreciates the inclusion of a notch as part of the project description; however, recreational boating in the project area will still be impacted during the months when the notch is filled. Therefore, the Project DEIR should identify mitigation measures to minimize recreation impacts. This may include delaying construction of the barrier until later in the season, expanding the period when the notch is constructed, or providing portage facilities, such as those provided at the Old River near Tracy and Grant Line Canal.

Finally, the Project DEIR should also evaluate the impact to traffic – both landside and waterside—in the Delta. This should include an analysis of impacts to Delta roadways from construction traffic and impacts to ferry service operations in Fisherman's Cut.

We appreciate your consideration of our comments and look forward to reviewing the DEIR.

Sincerely,

Erik Vink

Erik Vink
Executive Director

State of California
Department of Fish and Wildlife

Memorandum

Date: March 24, 2022

To: Robert Trang
Department of Water Resources
1516 9th Street, 2nd Floor
Sacramento, CA 95814
wfrdsb_ceqa@water.ca.gov

DocuSigned by:
Erin Chappell
B77E9A6211EF486...

From: Erin Chappell, Regional Manager
California Department of Fish and Wildlife-Bay Delta Region, 2825 Cordelia Road, Suite 100, Fairfield, CA 94534

Subject: West False River Drought Salinity Barrier, Notice of Preparation of a Draft Environmental Impact Report, SCH No. 2022020528, Contra Costa County

The California Department of Fish and Wildlife (CDFW) has reviewed the Notice of Preparation (NOP) for a draft Environmental Impact Report (EIR) provided for the West False River Drought Salinity Barrier (Project), located at West False River approximately 0.4 miles east of its confluence with the San Joaquin River.

CDFW is a Trustee Agency with responsibility under the California Environmental Quality Act (CEQA) §15386 for commenting on projects that could impact fish, plant, and wildlife resources (e.g., biological resources). CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as the California Endangered Species Act (CESA) Permit, the Native Plant Protection Act Permit, the Lake and Streambed Alteration (LSA) Agreement and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife trust resources. Pursuant to our jurisdiction, CDFW has the following concerns, comments, and recommendations regarding the Project.

PROJECT DESCRIPTION AND LOCATION

The Project is located at West False River, a tributary to the San Joaquin River, in the County of Contra Costa, State of California; Latitude 38.057057 N, Longitude -121.670432 W; Assessor's Parcel Number 027-010-005-0.

The Project consists of the installation of approximately 84,000 cubic yards of 18-inch minus embankment rock to create an approximately 800-foot-long temporary rock barrier in the West False River, between the Jersey Island Levee and the Bradford Island Levee. The Project proponent, the California Department of Water Resources (DWR), is proposing to install the Project a maximum of two times between 2023 to 2032 and for a period of up to 20 months during drought conditions. The goal of the Project is to minimize the impacts of salinity intrusion on the beneficial uses of

Sacramento-San Joaquin Delta (Delta), consistent with the Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region: the Sacramento River Basin and the San Joaquin River Basin (May 2018), during drought conditions.

When the temporary rock barrier is needed, installation will occur no sooner than April 1 and removal of the barrier will occur by November 30 of the same year or the subsequent year. DWR will remove the barrier based on hydrologic conditions (e.g., Delta outflow) and identification that the barriers beneficial use of minimizing saltwater intrusion into the interior Delta, are no longer needed. When the barrier is left in a subsequent year, a notch will be constructed in January to allow for fish passage and vessel navigation through West False River. The notch will be refilled as early as the first week of April.

The CEQA Guidelines (§§15124 & 15378) require that the draft EIR incorporate a full project description, including reasonably foreseeable future phases of the Project, and that contains sufficient information to evaluate and review the Project's environmental impact. Please include a complete description of the following Project components in the Project description:

- Boat navigation and native fish presence (migration) occurs at the barrier site year-round, please describe how and why the January-April notch period was chosen as opposed to a year-round notch.

- Additional installations of the Project between the year 2023-2032 and increased installation length should be incorporated into the project description. Climate change has the potential to increase and intensify California droughts (Diffenbaugh et al. 2015, Mann and Gleick 2015). Therefore, it is reasonable to expect that the Project would be installed more than two times between 2023-2032.

- Any maintenance activities required (including dredging).

- Construction schedule, activities, equipment, and crew sizes.

- Specific hydrologic information DWR will be using to trigger installation and removal of the Project.

ENVIRONMENTAL SETTING

Sufficient information regarding the environmental setting is necessary to understand the Project's, and its alternative's (if applicable), significant impacts on the environment (CEQA Guidelines, §§15125 & 15360).

CDFW recommends that the CEQA document prepared for the Project provide baseline habitat assessments for special-status plant, fish and wildlife species located and potentially located within the Project area and surrounding lands, including all rare, threatened, or endangered species prior to or during EIR preparation (CEQA Guidelines, §15380). Fully protected, threatened or endangered, candidate, and other special-status species that are known to occur, or have the potential to occur in or near the Project site, include, but are not limited to:

Common Name	**Scientific Name**	**Status**
Central Valley spring-run chinook salmon	*Oncorhynchus tshawytscha*	ST
Delta smelt	*Hypomesus transpacificus*	SE
Delta tule pea	*Lathyrus jepsonii*	1B.2
Giant garter snake	*Thamnophis gigas*	FT, ST
Longfin smelt	*Spirinchus thaleichthys*	FC, ST
Mason's lilaeopsis	*Lilaeopsis masonii*	SR
Sacramento River winter-run chinook salmon	*Oncorhynchus tshawytscha*	SE
Song sparrow ("Modesto" population)	*Melospiza melodia*	SSC
Steelhead – Central Valley distinct population segment	*Oncorhynchus mykiss irideus*	FT
Suisun marsh aster	*Aster lentus*	1B.2
Swainson's hawk	*Buteo swainsoni*	ST
Western pond turtle	*Emys marmorata*	SSC
Woolly rose-mallow	*Hibiscus lasiocarpos* var. *occidentalis*	1B.2
Nesting and migratory birds		
Notes: FT = federally threatened under ESA; FC = candidate species under ESA; SE = state endangered under CESA; ST = state threatened under CESA; SR = state rare; SSC = state species of special concern; 1B = CNPS Plant Rank – Rare, Threatened, or Endangered in CA and Elsewhere; 0.2 = CNPS Threat Ranks – moderately threatened in CA		

Habitat descriptions and species profiles should include information from multiple sources: aerial imagery, historical and recent survey data, field reconnaissance, scientific literature and reports, and findings from "positive occurrence" databases such as California Natural Diversity Database (CNDDB). Based on the data and information from the habitat assessment, the CEQA document can then adequately assess which special-status species are likely to occur in the Project vicinity.

CDFW recommends that prior to development of the draft EIR, baseline surveys be conducted for special-status species with potential to occur, specifically fish assemblages located within Franks Track. CDFW recommends following recommended survey protocols if available. Survey and monitoring protocols and guidelines are available at: https://wildlife.ca.gov/Conservation/Survey-Protocols and replicating the sample locations and methods used in the Young et al. 2018 study.

Botanical surveys for special-status plant species, including those listed by the California Native Plant Society (http://www.cnps.org/cnps/rareplants/inventory/), must be conducted during the blooming period for all sensitive plant species potentially occurring within the Project area and require the identification of reference populations. Please refer to CDFW protocols for surveying and evaluating impacts to rare plants available at: https://www.wildlife.ca.gov/Conservation/Plants.

ALTERNATIVE ANALYSIS

The CEQA Guidelines (§15126.6) necessitate that the draft EIR must describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives.

CDFW recommends that the draft EIR identifies a range of reasonable Project alternatives to the Project. Alternatives CDFW recommends including are:

- Increasing Delta outflow during periods of drought to prevent Delta salinity intrusion;
- A completely submerged temporary rock barrier constructed to the elevation of the hypersaline layer of the stream; and
- A temporary rock barrier that contains a notch for fish passage for the for the duration of barrier installation.

IMPACT ANALYSIS AND MITIGATION MEASURES

The CEQA Guidelines (§15126.2) necessitate that the draft EIR discuss all direct and indirect impacts (temporary and permanent) that may occur with implementation of the Project. This includes evaluating and describing impacts such as:

- Potential for “take” of special-status species;
- Expansion and/or establishment of non-native aquatic weeds;

- Increased predator habitat;
- Permanent and temporary habitat disturbances associated with ground disturbance, noise, lighting, reflection, air pollution, traffic or human presence; and
- Obstruction of movement corridors, fish passage, or access to water sources and other core habitat features.

The CEQA document also should identify reasonably foreseeable future projects in the Project vicinity (e.g., the Delta Conveyance Project), disclose any cumulative impacts associated with these projects (e.g., installation of other temporary rock drought salinity barriers, decreased Sacramento-San Joaquin Delta outflow during periods of drought), determine the significance of each cumulative impact, and assess the significance of the Project’s contribution to the impact (CEQA Guidelines, §15355). Although a project’s impacts may be insignificant individually, its contributions to a cumulative impact may be considerable; a contribution to a significant cumulative impact – e.g., reduction of available habitat for a listed species – should be considered cumulatively considerable without mitigation to minimize or avoid the impact.

Based on the comprehensive analysis of the direct, indirect, and cumulative impacts of the Project, the CEQA Guidelines (§§ 15021, 15063, 15071, 15126.2, 15126.4 & 15370) direct the lead agency to consider and describe all feasible mitigation measures to avoid potentially significant impacts in the draft EIR, and/or mitigate significant impacts of the Project on the environment. This includes a discussion of take avoidance and minimization measures for special-status species, which are recommended to be developed in early consultation with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service and CDFW. These measures can then be incorporated as enforceable Project conditions to reduce potential impacts to biological resources to less-than-significant levels.

CDFW strongly recommends that DWR consider implementation the Franks Tract Futures Project to mitigate for project impacts as well as decrease the need for future drought salinity barriers.

REGULATORY REQUIREMENTS0

California Endangered Species Act

Please be advised that a CESA Permit must be obtained if the Project has the potential to result in “take” of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA Permit is subject to CEQA documentation; the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit.

CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species [CEQA §§ 21001(c), 21083, & CEQA Guidelines §§ 15380, 15064, 15065]. Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code § 2080.

Lake and Streambed Alteration Agreement

CDFW will require an LSA Agreement, pursuant to Fish and Game Code §§ 1600 et. seq. for Project-related activities that will substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake, or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW, as a Responsible Agency under CEQA, will consider the CEQA document for the Project. CDFW may not execute the final LSA Agreement until it has complied with CEQA (Public Resources Code § 21000 et seq.) as the responsible agency.

FILING FEES

CDFW anticipates that the Project will have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code, § 711.4; Pub. Resources Code, § 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

If you have any questions regarding operational comments, please contact Vanessa Kollmar, Environmental Scientist, at Vanessa.Kollar@wildlife.ca.gov or Sheena Holley, Senior Environmental Scientist (Supervisory), at (916) 903-6426 or Kimberly.Holley@wildlife.ca.gov. If you have any questions regarding construction comments, please contact Monica Oey, Senior Environmental Scientist (Specialist), at (707) 428-2088 or Monica.Oey@wildlife.ca.gov or Melissa Farinha, Environmental Program Manager, at (530) 351-4801 or Melissa.Farinha@wildlife.ca.gov.

ec: State Clearinghouse
Vanessa Kollmar, CDFW Water Branch – Vanessa.Kollar@wildlife.ca.gov
Sheena Holley, CDFW Water Branch – Kimberly.Holley@wildlife.ca.gov
Monica Oey, CDFW Bay Delta Region – Monica.Oey@wildlife.ca.gov
Melissa Farinha, CDFW Bay Delta Region – Melissa.Farinha@wildlife.ca.gov

REFERENCES

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Mann, Michael E. and Gleick, Peter H. 2015. Climate change and California drought in the 21 century. National Academy of Sciences 112: 3858-3859.

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Delta Stewardship Council
A CALIFORNIA STATE AGENCY

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Suite 15-300
Sacramento, CA 95814

916.445.5511
DELTACOUNCIL.CA.GOV

March 25, 2022

Robert Trang

California Department of Water Resources, South Delta Branch

1516 9th Street, 2nd Floor

Sacramento, CA 95814

Delivered via email: wfrdsb_ceqa@water.ca.gov

RE: Comments on the Notice of Preparation of an Environmental Impact Report for the West False River Drought Salinity Barrier Project

Dear Robert Trang:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the West False River Drought Salinity Barrier Project (Project). The Delta Stewardship Council (Council) recognizes the objective of the Project, as described in the NOP, to minimize the impacts of salinity intrusion on the beneficial uses of Delta water during persistent drought conditions.

The Council is an independent state agency established by the Sacramento-San Joaquin Delta Reform Act of 2009, codified in Division 35 of the California Water Code, sections 85000-85350 (Delta Reform Act). The Delta Reform Act charges the Council with furthering California's coequal goals of providing a more reliable water supply and protecting, restoring, and enhancing the Sacramento-San Joaquin River Delta (Delta) ecosystem. (Wat. Code, § 85054.) The Delta Reform Act further states that the coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The Council is charged with furthering California's coequal goals for the Delta through the adoption and implementation of the Delta Plan. (Wat. Code, § 85300.)

Pursuant to the Delta Reform Act, the Council has adopted the Delta Plan, a comprehensive long-term management plan for the Delta and Suisun Marsh that furthers the coequal goals. The Delta Plan contains regulatory policies, which are set forth in California Code of Regulations, Title 23, sections 5001-5015. Through the Delta Reform Act, the Council was granted specific regulatory and appellate authority over certain actions of State or local public agencies that take place in whole or in part in the Delta, called "covered actions." (Wat. Code, §§ 85210, 85225.30.) A state or local agency that proposes to undertake a covered action is required to prepare a written Certification of Consistency with detailed findings as to whether the covered action is consistent with the Delta Plan and submit that certification to the Council prior to initiating the implementation of the project. (Wat. Code, § 85225.)

COVERED ACTION DETERMINATION AND CERTIFICATION OF CONSISTENCY WITH THE DELTA PLAN

Based on the project location and scope provided in the NOP, the proposed project appears to meet the definition of a covered action. Water Code section 85057.5(a) states that a covered action is a plan, program, or project, as defined pursuant to Section 21065 of the Public Resources Code that meets all of the following conditions:

> *(1) Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh.* The project is located within the legal Delta.
>
> *(2) Will be carried out, approved, or funded by a State or a local public agency.* The project is being carried out by the California Department of Water Resources (DWR), a State agency.
>
> *(3) Is covered by one of the provisions of the Delta Plan.* Delta Plan regulatory policies that may apply to the project are discussed below.
>
> *and*

> *(4) Will have a significant impact on achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and State interests in the Delta.* This project would have a significant impact on the coequal goals of providing a more reliable water supply and protecting, restoring, and enhancing the Delta ecosystem.

The State or local agency approving, funding, or carrying out the project must determine if that project is a covered action and, if so, file a Certification of Consistency with the Council prior to initiating project implementation. (Wat. Code, § 85225; Cal. Code Regs., tit. 23, § 5001(j)(3).)

COMMENTS REGARDING DELTA PLAN POLICIES AND POTENTIAL CONSISTENCY CERTIFICATION

The following section describes the Delta Plan regulatory policies that may apply to the proposed project based on the available information in the NOP.

General Policy 1: Detailed Findings to Establish Consistency with the Delta Plan

Delta Plan Policy **G P1** (Cal. Code Regs., tit. 23, § 5002) specifies what must be addressed in a Certification of Consistency for a project that is a covered action. If a future Certification of Consistency is prepared for the Project, it must include detailed findings that address each of the following requirements:

Mitigation Measures

Delta Plan Policy **G P1(b)(2)** (Cal. Code Regs., tit. 23, § 5002(b)(2)) requires that covered actions not exempt from the California Environmental Quality Act (CEQA) must include all applicable feasible mitigation measures adopted and incorporated into the Delta Plan as amended April 26, 2018 (unless the measures are within the exclusive jurisdiction of an agency other than the agency that files the Certification of Consistency), or substitute mitigation measures that the agency finds are equally or more effective. These mitigation measures are identified in Delta Plan Appendix O and are available at: https://deltacouncil.ca.gov/pdf/delta-plan/2018-appendix-o-mitigation-monitoring-and-reporting-program.pdf.

When preparing the EIR for this project, DWR should propose mitigation measures for potentially significant impacts that are equally as or more effective than the applicable and feasible measures included in Appendix O.

Best Available Science

Delta Plan Policy **G P1(b)(3)** (Cal. Code Regs., tit. 23, § 5002(b)(3)) states that actions subject to Delta Plan regulations must document use of best available science as relevant to the purpose and nature of the project. The Delta Plan defines best available science as "the best scientific information and data for informing management and policy decisions." (Cal. Code Regs, tit. 23, § 5001 (f).) Best available science is also required to be consistent with the guidelines and criteria in Appendix 1A of the Delta Plan (https://deltacouncil.ca.gov/pdf/delta-plan/2015-appendix-1a.pdf).

To support a future Certification of Consistency, DWR should document and describe how best available science was used in the development of, effectively communicated, fostered an improved understanding, and informed DWR's Project design and mitigation decisions.

Adaptive Management

Delta Plan Policy **G P1(b)(4)** (Cal. Code Regs., tit. 23, § 5002(b)(4)) requires that ecosystem restoration and water management covered actions include adequate provisions for continued implementation of adaptive management, appropriate to the scope of the action. This requirement is satisfied through: a) the development of an adaptive management plan that is consistent with the framework described in Appendix 1 B of the Delta Plan (https://deltacouncil.ca.gov/pdf/delta-plan/2015-appendix-1b.pdf), and b) documentation of adequate resources to implement the proposed adaptive management plan.

At the public scoping meeting on March 9, 2022, DWR stated that the Project need and benefit is to protect beneficial uses of water in the interior Delta by reducing saltwater intrusion, while preserving the use of critically needed reservoir water. The need and benefit imply that the Project is a water management project. If so, Delta Plan policy G P1(b)(4) applies and DWR should prepare an Adaptive Management Plan consistent with the framework described in Delta Plan Appendix 1B to support a future Certification of Consistency.

Ecosystem Restoration Policy 1: Delta Flow Objectives

Delta Plan Policy **ER P1** (Cal. Code Regs., tit. 23, § 5005) requires the State Water Resources Control Board's Bay-Delta Water Quality Control Plan flow objectives to be used to determine consistency with the Delta Plan.

The NOP states the Project objective is to be consistent with the Central Valley Regional Water Quality Control Board's Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan). Basin Plan section 3.1.14.2 *Electrical Conductivity, Total Dissolved Solids, and Chloride-Delta Waters*, refers to the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, which is the State Water Resources Control Board Resolution No. 2006-0098 and amends the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan).

In a future Certification of Consistency, DWR should discuss the relationship between the Basin Plan, the Bay-Delta Plan, and the 1999 revised Water Right Decision 1641(D-1641) and which plan or parts from each plan would provide criteria for operations and management of water in the Delta. In addition, DWR should analyze and document how the Project may affect or alter Delta flows subject to the Bay-Delta Water Quality Control Plan and D-1641 for Delta Estuary flow and water quality objectives, given the potential for operational changes to impact listed species and the ability of the SWP to meet flow and water quality objectives under varying hydrologic conditions and water year types.

Ecosystem Restoration Policy 5: Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species

Delta Plan Policy **ER P5** (Cal. Code Regs., tit. 23, § 5009) requires that covered actions fully consider and avoid or mitigate the potential for new introductions of, or improved habitat conditions for, nonnative invasive species, striped bass, or bass in a way that appropriately protects the ecosystem.

Alternating flows through West False River may favor the colonization of invasive aquatic vegetation, such as *Egeria densa* (Brazilian water weed) and/ or water hyacinth, which could infest Delta channels.[1] In the EIR, DWR should analyze and

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[1] Kimmerer, W.; Wilkerson, F.; Downing, B.; Dugdale, R.; Gross, E. S; Kayfetz, K., et al. (2019). Effects of Drought and the Emergency Drought Barrier on the Ecosystem of the California Delta. San Francisco Estuary and Watershed Science, 17(3). http://dx.doi.org/10.15447/sfews.2019v17iss3art2 Retrieved from https://escholarship.org/uc/item/0b3731ph

document how the potential for new introductions of, or improved habitat conditions for, nonnative invasive species, striped bass, or bass was considered and avoided or mitigated in a way that appropriately protects the ecosystem.

Delta as Place Policy 2: Respect Local Land Use when Siting Water or Flood Facilities or Restoring Habitats

Delta Plan Policy **DP P2** (Cal. Code Regs., tit. 23, § 5011) reflects one of the Delta Plan's charges to protect the Delta as an evolving place by siting water management facilities, ecosystem restoration, and flood management infrastructure to avoid or reduce conflicts with existing uses or uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission (as defined in Cal. Code Regs., tit. 23 § 5001(p)).

To support a future Certification of Consistency, DWR should analyze and document Project siting considerations, provide a basis for the decision made to locate the Project in the West False River location, describe existing uses or uses described or depicted in city and county general plans, and describe whether there is a conflict with such uses and how DWR avoided or reduced conflicts with existing uses or uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible.. If such considerations were not incorporated into the Project, DWR should provide a basis for why such considerations are not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (Cal. Code Regs., tit. 23, § 5001 (p)).

CLOSING COMMENTS

As DWR proceeds with development of the Project, the Council invites DWR to engage Council staff in early consultation (prior to submittal of a Certification of Consistency) to discuss project features and proposed mitigation measures that would promote consistency with the Delta Plan.

More information on covered actions, early consultation, and the certification process can be found on the Council website, https://coveredactions.deltacouncil.ca.gov. Please contact Anthony Navasero at 916-445-5511 or Anthony.Navasero@deltacouncil.ca.gov with any questions.

Sincerely,

Jeff Henderson, AICP
Deputy Executive Officer
Delta Stewardship Council

March 25, 2022

Robert Trang
South Delta Branch
California Department of Water Resources
1516 9th Street 2nd Floor
Sacramento, CA 95814

Submitted via email to: wfrdsb_ceqa@water.ca.gov

Subject: Scoping Comments for the West False River Drought Salinity Barrier Project

Dear Mr. Tang:

Contra Costa Water District (CCWD) appreciates the opportunity to provide comments on the scope and content of Environmental Impact Report (EIR) for the West False River Drought Salinity Barrier project (Proposed Project). CCWD solely relies on the Delta to provide water to approximately 550,000 people in Contra Costa County. CCWD's three main intakes, Rock Slough, Old River, and Middle River Intakes, are all located within a few miles of the Proposed Project. Therefore, CCWD is interested in any changes in Delta water quality resulting from the Proposed Project and potential impacts to CCWD's water quality and water supply.

CCWD recognizes the importance of controlling salinity intrusion into the Delta during extreme dry hydrological conditions, but salinity is not the sole consideration when evaluating drinking water quality. We would like to provide the following specific comments:

1. Culverts with flap gates to allow one-way flow from Franks Tract to the San Joaquin River at Jersey Point on ebb tides should be considered in the design of the drought salinity barrier. In 2021, when a temporary drought salinity barrier was installed on West False River, the altered flow and increased residence time in Franks Tract caused high algae growth that affected not only Franks Tract, but also the Old River and Middle River corridor. The algae caused taste and odor issues impacting municipal and industrial water users in central and southern Delta, including CCWD, and increased the potential for formation of disinfection byproducts. Culverts with flap gates would improve flow circulation and thus reduce the potential for algae growth in the area, while maintaining the function the salinity barrier to prevent salt intrusion on flood tides.

2. CCWD appreciates the inclusion of additional water quality monitoring in the Proposed Project. The Notice of Preparation (NOP) for the EIR did not specify what constituents would be monitored at the three new water quality stations. In order to estimate the algae flux, we suggest adding Chl-a

continuous sensors paired with flow stations at the three locations identified in the NOP on Woodward Cut and Railroad Cut. DWR's Draft Emergency Drought Salinity Barrier 2021-2023 Monitoring Plan included the new flow stations on Woodward Cut and Railroad Cut, but it is unclear if those sensors have been installed because the data do not appear to be available online. CCWD also requests that a continuous Chl-a sensor be added at the existing flow station on Old River near Bacon Island. These data would allow quantified comparison of algae growth and transport in the Old River and Middle River corridor in the years with and without the drought salinity barrier.

CCWD looks forward to reviewing the details of the Proposed Project. Please do not hesitate to contact me at (925) 688-8168 or lshih@ccwater.com if you have any questions or would like to discuss these issues further.

Sincerely,

Lucinda Shih

Lucinda Shih
Water Resources Manager

YL

VIRTUAL SCOPING MEETING

Public Hearing in the Matter of:)
)
DWR WEST FALSE RIVER DROUGHT SALINITY EIR,)
)
)

Transcript of proceedings
Wednesday, March 9, 2022

ATKINSON-BAKER, A VERITEXT COMPANY
(800) 288-3376

Reported by: EILEEN ELDRIDGE, Hearing Reporter
File No.: 5111956

INTERNATIONAL VIRTUAL SCOPING MEETING

Public Hearing in the Matter of:)
)
DWR WEST FALSE RIVER DROUGHT SALINITY EIR,)
)
)

Transcript of Proceedings, beginning at 5:30 p.m. and ending at 7:30 p.m., on Wednesday, March 9, 2022, electronically using the Zoom Webinar platform, reported by Eileen Eldridge, Hearing Reporter.

ATKINSON-BAKER, A VERITEXT COMPANY
(800) 288-3376

Reported by: EILEEN ELDRIDGE, Hearing Reporter
File No.: 5111956

APPEARANCES:

FACILITATOR:
Erika Britney

PUBLIC SPEAKERS:
Dr. Tom Williams

Wednesday, March 9, 2022

5:30 p.m.

MS. BRITNEY: So first up is Tom Williams. We're going to unmute your mic and we'll go onto the next screen.

And go ahead, Tom.

MR. WILLIAMS: Dr. Tom Williams here, Club Water Committee. We're quite concerned regarding -- in this presentation, what are the goals? What are the objectives? Why? Because without the goals and objectives, we cannot consider alternatives.

And you didn't even mention alternatives and mitigation, which is a primary purpose of having scoping as to what would be the alternatives that we could come up with if we knew the goals and objectives of the project.

So, you might say, we will be submitting specific comments by mail or e-mail, and it will be centered on the inadequacy of the scoping presentation, because you have not considered any of the alternatives.

I have worked in the Delta, I have contributed testimony to the Water Board regarding the conveyance and the double tube tunnel. And one of the specific things is what is the influence of this project upon water rights?

And you need to be somewhat specific on that because there's an inclusion nowadays of normal flow water rights and flood flow water rights. And having done a little bit of mineralogy, climatology, you haven't even mentioned snow pack and the influence of snow pack freshly on the water between August and November, which is critical for your drought barrier and for the snow pack.

So provided information on the scoping, so those will be part of the comments. And you should extend the period of all comments on this particular one, because of the absence of any reference to alternatives and mitigation.

Thank you. That's all.

MS. BRITNEY: Thank you, Tom.

I think we're going to unmute Tom Williams, again. Please let me know when you've got him unmuted.

MR. WILLIAMS: Hi.

MR. BRITNEY: Hello.

MR. WILLIAMS: Okay. I would like to ask for an extension of the comment period for scoping by two weeks, because without goals and objectives, it's very difficult to formulate alternatives, such as a submerged barrier, rather than a fully exposed barrier.

There is also -- by the way -- are my verbal comments part of scoping comments?

MS. BRITNEY: Yes, your verbal comments are part of scoping comments.

MR. WILLIAMS: Okay. Then I would highly recommend that you do a survey of the Delta area as to where LiDAR surveys have been conducted and provide LiDAR surveys on a quarterly basis throughout the period of any barrier position there, because the Delta is not stable.

And when gas builds underneath the ledge, there has been movement up and down of islands and probably the channel bottoms within the project site. So it's a question as to do some real work on it because we don't know what's happening and how such a wall across the channel would influence the subsites of the area.

So give us a two-week extension and provide goals and objectives on the website so that we have something to respond to.

That's all.

MS. BRITNEY: Thank you, Tom.

And just to clarify, that was liter, l-i-t-e-r, survey?

MR. WILLIAMS: Capital L, lower case I, D-A-R all caps.

MS. BRITNEY: Got it. Thank you.

MR. WILLIAMS: And know where the gap fields are underneath the channel, false river, because they are active and they haven't left the area.

MR. BRITNEY: Thank you. Is that all you have to say, Tom?

MR WILLIAMS: Yep. That's enough for tonight.

MR. BRITNEY: Thanks.

MR. WILLIAMS: Just give us two weeks. I understand, I did my first environmental impact report in 1972, before there was scoping.

(End time: 7:30 p.m.)

HEARING REPORTER'S CERTIFICATE

I, EILEEN ELDRIDGE, HEARING REPORTER, IN AND FOR THE STATE OF CALIFORNIA, DO HEREBY CERTIFY:

THAT THE FOREGOING TRANSCRIPT OF PROCEEDINGS WERE LATER TRANSCRIBED BY COMPUTER-AIDED TRANSCRIPTION UNDER MY DIRECTION AND SUPERVISION; THAT THE FOREGOING IS A TRUE RECORD OF THE TESTIMONY AND PROCEEDINGS TAKEN AT THAT TIME.

I FURTHER CERTIFY THAT I AM IN NO WAY INTERESTED IN THE OUTCOME OF SAID ACTION.

I HAVE HEREUNTO SUBSCRIBED MY NAME THIS

17TH DAY OF MARCH 2022.

EILEEN ELDRIDGE

HEARING REPORTER

[17th - matter]

[meeting - zoom]

Appendix B
Initial Study Environmental Checklist

Environmental Checklist

Aesthetics

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AESTHETICS — Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☒	☐

Environmental Setting

The *Contra Costa County General Plan 2005–2020* identifies the San Francisco Bay/ Sacramento–San Joaquin Delta (Bay-Delta) estuary system, including West False River, as a scenic resource (Contra Costa County 2005). The land uses in the vicinity of the drought salinity barrier site are agricultural uses, predominantly irrigated pasture, on both sides of the West False River channel.

One rural residence is located approximately 1,800 feet east of the site of the proposed drought salinity barrier. The residence is situated on an exposed site on the north side of the channel. Therefore, the occupants of this residence would have a clear view of the temporary rock barrier and associated project construction. Recreational users of the river would also have a clear view of the drought salinity barrier. Motorists have access to and views of West False River from Bradford Island Levee Road to the north and from Jersey Island Road to the south.

Water quality monitoring stations would be installed on steel piles at two locations in San Joaquin County: Railroad Cut (two monitoring stations[1]) and Woodward Cut (one monitoring station). San Joaquin County has identified the entire Delta, including these waterways, as scenic resources (San Joaquin County 2016). The closest residences to the proposed water quality monitoring stations are located approximately 2,400 feet from the site of the proposed Railroad Cut monitoring stations and 1,400 feet from the Woodward Cut site.

1 One pile would be installed in each Railroad Cut channel (north and south) because an existing train trestle limits access by boat to the other side.

Discussion

The off-loading and stockpile sites that would be used for the proposed project are currently in use, and proposed activities would be consistent with existing operations and would not alter aesthetics. Therefore, the off-loading and stockpile sites are not discussed further in this section.

a) **Would the project have a substantial adverse effect on a scenic vista?** *Less-than-Significant Impact*. West False River has been designated as a scenic resource by Contra Costa County and Railroad Cut and Woodward Cut have been designated as scenic resources by San Joaquin County. Project construction activities would occur primarily in the West False River channel, but would involve some land-based staging activities on approximately 0.37 acre at the barrier site. The land staging area for the proposed project would be used primarily for parking, equipment staging, portable toilets, and a job trailer.

Most materials and construction equipment (e.g., cranes, clamshells) would be brought to the project site by barge, and most construction would take place from the water. The barrier would have a 12-foot-wide top above the water surface, and the top of the barrier would be at an elevation of 7 feet North American Vertical Datum of 1988 (NAVD88) across the entire crest. The California Department of Water Resources (DWR) would install exclusion fencing on the levees near the rock. As described in Protective Environmental Measure 2.5.4 in Draft Environmental Impact Report (EIR) Chapter 2, *Project Description*, as part of the contract specifications, DWR would install navigational buoys, lights, and signage on each side of the drought salinity barrier and near Fisherman's Cut to advise boaters of the presence of the barrier and maintain navigation along both waterways. Safety float lines, signs, and warning buoys would also be installed on both sides of the barrier across the width of the channel to deter boaters from approaching the barrier, and solar-powered warning buoys with flashing lights would be installed on the barrier crest to prevent nighttime accidents. DWR would also post signs at upstream and downstream entrances to the waterway or other key locations, informing boaters of the restricted access. Navigation signage would comply with requirements set forth by the U.S. Aids to Navigation System and the California Waterway Marker System, as appropriate. These temporary navigation features would be visible from West False River and adjacent roadways.

Equipment, construction and removal activities, and the drought salinity barrier would be visible from roads, a residence, and the river, which would temporarily degrade the area's visual quality. Viewer groups affected would include residents in the immediate vicinity of the project site, motorists or recreationists using any local roadways on either side of the project site (i.e., Jersey Island Road and Bradford Island Levee Road), and boaters in West False River.

Views of construction activities would be short term and temporary, with the drought salinity barrier potentially installed up to two times within 10 years. Construction activities would begin no sooner than April 1 and would continue for up to 45 working days. Transit to and from stockpile locations and mobilization may occur before April 1. Placement of rock would occur primarily during daylight hours but may require work on a 24-hour basis as needed. Barrier removal would be complete by November 30 of the same year as installation or the subsequent year. If a notch is placed in the middle portion of the barrier, construction would begin in early January of the second year of installation and it would be refilled the first week of April. As described in Chapter 2, *Project Description*, of the Draft EIR, any disturbed areas, including the staging area on the Jersey Island levee, would be restored after the removal of the drought salinity barrier. Any levee access roads damaged by construction equipment or truck use would be restored to preconstruction conditions or better after construction is completed.

Because the drought salinity barrier would be present temporarily, maintenance would be minimal or nonexistent; however, DWR would inspect the barrier regularly and would inform the permitting agencies should any major maintenance activities be required. DWR would maintain the navigational aids (e.g., signage, buoy lines) and would coordinate with the California Department of Parks and Recreation, Division of Boating and Waterways, for the removal of nonnative invasive freshwater plants, including water hyacinth, as needed, while the drought salinity barrier is in place. These activities would be visible from adjacent roads, a residence, and the river. However, the activities would be consistent with existing activities that occur throughout the Delta.

Each of the three water quality monitoring stations (two at Railroad Cut and one at Woodward Cut) would be installed on a 12-inch-diameter steel pipe pile and would include navigational aids as needed. DWR would complete maintenance activities at the stations every three to four weeks to clear away any surrounding vegetation and algal growth and replace equipment as needed. These stations would remain in place beyond the removal of the drought salinity barrier to increase the monitoring network and provide expanded water quality data for the Central Delta. A residence approximately 1,400 feet from the Woodward Cut water quality monitoring station would have short-term, temporary views of pile driving activities at this location for approximately one day. Any temporary visual impacts from construction of the water quality monitoring stations are considered negligible. The water quality monitoring stations would include navigational aids that would remain in place along with the stations; however, given the monitoring stations' limited, 12-inch footprint, long-term visual impacts from their placement are also considered negligible.

For these reasons, and because DWR anticipates temporarily installing the drought salinity barrier up to two times within 10 years, the proposed project would not have a substantial adverse effect on a scenic vista or conflict with Contra Costa County's or San Joaquin County's scenic designations. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

b) **Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?** *Less-than-Significant Impact*. The project site would not be visible from any State- or county-designated scenic highway (Caltrans 2019).

West False River is a locally designated scenic waterway (Contra Costa County 2005). Construction activities to install and remove the temporary barrier at the project site would result in a temporary, short-term (up to approximately 60-day) degradation of the scenic view in a portion of West False River. The drought salinity barrier would be visible for up to approximately 20 months and would be consistent with the existing visual character of the Delta, which includes levees and channels. Given the short-term temporary nature of project-related construction activities and the limited number of viewers (described in more detail in question a) above), the proposed project would not substantially damage scenic resources, and this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings?** *Less-than-Significant Impact*. For the same reasons as discussed in question a) above, the proposed project would not substantially degrade the existing visual character or quality of public views of the project site or its surroundings. Installing the drought salinity barrier would temporarily alter the visual character of the river channel as experienced by boaters and water recreationists; however, the planned removal of the barrier would limit the visual effects to a period when the drought salinity barrier is in place. After removal, existing visual quality would be returned. Therefore, the visual effects are not considered substantial. The three newly installed water quality monitoring stations would include navigational aids; however, the stations would be similar to existing water quality monitoring stations in the area and would not result in substantial impacts on visual quality. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

d) **Would the project create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?** *Less-than-Significant Impact.* Construction and removal of the drought salinity barrier could occur up to 24 hours a day, as needed. For work during non-daylight hours, contractors may use light plants, situated on the levees and/or barges as needed. To reduce illumination of adjacent areas, lighting would be directed downward toward construction activities to the extent practical. Solar-powered warning buoys with flashing lights would also be installed on the crest of the drought salinity barrier to minimize nighttime boating hazards. No nighttime work is planned for installation of the water quality monitoring stations.

As described previously in the "Environmental Setting" section, inhabitants of the residence along West False River would be able to see construction site lighting and flashing warning lights associated with navigational aids. This residence is located approximately 1,800 feet from the proposed nighttime lighting, and the effects of any spillover light from light plants or navigational lighting would be attenuated by distance. Although project construction activities would occur primarily during the daytime, potential nighttime activities would introduce temporary lighting sources observable to nearby residents. This temporary nighttime lighting would cease when associated construction activities are completed. The proposed project would not introduce new sources of glare. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

California Department of Transportation (Caltrans). 2019. List of Eligible and Officially Designated State Scenic Highways. Viewed online at: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed: Mar. 31, 2022. Last updated: Aug. 2019.

Contra Costa County. 2005. *Contra Costa County General Plan 2005–2020.* Open Space Element*.* Martinez (CA): Department of Conservation and Development. Jan. 18, 2005 (reprint July 2010).

San Joaquin County. 2016. *San Joaquin County 2035 General Plan Update. Scenic Resources Background Report.* Stockton (CA): Community Development Department. Sept. 2016.

Agriculture and Forestry Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
AGRICULTURE AND FORESTRY RESOURCES — In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) 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?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) 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))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) 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?	☐	☐	☒	☐

Environmental Setting

Pasture land is located adjacent to the project site. As described below, these agricultural lands are designated as Important Farmland (DOC 2018). For additional information about land uses within and adjacent to the project site, see the "Land Use and Planning" section of this Initial Study Environmental Checklist. The three new water quality monitoring stations would be in Railroad Cut and Woodward Cut, and these sites are also located adjacent to agricultural fields.

Farmland Mapping and Monitoring Program

The California Department of Conservation's (DOC's) Important Farmland classifications—Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance—recognize the land's suitability for agricultural production by considering the physical and chemical characteristics of the soil, such as soil temperature range, depth of the groundwater table, flooding potential, rock fragment content, and rooting depth. The classifications also consider location, growing season, and moisture available to sustain high-yield crops. Together, Important Farmland and Grazing Land are defined by DOC as "Agricultural Land" (Public Resources Code Sections 21060.1 and 21095).

According to the Contra Costa County Important Farmland maps, the lands adjacent to the project site are designated as Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance (DOC 2018).

DOC's Farmland Mapping and Monitoring Program defines these types of Important Farmland as follows:

- **Prime Farmland**—Land that has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. The land must have been used for irrigated agricultural production at some time during the four years before the mapping date.
- **Farmland of Statewide Importance**—Land similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. The land must have been used for irrigated agricultural production at some time during the four years before the mapping date.
- **Farmland of Local Importance**—Land that is of importance to the local agricultural 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.

Williamson Act

Under the California Land Conservation Act of 1965, also known as the Williamson Act, local governments can enter into contracts with private property owners to protect land (within agricultural preserves) for agricultural and open space purposes.

No parcels in the immediate vicinity of the project site are held under Williamson Act contracts (Contra Costa County 2017).

Agricultural Zoning

The project site is zoned by Contra Costa County as General Agricultural (A-2); the area just south of the proposed barrier is zoned Heavy Agricultural (A-3). These districts were established for all types of agriculture, agricultural uses, a farm stand, detached single-family dwellings, foster homes, family day care, and residential second units (Contra Costa County 2020).

Discussion

The three new water quality monitoring stations in Railroad Cut and Woodward Cut would be like other existing water quality monitoring stations used by DWR in the Delta. The off-loading and stockpile sites that would be used by the proposed project are currently in use and proposed activities would be consistent with existing operations. Therefore, neither the water quality monitoring station locations nor the off-loading and stockpile sites would affect agriculture and forestry resources, and they are not discussed further in this section.

a) **Would the project 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?** *Less-than-Significant Impact.* Project activities would not occur on land that is designated as Important Farmland or in agricultural use. Implementation of the proposed project would consist of installing and removing the proposed temporary drought salinity barrier, which would extend from the Jersey Island levee on the south side of West False River to the Bradford Island levee on the north side of West False River. Most materials and construction equipment would be brought to the site by barges and most construction would take place from the water. Access to the project site for these activities would be via Jersey Island Road and Bradford Island Levee Road, and the staging area would be located on the Jersey Island levee. Project activities would not convert Important Farmland to nonagricultural uses.

As discussed above, lands adjacent to and near the project site are designated as Prime Farmland and Farmland of Statewide Importance (DOC 2018) and are used for agricultural purposes. The proposed project would not have an indirect effect on these agricultural land uses by causing changes in water quality or perched groundwater levels within the root zones of adjacent agricultural land. The proposed project would reduce salinity at the Central Valley Project (CVP) and State Water Project (SWP) export pumps and at the Contra Costa Water District intakes at Rock Slough, Old River at State Route (SR) 4, and the Victoria Canal (discussed further in Draft EIR Section 3.5, *Hydrology and Water Quality*). The salinity of agricultural diversions from Franks Tract and Old River would also be reduced slightly with the barrier in place. Once installed, the drought salinity barrier would reduce demand for reservoir releases to maintain salinity objectives in the Delta, thus leaving more water in upstream reservoirs that could be released later for upstream agricultural uses.

No seepage-flow changes that could affect these lands are expected to occur in the vicinity of the drought salinity barrier. Before construction of the 2015 emergency drought barrier (EDB), the adjacent levees were strengthened by Reclamation District 830 at Jersey Island and Reclamation District 2059 at Bradford Island; the levee strengthening also likely reduced seepage flows at these sites. This reduced local seepage would not likely change groundwater quality in the vicinity of the West False River barrier.

The proposed project would cause small changes in tidal height and flow velocity locally, but almost no change in mean tidal elevations would result (discussed further in Draft EIR Section 3.5, *Hydrology and Water Quality*). Therefore, with the drought salinity barrier in place, water intakes near the barrier would not experience lower water levels that would affect their operations.

For these reasons, the proposed project would not directly or indirectly convert Important Farmland to nonagricultural uses. This impact would be less than significant and this issue will not be evaluated in the Draft EIR.

b) **Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?** *Less-than-Significant Impact.* No parcels that are held under Williamson Act contracts are in the immediate vicinity of the project site (DOC 2018).

The temporary drought salinity barrier would be located adjacent to areas zoned primarily for agricultural use. As described in question a) above, the proposed project would not directly or indirectly affect areas zoned for agricultural uses. The proposed project would reduce saltwater intrusion into the Delta and would reduce demand for reservoir releases to maintain the Delta's salinity levels, leaving more water available for agricultural irrigation. There would be no effects on seepage that would cause local changes to groundwater quantity or quality. In addition, with the drought salinity barrier in place, water intakes near the barrier would not experience lower water levels that would affect their operations. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **Would the project 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))?** *No Impact.* The project site is not zoned as forestland, timberland, or a Timberland Production Zone. Therefore, implementing the proposed project would not conflict with existing zoning for, or cause rezoning of, forestry resources. No impact would occur and this issue will not be evaluated in the Draft EIR.

d) **Would the project result in the loss of forest land or conversion of forest land to non-forest use?** *No Impact.* Section 12220(g) of the California Public Resources Code defines forestland as land that can support 10 percent native tree cover and woodland vegetation of any species (including hardwoods) under natural conditions, and that allows for management of one or more forest resources (e.g., timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation) and other public benefits. The project site does not contain forestland as defined by Section 12220(g). Therefore, implementing the proposed project would not result in the loss of forestland or conversion of forestland to nonforest uses. No impact would occur and this issue will not be evaluated in the Draft EIR.

e) **Would the project 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?** *Less-than-Significant Impact.* For the reasons described in question a) above, the proposed project would not directly or indirectly result in the conversion of agricultural land to nonagricultural uses. The proposed project would reduce saltwater intrusion into the Delta and would reduce demand for reservoir releases to maintain the Delta's salinity levels, leaving more water upstream for agricultural irrigation. There would be no effects on seepage that would result in changes to groundwater quality. In addition, with the drought salinity barrier in place, water intakes near the barrier would not experience lower water levels that would affect their operations.

For the reasons described in response to question d) above, implementing the proposed project would not result in other changes in the physical environment that could indirectly result in the conversion of forestland to nonforest uses. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

California Department of Conservation (DOC). 2018. Contra Costa County Important Farmland 2016. Aug. 2018.

Contra Costa County. 2017. 2016 Agricultural Preserves Map. Martinez (CA): Department of Conservation and Development. Viewed online at: https://www.contracosta.ca.gov/DocumentCenter/View/882/Map-of-Properties-Under-Contract?bidId=. Accessed: Mar. 31, 2022. Last updated: Feb. 1, 2017.

———. 2020. Contra Costa County Code, Title 8, Zoning. Viewed online at: https://library.municode.com/ca/contra_costa_county/codes/ordinance_code?nodeId=TIT8ZO. Accessed: Jan. 8, 2020.

Air Quality

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
AIR QUALITY — Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	☒	☐	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

The environmental setting and potential impacts of the proposed project on air quality are discussed in greater detail in Draft EIR Section 3.2, *Air Quality*.

Environmental Setting

The drought salinity barrier would be in Contra Costa County, the off-loading and stockpile sites would be in Solano and San Joaquin counties, the water quality monitoring stations would be in San Joaquin County, and barges would travel through Sacramento County. Portions of these counties are located within the San Francisco Bay Area Air Basin (SFBAAB), San Joaquin Valley Air Basin (SJVAB), and Sacramento Valley Air Basin (SVAB). The SFBAAB includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties; the southern portion of Sonoma County; and the southwestern portion of Solano County. The SJVAB includes San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare counties, and the western portion of Kern County. The SVAB includes Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties; the western portion of Placer County; and the eastern portion of Solano County.

Although the drought salinity barrier site itself is in Contra Costa County, rock used for barrier construction could be sourced either from a commercially operated quarry located near San Rafael in Marin County or from DWR's Rio Vista or Weber stockpile sites. Rock would be transported to the project site via barges. Upon removal of the drought salinity barrier, the rock would be transported to the Rio Vista or Weber stockpile sites. The entire barge trip route from the San Rafael quarry to the barrier site is assumed to occur within the SFBAAB. Approximately 7.4 miles of the 11-mile outbound barge trip route from the barrier site to the Rio Vista stockpile site would traverse Sacramento County; the remainder of the route would be within the SFBAAB. The Rio Vista stockpile is in the portion of Solano County that is included within the SFBAAB. Ten miles of the 28-mile outbound barge trip from the barrier site to the Weber stockpile site in Stockton would occur within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) and the remaining 18 miles are within the jurisdiction of the San Joaquin Valley Air

Pollution Control District (SJVAPCD). The proposed project would also include the installation of three water quality monitoring stations in San Joaquin County, located within the SJVAB.

Discussion

a,b) **Would the project conflict with or obstruct implementation of the applicable air quality plan or result in a cumulative considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard?** *Potentially Significant Impact.* The proposed project would generate emissions primarily during the temporary construction phase. Construction emissions associated with the proposed project would include emissions from off-road equipment such as loaders, excavators, and dump trucks; in-water construction vessels such as barges and tugboats; tug-assisted barges transporting rock to the drought salinity barrier site during construction and away from the site during removal; and vehicles used for worker commutes and truck trips associated with mobilization and demobilization. Maintenance activities would generate a small number of vehicle trips and associated emissions, potentially resulting in long-term impacts on air quality.

The Draft EIR will analyze the potential for the proposed project to conflict with or obstruct implementation of an air quality plan or result in a cumulative considerable net increase of criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard.

c) **Would the project expose sensitive receptors to substantial pollutant concentrations?** *Less-than-Significant Impact.* Project construction activities would result in short-term emissions of diesel exhaust from on-site heavy-duty equipment. CARB identified diesel particulate matter (DPM) from diesel-fueled engines as a toxic air contaminant (TAC) in 1998. Project construction activities would generate DPM emissions during the use of off-road diesel construction equipment, in-water marine vessels used for barrier construction and removal, and barge trips to haul rock to and from the project site. The dose to which receptors are exposed (a function of the concentration and 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. According to the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-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 by project construction would be temporary. Construction of the drought salinity barrier would take a maximum of 45 working days (1.5 months) and removal would take 60 days (2 months). This would constitute a maximum total exposure of 3.5 months each year, or a total of 7 months over the 10-year period of project implementation, equivalent to less than 2 percent of the 30-year exposure period used for health risk assessments. Further, OEHHA recommends that health risks be evaluated for projects that last longer than two continuous months, given the uncertainty in assessing cancer risk from very short-term exposures (OEHHA 2015).
- No sensitive receptors are located in the immediate vicinity of the drought salinity barrier site or the water quality monitoring sites. BAAQMD requires that health risk impacts be considered if construction activities would take place within 1,000 feet of sensitive receptors. No sensitive receptors are located within 1,000 feet of the barrier site or the Rio Vista or the Stockton stockpile sites.

Consequently, given the short duration of construction activity at the drought salinity barrier site and the distance to sensitive receptors, the proposed project would have a less-than-significant impact with respect to exposure of sensitive receptors to substantial pollutant concentrations.

All construction emissions would cease after completion of the proposed project. As mentioned previously, after removal of the drought salinity barrier, no long-term maintenance or operational activities would occur. Thus, implementing the proposed project would not expose sensitive receptors to substantial TAC concentrations. No operational impact would occur. This impact would be less than significant and this issue will not be evaluated in the Draft EIR.

d) **Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?** *Less-than-Significant Impact.* Human response to odors is subjective, and sensitivity to odors varies greatly. Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, anxiety) to physiological (e.g., circulatory and respiratory reactions, nausea, vomiting, headaches). Equipment exhaust is a potential source of odors during construction activities. However, exhaust emitted by construction equipment used for the proposed project would be localized, generally confined to the immediate area surrounding the project site. The proposed project would use typical construction techniques, and the odors would be temporary and typical of most construction sites. In addition, there are no sensitive receptors in the immediate vicinity of the project site that could be affected by these odors. Lastly, odors from the proposed project would be short term and temporary. After construction and removal of the drought salinity barrier, the proposed project would not include long-term maintenance or operational activities that could generate substantial odors. Therefore, implementation of the proposed project would not create objectionable odors that would affect a substantial number of people. This impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

California Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*. Sacramento (CA): California Environmental Protection Agency. Viewed online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: Jan. 30, 2020. Last updated: Feb. 2015.

Biological Resources

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES — Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c) 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?	☒	☐	☐	☐
d) 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?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

The environmental setting and potential impacts of the proposed project on biological resources are discussed in greater detail in Draft EIR Section 3.3, *Biological Resources*.

Environmental Setting

Vegetation communities and land cover types present on the project site include the aquatic habitat in which the drought salinity barrier would be placed and terrestrial habitat associated with the adjacent channel slopes, levee roads, and landside berm. The three new water quality monitoring stations would be placed in Railroad Cut and Woodward Cut, both of which provide perennial riverine habitat.

Discussion

a, d) **Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service, or 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? *Potentially Significant Impact.* The construction, presence, and removal of the drought salinity barrier could result in adverse effects on a variety of fish, plant, and wildlife species. These effects could result in potentially significant impacts. Therefore, the Draft EIR will analyze the potential for the proposed project to have a substantial adverse effect on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

The Draft EIR will also analyze the potential for the proposed project to interfere substantially with the movement of a native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or to impede the use of native wildlife nursery sites.

b) **Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?** *Less-than-Significant Impact*. Barrier construction activities would affect open-water habitat in West False River and disturbed upland areas on the levees and the Jersey Island seepage berm. No riparian habitat or sensitive natural communities would be affected, and temporary fill placed in West False River would be removed. This impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **Would the project 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?** *Potentially Significant Impact.* Barrier construction would result in temporary filling of approximately 2.75 acres in West False River. Filling would occur across the entire width of the river and would result in flow alteration and potential adverse effects on water quality; this would be a potentially significant impact.

The Draft EIR will analyze the potential for the proposed project to have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.).

e) **Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?** *No Impact*. The proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. No impact would occur and this issue will not be evaluated in the Draft EIR.

f) **Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?** *No Impact*. The proposed project would not conflict with the provisions of any adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan. No impact would occur and this issue will not be evaluated in the Draft EIR.

References

No references cited in this section.

Cultural Resources

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section15064.5?	☒	☐	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

The environmental setting and potential impacts of the Proposed Project on cultural resources are discussed in greater detail in Draft Section 3.4, *Cultural Resources*.

Environmental Setting

This section examines the potential impacts of the proposed project on cultural resources. Tribal cultural resources are addressed in the "Tribal Cultural Resources" section. For the purposes of this analysis, the term *cultural resource* is defined as follows:

> Native American 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 another reason. These resources include the following types of CEQA-defined resources: historical resources, archaeological resources, and human remains.

This section relies on the information and findings presented in *West False River Drought Salinity Barrier Project, Contra Costa and San Joaquin Counties, California: Cultural Resources Inventory Report* (Hoffman 2021). That confidential report 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.

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 the proposed project, including the drought salinity barrier site, the staging area, and the water quality monitoring stations. The off-loading and stockpile sites that would be used for the proposed project are currently in use, and project activities would be consistent with existing operations and would not affect cultural resources. Therefore, the off-loading and stockpile sites are not discussed further in this section.

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. The C-APE comprises approximately 3.33 acres: a 3.12-acre project footprint (drought salinity barrier, 2.75 acres and a 0.37-acre staging area) and three water quality monitoring stations, 0.07 acre each). The C-APE extends vertically to the maximum depth of the proposed project's ground-disturbing activities, which varies by specific location. The terrestrial ground disturbance proposed consists of very minor grading (to less than 0.5 foot below surface) at the staging area, while the vertical extent of the in-water portion of the C-APE is 3 feet below surface.

Methods

California Historical Resources Information System Records Search

In 2019, ESA conducted a cultural resources records search for the C-APE and vicinity at the Northwest Information Center at Sonoma State University in Rohnert Park and the Central California Information Center at California State University, Stanislaus, in Turlock. The Northwest Information Center maintains the California Historical Resources Information System's official records of previous cultural resources studies and recorded cultural resources for the drought salinity barrier portion of the C-APE; the Central California Information Center maintains the system's official records for the water quality monitoring station portions of the C-APE.

The study area for the records searches consisted of the C-APE with a 0.25-mile buffer. Two cultural resources studies conducted for previous EDB work that are not on file with the California Historical Resources Information System (AECOM 2014; Rehor 2016) were also reviewed.

A previous cultural resources investigations completed for an earlier version of the project identified and recorded two structures in the C-APE, the Bradford Island Levee and Jersey Island Levee, and evaluated their eligibility for the National Register of Historic Places (National Register) and California Register of Historical Resources (California Register). Both resources were recommended not eligible for the National Register and California Register (AECOM 2014). ESA conducted a cultural resources survey of non-inundated portions of the drought salinity barrier location on Jersey Island (as well as the stockpile sites and off-loading site); no new cultural resources were identified (Hoffman 2021).

The Jersey Island Levee and the Bradford Island Levee are recommended not eligible for listing in the National Register and the California Register (Deis 2014a, 2014b). Neither levee meets the significance criteria for association with important events related to reclamation, or with persons important to local, state, or national history. The levees do not represent new or innovative designs, nor are they the work of a notable engineer. No archaeological deposits were identified within the C-APE, and the levees themselves are not considered to contain information that would be useful in addressing questions important to history. Therefore, the Jersey Island Levee and the Bradford Island Levee are not considered historical resources for the purposes of CEQA.

Shipwrecks Database

The California State Lands Commission (CSLC) maintains a Shipwrecks Database that currently identifies approximately 1,550 recorded shipwrecks in California. On December 13, 2019, ESA sent an email request to the CSLC requesting that the CSLC conduct a records search of its Shipwrecks Database for the drought salinity barrier portion of the C-APE. The CSLC responded on December 18, 2019, indicating that the Shipwrecks Database has records of three shipwrecks in the general Rio Vista area:

- *Washoe*, a river steamer that sank on September 6, 1864, from a boiler explosion. The owner of the ship was California Navigation & Imrov. Co. and the Captain was G. W. Kidd. A note in the database states that this shipwreck is also shown as sunk 5 miles down from Sacramento and that the hull was raised.
- *Alert*, a sidewheel steamboat that was built in 1885 and was foundered September 26, 1919, at Rio Vista. This was a 65-ton ship built in Benicia.
- *Grace Barton*, a 195-ton sternwheel steamboat built in 1890 that sank at Rio Vista in 1916. This ship was owned by the Alden Bros. and a note states that the ship was burned during the making of the movie *Jim Bludso*.

The CSLC also noted that not all shipwrecks are listed in the Shipwrecks Database and that listed locations may be inaccurate; previously unidentified vessels or parts of vessels may exist.

Field Survey

In December 2019, ESA conducted a cultural resources survey of non-inundated areas of the drought salinity barrier portion of the C-APE on Jersey Island. The survey used intensive pedestrian methods, consisting of walking in transects spaced at intervals of approximately 10 meters and inspecting the ground surface for evidence of cultural material (archaeological and architectural). Specific attention was also given to inspecting the areas of the drought salinity barrier portion of the C-APE where two architectural resources (Bradford Island Levee, Jersey Island Levee) had been previously recorded by AECOM (2014). The Jersey Island Levee was revisited and the Bradford Island Levee was observed from across West False River, on the Jersey Island side of the drought salinity barrier portion of the C-APE.

During the survey, ground visibility at the drought salinity barrier portion of the C-APE was approximately 90 percent, although the ground consisted almost solely of imported gravels and sediment used for levee construction. The drought salinity barrier portion of the C-APE that was surveyed (the Jersey Island side) consists exclusively of the Jersey Island Levee; the Bradford Island side of the drought salinity barrier portion of the C-APE, as observed from the Jersey Island side, consists exclusively of the Bradford Island Levee. During the field survey, no new cultural resources were identified in the C-APE, but two previously recorded cultural resources were identified there: the Bradford Island Levee and Jersey Island Levee. Both cultural resources identified in the C-APE are historic-era levees.

Discussion

a) **Would the project cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?** *No Impact.* Two cultural resources, both levees, were identified in the C-APE. Neither resource meets the criteria for listing in the California Register; therefore, they are not considered historical resources for the purposes of CEQA. No archaeological resources were identified in the C-APE. A field survey of the in-water portion of the C-APE was not feasible; however, that portion of the C-APE has been previously heavily disturbed through channel dredging, levee repairs, and installation of the drought salinity barrier, and has minimal potential for intact archaeological resources, including any that could qualify as a historical resource, for the purposes of CEQA. Therefore, no impact on historical resources would occur and this issue will not be evaluated in the Draft EIR.

b-c) **Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section15064.5?** *Potentially Significant Impact.* No archaeological resources have been identified in the C-APE. A field survey of the in-water portion of the C-APE was not feasible; however, that portion of the C-APE has been previously heavily disturbed through channel dredging, levee repairs, and past installation of the drought salinity barrier, and has minimal potential for intact archaeological resources, including any that could qualify as a historical resource or unique archaeological resource for the purposes of CEQA. Given the minimal ground disturbance associated with the proposed project, it is unlikely that buried intact archaeological resources would be identified during construction.

No evidence of the existence of human remains was identified at the C-APE during documentary research, and buried human remains are unlikely to be present. Therefore, the proposed project is not anticipated to disturb any human remains.

However, 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 archaeological resources that have not been identified at the C-APE or previously undiscovered or unknown cultural remains. This would be a potentially significant impact if any such resources were found to qualify as historical resource or unique archaeological resources, pursuant to CEQA. This issue will be evaluated in the Draft EIR.

References

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Rehor, J. 2016. *UPDATE: National Historic Preservation Act Section 106 Cultural Resources Report—West False River Salinity Barrier Project*. Memorandum prepared for Jacob McQuirk and William McLaughlin, California Department of Water Resources. Prepared by AECOM, Sacramento (CA). Oct. 27, 2016.

Energy

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
ENERGY — Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

Environmental Setting

Pacific Gas and Electric Company (PG&E) is responsible for the generation, transmission, and distribution of electricity and the procurement, storage, and distribution of natural gas to its 70,000-square-mile Northern and Central California service area, which includes the area immediately surrounding the two project sites in the Sacramento River. PG&E maintains approximately 5.3 million electric distribution accounts and 4.4 million natural gas accounts, serving nearly 16 million people (PG&E 2022). The company is bound by contract to meet any additional energy demand.

In 2017, PG&E obtained its energy from the following sources: nuclear (27 percent), natural gas (20 percent), large hydroelectric (18 percent), solar (13 percent), wind (8 percent), geothermal (5 percent), biomass and waste (4 percent), and small hydroelectric (3 percent) (PG&E 2022). Approximately 33 percent of PG&E's energy portfolio is from eligible renewable resources. Two percent of PG&E's energy was from "unspecified" sources, a designation required by Section 398.2(d) of the Public Utilities Code if power is obtained through transactions and is not traceable to specific generation sources.

Gasoline makes up the vast majority of transportation fuel usage in California, with 97 percent of all gasoline consumed by light-duty cars, pickup trucks, and sport utility vehicles (CEC 2019). Diesel fuel is the next most frequently used transportation fuel used in California, representing 17 percent of total fuel sales. Nearly all heavy-duty trucks, delivery vehicles, buses, trains, ships, boats and barges, farm equipment, construction equipment, and heavy-duty military vehicles have diesel engines. Diesel is popular for heavy-duty usage because it has 12 percent more energy per gallon than gasoline and has fuel properties that prolong engine life, making it ideal for heavy-duty vehicle applications (CEC 2022). According to the State Board of Equalization, approximately 15.6 billion gallons of gasoline, including aviation gasoline, and 3.1 billion gallons of diesel, including off-road diesel, were sold in California in 2018 (BOE 2021a, 2021b).

Discussion

Consistent with Public Resources Code Section 21100(b)(3), this impact analysis evaluates the potential for the proposed project to result in a substantial increase in energy demand and/or wasteful use of energy during project construction, maintenance, and removal of the drought salinity barrier. The impact analysis is informed by Appendix F of the State CEQA Guidelines. The potential impacts are analyzed based on an evaluation of whether construction energy use estimates for the proposed project would be considered excessive, wasteful, or inefficient.

a) **Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?** *Less-than-Significant Impact.* The analysis in this section utilizes the assumptions identified in the "Air Quality" and "Greenhouse Gas Emissions" sections. Construction and removal of the drought salinity barrier up to two times over 10 years and installation of the three new water quality monitoring stations would result in fuel consumption from the use of construction tools and equipment, truck trips and barge trips to haul equipment and material, and vehicle trips generated by construction workers commuting to and from the site.

Construction activities and corresponding fuel energy consumption would be temporal, occurring up to two times in 10 years and localized along the project site and transport routes. In addition, there are no unusual project characteristics that would cause the use of construction equipment or haul vehicles that would be less energy efficient compared with other similar construction sites in other parts of the State. In conclusion, fuel consumption for periodic construction and removal of the drought salinity barrier proposed by the project would not result in inefficient, wasteful, or unnecessary energy use compared with other construction sites in the region. Because of the temporary nature of the project, there would be no long-term operational energy impacts as addressed above. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

b) **Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?** *Less-than-Significant Impact.* The transportation sector is a major end user of energy in California, accounting for approximately 39 percent of total statewide energy consumption in 2019 (USEIA 2022). In addition, energy is consumed in connection with construction and maintenance of transportation infrastructure, such as streets, highways, freeways, rail lines, ports, and airport runways. California's 30 million vehicles consume more than 16 billion gallons of gasoline and more than 3 billion gallons of diesel each year, making California the second largest consumer of gasoline in the world (CEC 2016).

Existing energy standards for transportation fuels such as diesel and gasoline are promulgated through the regulation of fuel refineries and products, such as the Low Carbon Fuel Standard (LCFS), which mandates a 10 percent reduction in the non-biogenic carbon content of vehicle fuels by 2020. Additionally, there are other regulatory programs with emissions and fuel efficiency standards established by EPA and CARB such as Pavley II/LEV III and the Heavy-Duty (Tractor-Trailer) GHG Regulation. CARB has set a goal of 4.2 million Zero Emissions Vehicles (ZEV) on the road by the year 2030. Further, construction sites will need to comply with State requirements designed to minimize idling and associated emissions, which also minimize use of fuel. Specifically, idling of commercial vehicles and off-road equipment would be limited to five minutes in accordance with the Commercial Motor Vehicle Idling Regulation and the Off-Road Regulation (California Code of Regulations Title 13, Section 2485). Given that construction and removal activities for the drought salinity barrier and new water quality monitoring stations would be subject to the above-cited existing regulations which directly and indirectly address energy conservation, the proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

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California State Board of Equalization (BOE). 2021a. Motor Vehicle Fuel 10 Year Reports: Net Taxable Gasoline Gallons (including Aviation Gasoline). Viewed online at: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed: Mar. 17, 2022. Last updated: Nov. 2021.

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U.S. Energy Information Administration (USEIA). 2022. California State Profile and Energy Estimates: Consumption by Sector. Viewed online at: https://www.eia.gov/state/?sid=CA#tabs-2. Accessed Mar. 17, 2022. Last updated: Mar. 17, 2022.

Geology and Soils

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
GEOLOGY AND SOILS — Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

Environmental Setting

Geologic Background

The project site is located in the Great Valley Geomorphic Province of California. The Great Valley is drained by the Sacramento and San Joaquin rivers, which join and flow out of the province through San Francisco Bay. This geomorphic province is an asymmetric trough approximately 400 miles long and 50 miles wide, filled with a thick sequence of sediments ranging from Jurassic (180 million years BP) to recent age. The sediments in the Great Valley vary in thickness from 3 to 6 miles and were derived primarily from erosion of the Sierra Nevada to the east, with lesser amounts of material from the Coast Ranges to the west.

The project site is located south of Sacramento, in the northern and central reaches of the Delta. Most Delta sediments were deposited between 175 million and 25 million years BP and accumulated in marine environments. Younger deposits (25 million years BP to recent) generally are described as nonmarine; however, some of the younger deposits may have formed as marine deposits in shallow seas and estuaries. The depositional history of the Delta during the late Quaternary period (the last 1 million years) probably was controlled by several cycles related to fluctuations in the regional and global climate, with each cycle consisting of a period of deposition followed by a period of non-deposition and erosion. Thus, during the late Quaternary period, the Delta had stages of wetlands and floodplain creation as tidewaters rose in the Central Valley from the west, areas of erosion when tidewaters receded, deposition of alluvial fans that were reworked by wind to create extensive sand dunes, and alluvial fan deposition from streams emanating from the adjacent mountain ranges.

From 70,000 to 11,700 years BP, sea level may have been as low as 365 feet below the present-day level. During this time, the Delta was a fluvial and alluvial system, where fast-moving rivers deposited coarse-grained sediments in alluvial fans and channels. During the Holocene (11,700 years BP to present day), sea levels rose, flooding San Francisco Bay and the Delta. In the initial flood stages, fine-grained silty sands and clayey silts were deposited in shallow bays. As conditions in the Delta became conducive to plant growth over time, organic sediments made mainly of peat began to accumulate above the silt that had been deposited previously. After the plants became established, their growth and decay led to repeated cycles of peat deposition. The thickest deposits likely occurred at the sites of major Pleistocene-age drainage ways. Over thousands of years, the process of peat deposition led to the formation of peat islands, with river channels and sloughs around the islands. During flood events, rivers would flow over their banks and form natural levees of sand and silt along the edges of the islands. Many of the existing Delta levees are located at the sites of these older, natural levees.

Seismic Activity and Levees

The Delta is subject to seismic risk because of its proximity to large active or potentially active fault systems—the San Andreas Fault system and several potentially active faults in the immediate area. The San Andreas Fault system includes the San Andreas, Hayward, Calaveras, Rodgers Creek, Antioch, Green Valley–Concord, and Greenville faults. The Midland Fault Zone and the Tracy-Stockton, Antioch, Rio Vista–Sherman Island, and Montezuma Hills faults are all located near or within the limits of the Delta. **Table 2** shows the closest seismic sources and their activity levels.

TABLE 2
SEISMIC SOURCES IN THE PROJECT VICINITY

Fault Name	Approximate Distance from Project Site	Activity Level
Midland	0.5 mile east	No activity in the last 1.6 million years
Sherman Island	0.5 mile west	Active during the Quaternary, but without evidence of Holocene movement (last 11,700 years)
Rio Vista	3.5 miles northwest	Activity in the last 1.6 million years, but not during the last 200 years
Vaca–Kirby Hills	10.3 miles west	Micro-earthquakes recorded over the last 32 years
Greenville–Clayton–Marsh Creek	18 miles west	Two magnitude 5.8 earthquakes in 1980

SOURCE: Myer et al. 2010

Seismic activity is a potential threat to the stability of Delta levees. The most severe effect from earthquakes in the Delta would be damage to the levee system. Many Delta levees are saturated, lacking in cohesion, and constructed on extremely unstable soils that could amplify earthquake waves passing from bedrock to unconsolidated soil layers. Historical information indicates that past earthquakes have caused little damage to Delta levees. No report could be found to indicate that an earthquake-induced levee failure has caused flooding of an island or tract, or that earthquake shaking has ever induced substantial damage. The minor damage reported has not substantially jeopardized the stability of the Delta's levee system (CALFED 2000). However, a major earthquake could cause extensive damage to large sections of levees on multiple islands at the same time. As a result, many islands could be flooded simultaneously. For example, a 2009 DWR report identified a 40 percent probability that a major earthquake could cause 27 or more islands to flood at the same time during the 25-year period from 2005 to 2030 (DWR 2009).

Non-seismic levee erosion in the Delta is caused by scouring, tidal action, and wind- and boat-generated waves. Wave-induced erosion from wind or boating activity results from run-up, when water sloshes up and down onto a riverbank or levee as a result of the staggered arrival of waves. Locally generated wind waves can cause the erosion of levees that protect other Delta islands from flooding. Levees may be weakened by this erosion, leaving them increasingly susceptible to failure and breaching during storm events.

Soils

Delta soils vary primarily as a result of differences in geomorphologic processes, climate, biological activity, topography, and time. Mineral soils cover most of the upland portions of the Delta, while the lowlands are dominated by peat soils, organic silt or muck, and clay. Delta peat soils are formed in open water from decomposing material from plants. According to the U.S. Department of Agriculture Natural Resources Conservation Service's Web Soil Survey, the project site is surrounded by different soil types. The most common is Rindge muck, followed by Venice muck and Ryde Silt loam (USDA 2019). In muck soils, the organic content of the soil is high and plant material is decomposed to a greater degree than in peat soils. Because of the high organic content, these soils are not stable and are subject to expansion, liquefaction, and sinkage, also known as *subsidence*. The Delta's peat soils have subsided below sea level by 9 to 26 feet or more (USGS 2013).

Paleontological Resources

Paleontology is a department of geology that studies life forms in past geologic time, specifically through the study of plant and animal fossils. These resources represent a small, nonrenewable, and sensitive scientific and educational resource. *Paleontological resources* are sites or geologic deposits containing unique and unusual individual fossils or fossil assemblages that are diagnostically or stratigraphically important, and that add to the existing body of knowledge in particular areas (e.g., stratigraphically, taxonomically, or regionally). *Paleontological sensitivity* is a qualitative assessment made by a professional paleontologist that accounts for paleontological potential based on the stratigraphic units present, local geology and geomorphology, and any other local factors that may be prevalent to fossil preservation and potential yield. Standard guidelines for sensitivity based on the Society of Vertebrate Paleontology (SVP 2010) are:

(a) the potential for a geological unit to yield abundant or significant vertebrate fossils or to yield a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains; and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data.

The project site is located in Holocene-age (11,700 years BP to present day) soft silts, clays, and peat deposits that generally contain the remains of extant, modern taxa and are considered to have low paleontological sensitivity. Sites with low paleontological sensitivity contain sediment that is relatively recent or that represents a high-energy sub-aerial depositional environment where fossils are unlikely to be preserved. A low abundance of invertebrate fossil remains or reworked marine shell from other units can occur, but the paleontological sensitivity remains low because these fossils lack the potential to serve as significant scientific or educational purposes. This rating also can be applied to strata that have been extensively sampled but have yielded no mega-fossils.

Discussion

The three new water quality monitoring stations in Railroad Cut and Woodward Cut would be similar to other existing water quality monitoring stations used by DWR within the Delta. The off-loading and stockpile sites that would be used for the proposed project are currently in use, and proposed activities would be consistent with existing operations. Therefore, neither the water quality monitoring station locations nor the off-loading and stockpile sites would affect geology and soils, and they are not discussed further in this section, except that the response to question f) discusses effects on paleontological resources from pile driving activities for installation of the water quality monitoring stations.

a.i) **Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

Less-than-Significant Impact. The project site is not located within an Alquist-Priolo Earthquake Fault Zone; however, it lies within the Montezuma Hills Fault Zone and near large active fault systems, including the San Andreas Fault system and the Great Valley Fault system. Surface rupture occurs when the ground surface is broken as a result of fault movement during an earthquake. The location of surface rupture generally can be assumed to be along an active or potentially active major fault trace. Damage from surface fault rupture is generally limited to a linear zone that is a few yards wide.

No active or potentially active faults have been mapped on the project site. Therefore, surface fault rupture would be unlikely, and this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

a.ii) **Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?**

Less-than-Significant Impact. The project site lies within the Montezuma Hills Fault Zone and near large active fault systems, including the San Andreas Fault system and the

Great Valley Fault system. As a result, the project site could be subject to strong seismic ground shaking if a large earthquake were to occur. The barrier has been designed and engineered to be stable in the event of strong seismic ground shaking. However, if strong seismic ground shaking were to result in the slumping or movement of rock, the rock would move only within the waterway. Rock movement would not cause substantial adverse effects because float lines, signs, and warning buoys would be installed on both sides of the barrier to deter boaters from approaching the barrier. Furthermore, because the levees in the vicinity of the proposed drought salinity barrier were previously reinforced by Reclamation Districts 830 and 2059, the barrier itself would not cause the area or surrounding areas to become unstable during a seismic event. Because of the barrier's design and the extremely low probability that a large-magnitude earthquake would occur during the limited periods when a drought salinity barrier could be in place, and given the lack of people or structures that would be affected by a barrier failure at this location, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

a.iii) **Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?** *Less-than-Significant Impact.* Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer that is saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. The soils and underlying geology at the project site are composed of soft silts, mucks, peat, and alluvium deposits. With the exception of alluvium deposits, soils at the site do not exhibit the characteristics of the soils most susceptible to liquefaction; however, these soils could soften as a result of seismic shaking. A large earthquake within one of the fault systems in the project vicinity could cause ground shaking in the area, potentially resulting in liquefaction and associated ground failure such as lateral spreading and differential settlement (densification or compaction of soils).

As described previously in the response to question ii), the barrier has been designed and engineered for stability, and any structural changes to the barrier or movement of rock resulting from seismic activity would be limited to the waterway. The barrier itself would not cause the project site or surrounding area to become unstable during a seismic event. Therefore, rock movement would not cause potential substantial adverse effects. Because of the barrier's design and the extremely low probability that a large-magnitude earthquake would occur during the limited period when a drought salinity barrier would be in place, and given the lack of people or structures that would be affected by a barrier failure at this location, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

a.iv) **Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?** *No Impact.* Because of the area's flat topography, the project site is not located in an area subject to landslides. Therefore, the proposed project would not cause potential substantial adverse effects from landslides. No impact would occur and this issue will not be evaluated in the Draft EIR.

b) **Would the project result in substantial soil erosion or the loss of topsoil?** *Less-than-Significant Impact.* As discussed in Protective Environmental Measure 2.5.1 in Draft EIR Section 2.5, *Protective Environmental Measures*, a water quality control plan would be prepared and implemented as part of the contract specifications during all ground-disturbing construction activities. The plan would include site-specific measures to control erosion, reduce the likelihood of spills, and control sedimentation, dust, and runoff. The staging area would be situated on the Jersey Island levee and would be limited to approximately 0.37 acre in size. Access routes would be restricted to Jersey Island Road and Bradford Island Levee Road. Furthermore, all disturbed areas would be restored after removal of the barrier. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?** *Less-than-Significant Impact.* As described previously, the drought salinity barrier would be constructed on the riverbed within the West False River channel, which is composed of unstable muck, silt, and peat, and therefore could be subject to liquefaction. However, in 2014 and 2015, the Bradford and Jersey Island levees adjacent to the project site were strengthened for the barrier installation using rock protection on the waterside slope, the levee toes were repaired, and steel sheet piles were driven through the levees (as discussed further in the "Hydrology and Water Quality" section). The barrier has been appropriately designed and engineered to resist liquefaction in the event of strong seismic ground shaking (discussed in the response to question a.ii) and prior to mobilization to install the drought salinity barrier, DWR engineers would conduct a design review and would make any adjustments to the design, if needed, based on experiences from prior installations. Given the temporary nature of the barrier (installed in West False River no sooner than April 1 and removed by November 30 of the same year or the subsequent year), engineered design based on experience from previous installations, and weekly inspections that would be conducted by DWR while the barrier is in place, the area around the barrier is not anticipated to become unstable as a result of the proposed project. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

d) **Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?** *Less-than-Significant Impact.* The project site would be located on expansive soils as defined in Table 18-1-B of the Uniform Building Code (1994), including muck, silt, and peat; however, the channel bed is not subject to wetting and drying, and the levees adjacent to the project site were reinforced for the 2015 EDB installation. The proposed project would not create substantial risks to life or property. The drought salinity barrier would be located within the West False River channel and would be temporary (installed no sooner than April 1 and removed by November 30 of the same year or the subsequent year). Because the levees are engineered structures that were recently strengthened, and given the temporary nature of the barrier, shrink-swell potential would not represent a substantial adverse hazard to people or structures. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

e) **Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?** *No Impact.* Portable restroom facilities would be used as needed during construction activities. No septic tanks are proposed as part of the project. Therefore, implementation of the proposed project would not result in impacts on soils associated with the use of such wastewater treatment systems. No impact would occur and this issue will not be evaluated in the Draft EIR.

f) **Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?** *Less-than-Significant Impact.* No paleontological resources were identified in the project vicinity (UCMP 2016). The temporary drought salinity barrier and water quality monitoring stations would be constructed in Holocene-age (11,700 BP to present day) soft silts, clays, peat, and alluvium deposits. Pile-driving activities for the three water quality monitoring stations would drive piles as deep as 40 feet; however, these activities would occur within Holocene-age Dos Palos Alluvium deposits that range from 150 feet to 1,000 feet thick. By definition, to be considered a fossil, a resource must be more than 11,700 years old. Holocene deposits contain only the remains of extant, modern taxa (if any resources are present), which are not considered "unique" paleontological resources. Thus, this formation is not considered paleontologically sensitive, and project-related ground-disturbing activities are not anticipated to affect unique paleontological resources. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

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Greenhouse Gas Emissions

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
GREENHOUSE GAS EMISSIONS — Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

The environmental setting and potential impacts of the proposed project related to greenhouse gas (GHG) emissions are discussed in greater detail in Draft EIR Section 3.2, *Air Quality and Greenhouse Gas Emissions*.

Environmental Setting

Certain gases in the earth's atmosphere, classified as greenhouse gases (GHGs), play a critical role in determining the earth's surface temperatures. A portion of the solar radiation that enters Earth's atmosphere is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. Infrared radiation (i.e., thermal heat) is absorbed by GHGs; as a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in the warming of the atmosphere. This phenomenon, known as the *greenhouse effect*, is responsible for maintaining a habitable climate on Earth.

Climate change is the name given to the increase in the average temperature of Earth's near-surface air and oceans since the mid-20th century. Increases in GHG concentrations in Earth's atmosphere are thought to be the main cause of human-induced climate change. As discussed above, some GHGs occur naturally and are necessary to keep Earth's surface habitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have reduced the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in an increase in global average temperature. GHG emissions associated with human activities are highly likely to be responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (IPCC 2013).

The principal GHGs are carbon dioxide (CO_2), methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, each of these gases varies significantly from the others in its potential ability to trap heat. For example, methane is 25 times as potent as CO_2, whereas sulfur hexafluoride is 22,800 times as potent as CO_2. Conventionally, GHGs are reported in units of CO_2 equivalents (CO_2e). This approach takes into account the relative potency of non-CO_2 GHGs, converting their quantities to an equivalent amount of CO_2, so that all GHG emissions can be reported as a single comparable quantity.

The primary human-made processes that release these gases are the burning of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release methane, such as livestock grazing and decomposition of crop residues; and industrial processes that release smaller amounts of gases with high global warming potential, such as sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. Deforestation and conversion of land cover have also been identified as contributing to climate change by reducing Earth's capacity to remove CO_2 from the air and altering Earth's albedo (surface reflectance), allowing more solar radiation to be absorbed.

Although climate change has regional and local impacts, those impacts are caused by global increases in emissions, not specifically by emissions in the region of the proposed project. Accordingly, the significance determinations for the project's GHG emissions are framed in terms of impacts on global climate change.

Discussion

a, b) **Would the project generate greenhouse gas 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 greenhouse gases?** *Potentially Significant Impact.* GHG emissions would be generated by project sources such as tugboat-assisted barges hauling materials to and from the project site, heavy-duty off-road and marine equipment used for barrier installation and removal, and worker commute vehicles.

The Draft EIR will analyze the potential for the proposed project to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. The EIR also will analyze the potential for the proposed project to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

References

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Hazards and Hazardous Materials

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐

Environmental Setting

The GeoTracker database maintained by the State Water Resources Control Board (State Water Board) (2020) and the EnviroStor and "Cortese List" database maintained by the California Department of Toxic Substances Control (DTSC) (2020) were reviewed for the project site. No existing hazardous waste or substances sites were identified by the DTSC EnviroStor database or the Cortese List within 2 miles of the project site.

The former Antioch Bombing Target is located upstream of the project site, in Frank's Tract State Recreation Area. The U.S. Government leased the property from 1944 until 1952. Floating targets were used by Navy aircraft pilots for dive-bombing practice that used air to ground rockets and miniature bombs.

The Rio Vista Gas Field is located north of the project site near Bradford Island.

Delta Vista Middle School is approximately 4.5 miles south of the project site. The nearest public airport, Rio Vista Municipal Airport, is located approximately 9.5 miles to the north. The Delta Air Park is located approximately 4.7 miles south of the project site.

The existing Rio Vista and Weber stockpile and off-loading sites that would be used by the proposed project are located approximately 1 mile northwest of White Rock Elementary School in Solano County and approximately 1.5 miles west of the Team Charter School in Stockton. The nearest airports, Rio Vista Municipal Airport and Stockton Metropolitan Airport, are respectively located approximately 1.5 miles north and 5.1 miles southwest of the sites.

Discovery Bay Elementary School is approximately 4 miles and 2.5 miles from the proposed Railroad Cut and Woodward Cut water quality monitoring stations, respectively. The nearest airport, Byron Airport, is located approximately 9 miles southwest of the proposed Railroad Cut water quality monitoring stations and 7 miles from the proposed Woodward Cut water quality monitoring station.

The California Department of Forestry and Fire Protection (CAL FIRE) classifies an area over which it has responsibility as either a very high fire hazard severity zone (VHFHSZ) or a Non-VHFHSZ. CAL FIRE has designated the project site as a Non-VHFHSZ or unzoned (CAL FIRE 2020). The project site is located within Alliance Zone 6 for the Contra Costa County Ambulance Zone. Typically, East Contra Costa County has response times of approximately 12 minutes for high-density population areas, 16 minutes for Bethel Island, and 20 minutes for low-density population areas (Contra Costa Health Services 2018).

Discussion

a) **Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?** *Less-than-Significant Impact.* Construction of the proposed project would involve the transport and use of common hazardous materials such as oils, lubricants, and fuels. Proposed project activities would not require extensive or ongoing use of acutely hazardous materials or substances. The temporary drought salinity barrier would be installed in approximately 45 days and removed in another approximately 60 days. A notch may also be placed in the middle portion of the barrier in early January of the second year of installation and it would be refilled it as early as the first week of April. No hazardous materials would be used after removal of the barrier. Project-related activities would require the limited, short-term use, storage, and handling of small quantities of hazardous materials, including fueling and servicing of construction equipment on-site using fuels, lubricating fluids, and solvents. These types of materials are not acutely hazardous, however, and DTSC, the U.S. Environmental Protection Agency, and the federal Occupational Safety and Health Administration and California Occupational Safety and Health Administration regulate all storage, handling, and disposal of these materials.

In addition, a water quality control plan would be implemented as part of the contract specifications (Protective Environmental Measure 2.5.1 in Chapter 2, *Project Description,* of the Draft EIR). The plan would identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline the procedures to be followed in case of a spill of a hazardous material. The plan would require that hazardous and potentially hazardous substances being stored on-site be kept in securely closed containers away from drainage courses, storm drains, and areas where stormwater is allowed to infiltrate. It would also stipulate procedures to minimize hazards during on-site fueling and servicing of construction equipment. If used and stored properly, these materials would not pose a significant risk to the public or the environment. Implementing the protective environmental measure referenced above would minimize any potential impacts from the routine transport, use, or disposal of hazardous materials. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

b) **Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?** *Less-than-Significant Impact.* Accidental spills or releases of hazardous materials during project construction and the barrier's presence in areas with recreational and agricultural use and sensitive habitat could expose workers, recreationists, and the environment to hazardous materials. As noted previously in the response to question a), proposed project activities would involve the incidental transport and use of small quantities of hazardous materials during construction. As discussed in Chapter 2, *Project Description*, of the Draft EIR, a water quality control plan would be prepared before and implemented during all ground-disturbing activities. This plan would include site-specific best management practices to minimize the potential for a release of hazardous, toxic, or petroleum substances at the project site during construction and barrier presence. Project activities would not affect the Rio Vista Gas Field located north of the project site. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?** *No Impact.* No existing or proposed schools are located within 0.25 mile of the project site. Delta Vista Middle School is approximately 4.5 miles south of the drought salinity barrier site, White Rock Elementary School is approximately 1 mile from the proposed Rio Vista off-loading and stockpile sites, the Team Charter School is approximately 1.5 miles from the proposed Weber off-loading and stockpile sites, and Discovery Bay Elementary School is approximately 4 miles southwest of the proposed Railroad Cut water quality monitoring stations and 2.5 miles west of the proposed Woodward Cut water quality monitoring station. No potential exists for project-related hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

d) **Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?** *Less-than-Significant Impact.* The Hazardous Waste and Substances Sites List (Cortese List) is compiled by DTSC in accordance with Section 65962.5 of the California Government Code. The Cortese List was searched, and DTSC's online EnviroStor database (DTSC 2020) was searched for sites near the project site with reported hazardous material spills, leaks, ongoing investigations, and/or remediation. In addition, a search was conducted using the State Water Board's GeoTracker database (State Water Board 2020). These sources found four sites located within 2 miles of the proposed off-loading and stockpile sites that have been reported with assessment and interim remedial action, verification monitoring, remediation, and site assessment statuses. However, because these areas are already in use and would be used to store removed rock, activities are not anticipated to result in potential hazardous contamination. These searches did not identify any sites with potential hazardous contamination within approximately 2 miles of the project site or the three proposed water quality monitoring stations located in Railroad Cut and Woodward Cut.

The former Antioch Bombing Target is located upstream of the project site, in Frank's Tract State Recreation Area. Although the ultimate disposition of the air to ground rockets and miniature bombs previously used at the site is unknown, in-water rock placement would not occur near the site. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

e) **For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?** *No Impact.* The project site and the three proposed water quality monitoring stations are not located within 2 miles of a public airport. The nearest public airport, Rio Vista Municipal Airport, is approximately 9.5 miles north of the project site. Rio Vista Municipal Airport is approximately 1.5 miles from DWR's existing Rio Vista stockpile and off-loading sites and Stockton Metropolitan Airport is approximately 5.1 miles from DWR's existing Weber stockpile and off-loading sites. Because these areas are already in use and activities for the proposed project would be similar to current activities, use by the proposed project is not anticipated to result in any new significant impacts. Therefore, the proposed project would not create a safety hazard or excessive noise associated with airport operations for people residing or working in the project vicinity. No impact would occur and this issue will not be evaluated in the Draft EIR.

f) **Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?** *Less-than-Significant Impact.* Land-based emergency response routes and plans would not be affected by construction or presence of the proposed project. Nearby roadways that would be accessed for construction and maintenance purposes include rural local roads adjacent to the project site that would be used intermittently by minimal truck traffic during construction and removal of the drought salinity barrier. Furthermore, most construction activities would occur from the river; therefore, traffic flow would not be substantially interrupted on any roadway.

The waterways in the project area are also used for emergency response. Bradford Island is located north of the project site. Emergency services to the island are provided by the ferry slip located on the southwest tip of the island, or by helicopter. The Bradford Island ferry slip would remain open during construction and would not be obstructed while the barrier is in place, and Bradford Island would remain accessible by helicopter.

The proposed project could affect emergency response times upstream and downstream of the drought salinity barrier location because the barrier would block passage through West False River. Boats would have to detour around the barrier, using Fisherman's Cut or Taylor Slough to access West False River. The Bradford Island ferry slip would remain open during construction and would not be obstructed while the barrier is in place, and Bradford Island would remain accessible by helicopter. Given the temporary nature of the proposed project and the availability of alternate routes, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

g) **Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?** *Less-than-Significant Impact.* As stated previously, CAL FIRE has designated the project site as Non-VHFHSZ or unzoned (CAL FIRE 2020). Bradford Island is not within the service area of any fire protection district and firefighting is the responsibility of property owners. However, the project site falls within East Contra Costa Fire Protection District's 5-mile response time and the East Contra Costa Fire Protection District aids in evacuation during fire emergencies, if necessary (ECCFPD 2020).

The proposed project would not add structures that could be exposed to fire risk. Access to the project site would be maintained during project activities, and in the event of a fire at the project site, Jersey Island Road, Bethel Island Road, and other local roadways could accommodate firefighting crews and equipment. Bradford Island is located north of the project site. Emergency services to the island are provided by the ferry slip located on the southwest tip of the island, or by helicopter. The Bradford Island ferry slip would remain open during construction and would not be obstructed while the barrier is in place, and Bradford Island would remain accessible by helicopter.

No features of the proposed project would add to the fire danger in the project vicinity. Furthermore, all equipment would be located at a staging area that has been disturbed previously or cleared of vegetation. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

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Hydrology and Water Quality

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☒	☐	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) 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:				
i) result in substantial erosion or siltation on- or off-site;	☒	☐	☐	☐
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv) impede or redirect flood flows?	☒	☐	☐	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

The environmental setting and potential impacts of the proposed project related to hydrology and water quality are discussed in greater detail in Draft EIR Section 3.5, *Hydrology and Water Quality*.

Environmental Setting

Hydrology

Surface Water

Tidal flows in the Delta are controlled by channel geometry, tidal elevations at the Golden Gate Bridge, inflows from the Sacramento and San Joaquin rivers, in-Delta consumptive use, CVP and SWP export pumping in the South Delta, and Delta outflows. Average tidal flows in False River are on the order of ±35,000 cubic feet per second (cfs), and the mean tidal elevation is around 4 feet NAVD88 with a tidal range of around 3.5 feet.

Salinity intrusion is the result of the dynamic balance between strong tidal mixing and the inflow of freshwater at the upstream end of the estuary (to Suisun Bay), which is often referred to as *Delta outflow*. Large diversions for agricultural use occur in the Delta, and the CVP and SWP pumping plants in the southern Delta export large quantities of water from the Delta. Therefore, the Delta outflow that controls the estuarine salinity gradient must be calculated from the measured river inflows minus the measured water exports and estimated agricultural diversions (channel depletions).

Because tidal mixing in the estuary is generally constant from day to day, with some differences between neap tide and spring tide, salinity intrusion increases with lower outflow and decreases with higher outflow. Higher Delta outflow (caused by higher river inflows) will "push" freshwater farther downstream, so that the upstream end of the salinity gradient will shift downstream with higher outflow. The upstream end of the salinity gradient has been defined as *X2*, a point identified by its distance from the Golden Gate Bridge where salinity at the river's bottom is about 2 parts per thousand (2,000 milligrams per liter total dissolved solids).

Groundwater

Shallow groundwater conditions adjacent to most Delta channels generally are a result of seepage flow through the levees and Delta (alluvial) sediments toward the adjacent, lower elevation agricultural islands. Groundwater elevation (depth to the water table) is controlled by the mean tide and adjacent land elevations, soil types and properties of the adjacent land, and subsurface soils underlying the channels and levees. Groundwater elevations on Jersey and Bradford islands are controlled by the network of drainage channels used to maintain groundwater elevations below the root zone of the pasture and crops.

Water Quality

Surface Water

Salinity and other water quality parameters in the Delta are controlled mainly by freshwater inflows from the Sacramento and San Joaquin rivers and by Delta outflow, which primarily determines salinity intrusion at Collinsville and other locations in the western Delta.

Water quality constituents, such as minerals, nutrients, metals, and contaminants, are generally higher during drought conditions because river flows are lower and provide less dilution of these substances. In the Delta waterways in the vicinity of the project site, constituents on the Clean Water Act Section 303(d) total maximum daily load list include chlorpyrifos (western and central portions of the Delta waterways); mercury (western, central, southern, and eastern portions); and dichlorodiphenyltrichloroethane, better known as DDT (central portion). Other constituents are to be listed, but total maximum daily loads have not been completed for those constituents. Among the constituents of particular relevance are chlorophyll, nutrients, bromide, turbidity, and dissolved oxygen.

Water quality in False River is controlled by Sacramento River inflow, mixed with salts and other constituents in seawater. A large proportion of the San Joaquin River inflow generally is pumped at the CVP and SWP export facilities in the South Delta; therefore, water quality in the San Joaquin River has very little effect on False River's water quality during drought conditions. Salinity is measured as electrical conductivity (EC), and levels of all minerals or other substances from seawater (e.g., chloride, bromide) are proportional to changes in EC.

The *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (Bay-Delta Plan) (State Water Board 2018) establishes all of the following:

- Beneficial uses to be protected.
- Water quality objectives for the reasonable protection of beneficial uses.
- An implementation program for achieving the water quality objectives.

The beneficial uses to be protected include fish and wildlife and agricultural, municipal, and industrial uses. The State Water Board's Revised Decision 1641 amended the water right license and permits for the SWP and CVP to require the projects to meet certain objectives in the Bay-Delta Plan. Specifically, Revised Decision 1641 assigns responsibility to DWR and the U.S. Bureau of Reclamation measures to ensure that specified water quality objectives are met. The water quality compliance and baseline monitoring established by the State Water Board are shown in Table 5 of the 2018 Bay-Delta Plan (State Water Board 2018).

Changes in EC that would be caused by the proposed project were evaluated using data that included the effects of the 2015 EDB in West False River from May through October (DWR 2019).

Groundwater

Groundwater quality in the vicinity of the project site is controlled by seepage water that flows from the surface water channels to the adjacent islands. Therefore, groundwater quality below and adjacent to Delta channels is similar to surface water quality (i.e., with regard to salinity, nutrients, and organic carbon).

Flood Flows and Flood Hazards

Major flood events in the Central Valley are generally the result of high-rainfall or high-snowmelt runoff events, which have occurred only in mid-November through June in recorded history. Potential flood flows from the Sacramento River are diverted at Fremont Weir to the Yolo Bypass; therefore, Sacramento River flows at Freeport are limited to about 100,000 cfs. Farther downstream on the Sacramento River, some of the remaining higher flows are diverted to Sutter and Steamboat sloughs, with remaining flows continuing to the Walnut Grove diversion into Georgiana Slough.

The Sacramento River's water surface elevation at Freeport increases to about 27.5 feet NAVD88 at the maximum flow of 100,000 cfs, whereas the water surface elevation increases to approximately 17.5 feet in Walnut Grove and approximately 12.5 feet at the mouth of Steamboat Slough and Cache Slough (DWR 1995). The 100-year flood flow elevation in West False River is about 10 feet, only 4 feet higher than the mean higher high water elevation of about 6 feet.

Since 1900, more than 160 levee failures have occurred in the Delta, primarily as a result of levee overtopping or structural failure. Flood hazards for land adjacent to Delta channels can be caused by levee failures resulting from flood flows and associated higher water elevations, excessive levee seepage (e.g., channeling), erosional events (e.g., wave overtopping), and/or seismic-induced failure. However, significant improvements made to the Delta levee system since 1982 have reduced the incidences of failure to just one major failure in the past 30 years. Most Delta levees have been strengthened in recent years with increased height, increased width from landside buttressing, or both. Levee stability (structural integrity) generally is greatest for wider levees composed of mineral soils (i.e., high sand, silt, and clay content, as compared with peat and other organic soils), with a lower side slope and height above adjacent land.

Levees on Bradford and Jersey islands, located adjacent to the proposed West False River barrier, have been strengthened in recent years and have sufficient height to contain anticipated floodwater surface elevations. In addition, implementation of the 2015 EDB project included placement of rock fill along the Jersey Island and Bradford Island levee toes approximately 225 feet upstream and downstream of the barrier centerline to strengthen the levees for barrier installation. For that project, 300 feet of sheet piles were installed parallel to the channel through the levees on both islands to a depth of approximately 35 feet, to prevent water piping beneath the levees from the river. These measures also limit flood hazard risks associated with the proposed project.

Discussion

The three new water quality monitoring stations in Railroad Cut and Woodward Cut would be similar to other existing water quality monitoring stations used by DWR in the Delta. The off-loading and stockpile sites that would be used for the proposed project are currently in use, and proposed activities would be consistent with existing operations. Therefore, neither the water quality monitoring station locations nor the off-loading and stockpile sites would affect hydrology and water quality (Protective Environmental Measure 2.5.1 in EIR Section 2.5, *Protective Environmental Measures*, would apply during ground-disturbing construction activities to protect water quality), and they are not discussed further in this section.

a) **Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?** *Potentially Significant Impact.* The placement and removal of rock through implementation of the proposed project has the potential to result in exceedance of applicable turbidity limits. In addition, the proposed drought salinity barrier would change tidal flow patterns in multiple Delta channels and would cause salinity (EC) to increase or decrease in some Delta channels. Temporary increases in turbidity during barrier installation and removal or significant changes in salinity (EC) would be a potentially significant impact. Therefore, these issues will be evaluated in the Draft EIR.

b) **Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?** *No Impact*. The proposed project would cause small changes in local tidal elevations, but would result in almost no change to mean tidal elevations, which primarily control subsurface seepage and adjacent groundwater elevations. No effects on seepage flows are expected in the vicinity of the proposed barrier. Before construction of the 2015 EDB, the adjacent levees were strengthened by Reclamation District 830 at Jersey Island and Reclamation District 2059 at Bradford Island; this also likely reduced seepage flows at these sites. However, this reduced local seepage would not likely change groundwater elevations in the vicinity of the West False River barrier. No effects on groundwater hydrology (elevation and seepage flow) would occur from temporary construction, presence, and removal of the drought salinity barrier, and the proposed project would not impede the sustainable groundwater management of the basin. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

c.i) **Would the project 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?** *Potentially Significant Impact.* The proposed project would block tidal flows (and velocities) in West False River, but tidal flows that otherwise would have flowed into or out from West False River would be redistributed to adjacent channels (e.g., Fisherman's Cut, Dutch Slough, and the mouth of Old River), which would experience greater tidal flows. Based on previous installations, the expected changes in erosion or siltation resulting from the temporary construction and removal of the drought salinity barrier would be minimal; however, if substantial changes were to occur, this would be a potentially significant impact. This issue will be evaluated in the Draft EIR.

c.ii) **Would the project 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 offsite?** *Less-than-Significant Impact.* The proposed project would block the normal tidal flows in West False River, but seepage flow through the barrier rocks for the 2015 EDB is estimated to have been well below 5 percent of the channel flow. The proposed project would occur when flood storage capacity in upstream reservoirs would be available to capture upstream runoff (i.e., during drought conditions). Therefore, the construction, presence, and removal of the drought salinity barrier would not substantially increase the rate or amount of surface runoff in a manner that would result in on- or off-site flooding. This impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c.iii) **Would the project 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 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?** *Less-than-Significant Impact.* The proposed project would not affect any stormwater drainage systems, and therefore would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. The proposed project also would not provide any substantial additional sources of polluted runoff. Furthermore, Protective Environmental Measure 2.5.1 would be implemented as part of the contract specifications to minimize potential impacts of polluted runoff from the proposed project (see Draft EIR Section 2.5, *Protective Environmental Measures*). Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c.iv) **Would the project 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 create or contribute runoff water which would impede or redirect flood flows?** *Potentially Significant Impact.* The proposed project would be in place potentially from mid to late April (construction in West False River would begin no sooner than April 1 and full removal would occur by November 30 of the same year or subsequent year). Because of low Sierra Nevada snowpack and excess storage capacity in upstream reservoirs during drought conditions, and the lack of historic flooding from high flows before November 30 under such conditions, only a minimal chance of flood flows in the Delta would exist before removal of the proposed barrier if it were installed and removed in the same year.

During significant flood events, about one-third of the San Joaquin River's maximum flood flow entering the Delta (in January 1997, 60,000 cfs) moves down the river channel past Stockton. About two-thirds flows into the South Delta to the Grant Line and Victoria canals, and moves down the Middle River channel (15,000 cfs) to the San Joaquin River and subsequently down the Old River channel (25,000 cfs) to Franks Tract. Modeling of such a flood event by DWR's Delta Simulation Model II, known as DSM2, shows that the portion of the San Joaquin River flood flow that moves from Franks Tract through False River is about 10,000 cfs. If a major flood flow were to occur in the San Joaquin River while the drought salinity barrier was in place, this portion of the flood flow would be redirected to the mouth of Old River, Fisherman's Cut, and Dutch Slough.

Because the proposed project may be in place for two consecutive years, the Draft EIR will evaluate the potential for the proposed project to impede or redirect flood flows.

d) **In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?** *Less-than-Significant Impact.* The proposed project would not result in inundation from being located in a flood hazard, tsunami, or seiche zone. The project site is located in a 100-year FEMA flood zone. Construction of the proposed project would involve the short-term transport and use of common hazardous materials; however, a water quality control plan would be implemented as part of the contract specifications (Protective Environmental Measure 2.5.1 in Chapter 2, *Project Description,* of the Draft EIR). No hazardous materials would be used after removal of the barrier. Therefore, the proposed project would not risk the release of pollutants due to inundation. A seiche would not be possible at the proposed barrier site. The potential for a tsunami would be negligible, especially given the temporary nature of the proposed project. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

e) **Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?** *Less-than-Significant Impact.* The temporary drought salinity barrier would be installed in West False River no sooner than April 1 and removed by November 30 of the same year or subsequent year. There would be no seepage effects from the proposed project that would cause local changes to groundwater quantity or quality. Furthermore, the 2015 and 2021/22 EDBs were found to protect water quality, as they helped to keep high-salinity water out of the Central and South Delta. The proposed project would have similar effects and would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

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Land Use and Planning

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
LAND USE AND PLANNING — Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

Environmental Setting

The project site is located between Jersey and Bradford islands in Contra Costa County, approximately 0.4 mile east of the confluence of West False River with the San Joaquin River, about 4.8 miles northeast of Oakley (see Figure 1-2 in Chapter 1, *Introduction*, of the Draft EIR).

Jersey Island is located within the service area of Reclamation District 830. The district, which encompasses only Jersey Island, was created in 1911, disperses recycled water on irrigated hay crops, and maintains the island’s levees and drainage facilities (LAFCO 2015). Bradford Island is located within Reclamation District 2059, which encompasses approximately 2,200 acres and 7.5 miles of levees. Reclamation District 2059 was created in 1921 to maintain and improve levees and maintain and operate the drainage control system consisting of pumps, canals, and ditches; Reclamation District 2059 also operates the local ferry service (LAFCO 2015).

West False River consists of open water, and the shoreline at the project site is completely rock-lined. The surrounding land uses in the project vicinity are agricultural. Nine marinas operate on the southwest side of Franks Tract, approximately 1.5 to 4.5 miles east of the project site. Three other marinas exist along Taylor Slough, approximately 1.5 to 2.1 miles to the south (see the “Recreation” section for further discussion). These marinas support extensive recreational opportunities, including boating, swimming, and fishing.

One rural residence is located in the immediate vicinity of the project site, approximately 1,800 feet east of the site of the proposed drought salinity barrier. Additional residences are located on Bradford Island and are accessible only by ferry. The nearest residential areas, on nearby Bethel Island, are about 8,500 feet south of the project site.

The existing off-loading and stockpile sites are located in existing industrial areas.

The proposed water quality monitoring stations located in Railroad Cut and Woodward Cut are approximately 2.9 miles northwest and 2 miles east, respectively, from the community of Discovery Bay.

Contra Costa County General Plan Land Use Designations and Zoning

The areas adjacent to the project site are designated by the Land Use Element of the *Contra Costa County General Plan 2005–2020* as Delta Recreation and Resources (to the north) and Public and Semi-Public (to the south) (Contra Costa County 2005).

The Delta Recreation and Resources land use designation encompasses the islands and adjacent lowlands of the Delta, excluding Bethel Island and the community of Discovery Bay. The intent of this land use designation is to balance the area's recreational opportunities against the need to allow only low-intensity uses that will not subject large numbers of residents or visitors to flood dangers. Allowable uses under the Delta Recreation and Resources land use designation include agricultural production and processing activities, wildlife habitat preservation, and low-intensity recreational uses (i.e., hunting or fishing).

The Public and Semi-Public land use designation includes properties owned by public governmental agencies such as libraries, fire stations, and schools. This land use designation is also applied to public transportation corridors (freeways, highways, and Bay Area Rapid Transit [i.e., BART]), as well as privately owned transportation and utility corridors such as railroads, Pacific Gas and Electric Company lines, and pipelines.

The site is zoned by Contra Costa County as General Agricultural (A-2); the area just south of the location of the proposed temporary barrier is zoned Heavy Agricultural (A-3). These districts were established for all types of agriculture, agricultural uses, a farm stand, a detached single-family dwelling, a foster home, family day care, and a residential second unit (Contra Costa County 2020).

The areas adjacent to the three proposed water quality monitoring stations are zoned as General Agricultural (AG-80) (San Joaquin County 2020).

Land Use and Resource Management Plan for the Primary Zone of the Delta

The Delta Protection Commission (DPC) has planning jurisdiction over portions of five counties: Contra Costa, Sacramento, San Joaquin, Solano, and Yolo. The DPC was charged with developing a comprehensive regional plan to guide land use and resource management. The resulting *Draft Land Use and Resource Management Plan for the Primary Zone of the Delta* (Management Plan) was initially adopted by the DPC in February 1995 and updated in 2010. The project site is in the Delta Primary Zone. The Management Plan includes the following goal and policy regarding land use and agricultural resources (DPC 2010):

> **Goal:** Protect and enhance long-term water quality in the Delta for agriculture, municipal, industrial, water-contact recreation, and fish and wildlife habitat uses, as well as all other beneficial uses.
>
> > ***Policy P-1:*** State, federal and local agencies shall be strongly encouraged to preserve and protect the water quality of the Delta both for in-stream purposes and for human use and consumption.

Delta Plan

The Sacramento–San Joaquin Delta Reform Act of 2009, created by SB 1X7, established the co-equal goals for the Delta of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" (Public Resources Code Section 29702; Water Code Section 85054). These coequal goals are to be achieved "in a manner that protects and enhances the unique cultural, recreational, natural resources, and agricultural values of the Delta as an evolving place" (Water Code Section 85054).

The Delta Reform Act also established the Delta Stewardship Council (DSC). The DSC is tasked with furthering the State of California's coequal goals for the Delta by developing the Delta Plan, a comprehensive, long-term resource management plan for the Delta that contains both regulatory policies and recommendations aimed at furthering the coequal goals and promoting a healthy Delta ecosystem. The Delta Plan (DSC 2013) provides for a distinct regulatory process for activities that qualify as Covered Actions under Water Code Section 85057.5. State and local agencies proposing a Covered Action, before initiating implementation of that action, must prepare a written certification of consistency with detailed findings regarding consistency with applicable Delta Plan policies and submit that certification to the DSC.

California State Lands Commission

The CSLC has jurisdiction over nearly 4 million acres of lands throughout the state that underlie navigable and tidal waterways. Known as *sovereign lands*, these lands include riverbeds, streams, sloughs, nonnavigable lakes, tidal navigable bays and lagoons, and tidal and submerged lands adjacent to the coast and offshore islands from the mean high-tide line to 3 nautical miles offshore. West False River is both tidal and navigable; therefore, it is under the jurisdiction of the CSLC.

The public's right to use California's waterways is protected by the Common Law doctrine of the Public Trust, and the CSLC has administrative jurisdiction over the State of California's Public Trust lands. The Public Trust refers to the basic right of the public to use its waterways to engage in commerce, navigation, fisheries, boating, rafting, sailing, rowing, fowling, skiing, and other water-related public uses.

Discussion

The three new water quality monitoring stations in Railroad Cut and Woodward Cut would be similar to other existing water quality monitoring stations used by DWR in the Delta and would not affect existing land uses in the area. The off-loading and stockpile sites that would be used for the proposed project are currently in use, and proposed activities would be consistent with existing operations. Therefore, neither the water quality monitoring station locations nor the off-loading and stockpile sites would affect land use and planning, and they are not discussed further in this section.

a) **Would the project physically divide an established community?** *No Impact.* One rural residence is located approximately 1,800 feet east of the site of the proposed drought salinity barrier. This residence is not part of a formally or informally established community. Residences on Bradford Island would remain accessible by ferry while the drought salinity barrier is in place. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

b) **Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?** *Less-than-Significant Impact.* As discussed above, the proposed drought salinity barrier would be located adjacent to areas that are designated by the *Contra Costa County General Plan 2005–2020* as Delta Recreation and Resources and Public and Semi-Public and zoned primarily for agricultural use. Implementation of the proposed project would consist of installing and removing the temporary barrier and possibly notching the barrier. No project activities would directly occur on lands subject to these land use designations or zoning. The proposed project would cause small, local changes in tidal height and flow velocity, but almost no change in mean tidal elevations would result. Therefore, with the barrier in place, the operation of water intakes near the barrier would not be affected by lower water levels. The proposed project would not preclude agricultural land uses.

Given the stated purpose of the proposed project, it would be consistent with the goal of the Management Plan to protect and enhance long-term water quality in the Delta for agriculture, municipal, industrial, water-contact recreation, and fish and wildlife habitat uses, as well as all other beneficial uses. The proposed project also would be consistent with Management Plan Policy P-1, which encourages State, federal, and local agencies to preserve and protect the water quality of the Delta both for instream purposes and for human use and consumption.

The proposed project seeks to protect the quality of water for users that rely on Delta water. As discussed previously, the proposed project would benefit communities and farmers because once installed, the barrier would reduce demand for reservoir releases to maintain salinity objectives in the Delta, thus leaving more water in upstream reservoirs that could be released later for critical upstream fisheries and community needs. Therefore, the proposed project is consistent with the Management Plan.

West False River is both tidal and navigable; therefore, it is under the jurisdiction of the CSLC and would be subject to a public navigational easement. (Such an easement ensures that the public has the right to navigate on State waters that can be physically navigated by oar or motor-propelled small craft.) Boat traffic on West False River upstream and downstream of the barrier would be temporarily restricted while the barrier is in place. Alternative routes would be available, such as through Fisherman's Cut or Taylor Slough.

As described in Protective Environmental Measure 2.5.4, *Install In-Water Navigational Buoys, Lights, and Signage*, in Draft EIR Chapter 2, *Project Description,* as part of the contract specifications, DWR would install navigational buoys, lights, and signage in West False River upstream and downstream of the proposed drought salinity barrier, and near Fisherman's Cut, to advise boaters of the presence of the barrier and maintain navigation along both waterways. Temporary floating signs and buoys would be anchored to the bottom with cables and concrete anchor blocks. Because the barrier would be temporary and alternative navigational routes would be available, the proposed project would not violate the Public Trust doctrine as safeguarded by the CSLC.

Specific impacts associated with other resource and issue areas are addressed in the EIR the resource issue sections of Chapter 3, *Environmental Setting and Impacts*, where appropriate. These sections provide a detailed analysis of other relevant environmental effects of project implementation and identify mitigation measures, if necessary, to reduce the effects to a less-than-significant level. Thus, the proposed project would not cause a significant environmental impact due to a conflict with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. This impact would be less than significant.

References

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Mineral Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Environmental Setting

In compliance with the Surface Mining and Reclamation Act, the California Geological Survey has established a classification system to denote both the location and the significance of key extractive resources. The project site has not been classified by the California Geological Survey as a mineral resource zone.

The project site is located in Contra Costa County. The Conservation Element of the *Contra Costa County General Plan 2005–2020* does not designate the project site as a locally important mineral resource recovery site (Contra Costa County 2005:Figure 8-4).

Discussion

a) **Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?** *No Impact.* Construction of the proposed project would require a total of approximately 84,000 cubic yards of basketball-sized rock, which would be obtained from a commercially operated quarry located near San Rafael, or from DWR's Rio Vista or Weber stockpile sites. Rock may be reused for future project-related construction or another project. Using rock from existing quarries to build the barrier would be an appropriate use of local mineral resources. Implementation of the proposed project would not affect the ability to recover mineral resources in the project vicinity, should any be present. The project site is not identified as a mineral resource zone. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

b) **Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?** *No Impact.* The project site is not designated as a locally important mineral resource recovery site in the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005:Figure 8-4). Thus, the proposed project would not result in the loss of locally important minerals. No impact would occur and this issue will not be evaluated in the Draft EIR.

References

Contra Costa County. 2005. *Contra Costa County General Plan 2005–2020.* Conservation Element*.* Martinez (CA): Department of Conservation and Development. Jan. 18, 2005 (reprint Jul. 2010). Viewed online at: https://www.contracosta.ca.gov/DocumentCenter/View/30918/Ch8-Conservation-Element?bidId=. Accessed: Jan. 9, 2020.

Noise

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
NOISE — Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Environmental Setting

Sound, Noise, and Acoustics

Sound is the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). *Noise* is defined as sound that is unwanted (loud, unexpected, or annoying). *Acoustics* is the physics of sound.

The amplitude of pressure waves generated by a sound source determines the perceived loudness of that source. A logarithmic scale is used to describe sound pressure level in terms of decibels (dB). The threshold of human hearing (near-total silence) is approximately 0 dB. A doubling of sound energy corresponds to an increase of 3 dB. In other words, when two sources at a given location are each producing sound of the same loudness, the resulting sound level at a given distance from that location is approximately 3 dB higher than the sound level produced by only one of the sources. For example, if one automobile produces a sound pressure level of 70 dB when it passes an observer, two cars passing simultaneously do not produce 140 dB; rather, they combine to produce 73 dB.

The perception of loudness can be approximated by filtering frequencies using the standardized A-weighting network. A strong correlation exists between A-weighted sound levels (expressed as dBA) and community response to noise. All noise levels reported in this section are in terms of A-weighting. As discussed above, doubling sound energy results in a 3-dB increase in sound. In typical noisy environments, noise-level changes of 1–2 dB are generally not perceptible by the healthy human ear; however, people can begin to detect 3-dB increases in noise levels. An increase of 5 dB is generally perceived as distinctly noticeable and a 10-dB increase is generally perceived as a doubling of loudness. The following are the sound level descriptors most commonly used in environmental noise analysis:

- ***Equivalent sound level (L_{eq})***: An average of the sound energy occurring over a specified time period. In effect, the L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The one-hour, A-weighted equivalent sound level ($L_{eq[h]}$) is the energy average of A-weighted sound levels occurring during a one-hour period.

- ***Maximum sound level (L_{max}):*** The highest instantaneous sound level measured during a specified period.
- ***Day-night average level (DNL or L_{dn}):*** The energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours (10 p.m. to 7 a.m.).

Sound from a localized source (i.e., *point source*) propagates uniformly outward in a spherical pattern, and the sound level attenuates (decreases) at a rate of 6 dB for each doubling of distance from a point/stationary source. Roadways and highways and, to some extent, moving trains consist of several localized noise sources on a defined path; these are treated as *line sources*, which approximate the effect of several point sources. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. Therefore, noise from a line source attenuates less with distance than noise from a point source with increased distance.

Groundborne Vibration

Groundborne vibration is energy transmitted in waves through the ground. Vibration attenuates at a rate of approximately 50 percent for each doubling of distance from the source. This approach considers only the attenuation from geometric spreading and tends to provide for a conservative assessment of the vibration level at the receiver.

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Vibration is typically described by its peak and root-mean-square amplitudes. The root mean square can be considered an average value over a given time interval. The peak vibration velocity is the same as the "peak particle velocity," generally presented in units of inches per second. *Peak particle velocity* is the maximum instantaneous positive or negative peak of the vibration signal and is generally used to assess the potential for damage to buildings and structures. The root-mean-square amplitude is typically used to assess human annoyance to vibration.

Existing Noise Setting

The surrounding land uses in the vicinity of the project site are agricultural and rural residences on both sides of West False River. One residential residence is located approximately 1,800 feet east of the site of the proposed drought salinity barrier; other residential properties are located approximately 1 mile west and 1.5 miles south of the project site.

Existing noise sources in the project vicinity include vehicular traffic, agricultural operations, and natural noise (i.e., vocalizations by birds and other wildlife, wind). No airports or airstrips are located nearby. However, because of the rural/agricultural nature of the land surrounding the project site, ambient noise levels are expected to be quite low—at or below 55 dBA L_{eq}, 50 dBA L_{eq}, and 45 dBA L_{eq} during the daytime, evening, and nighttime hours, respectively.

Local Noise Regulations

Contra Costa County

Noise standards in unincorporated Contra Costa County are set forth in the Noise Element of the *Contra Costa County General Plan 2005–2020* (Contra Costa County 2005). This element contains goals and policies to reduce or eliminate the effects of excessive noise on the community. Policy 11-2 of the Noise Element states that the standard for outdoor noise levels in residential areas is 60 dBA DNL. Policy 11-8 of the Noise Element specifies that construction should be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day, to provide relative quiet during the more sensitive evening and early morning periods.

Contra Costa County does not have an ordinance specifically addressing construction noise or establishing quantitative standards for construction activities. Noise complaints in the unincorporated area of the county are addressed by applying the peace disturbance sections and generic nuisance ordinances of the Contra Costa County Code.

San Joaquin County

The San Joaquin County General Plan and Municipal Code establish noise standards for transportation and stationary noise sources at outdoor areas of noise-sensitive uses. The standards restrict noise levels from stationary noise sources to 50 dBA L_{eq} and 70 dBA L_{max} during the daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA L_{eq} and 65 dBA L_{max} during the nighttime (10:00 p.m. to 7:00 a.m.) at the nearest location of off-site outdoor activity (i.e., the property line of the nearest noise receptor) (San Joaquin County 2016). Section 9-1025.9c of the San Joaquin County Municipal Code exempts construction activities from noise standards if they are conducted between 6:00 a.m. and 9:00 p.m. on any day.

Furthermore, Section 9-1025.5c of the Municipal Code exempts vibration from the construction or demolition of structures or infrastructure, and vibration caused by motor vehicles or trains, from the code’s vibration standards.

Discussion

The off-loading and stockpile sites that would be used for the proposed project are currently in use, and proposed activities would be consistent with existing operations and would not alter noise levels. Therefore, the off-loading and stockpile sites are not discussed further in this section.

a) **Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?** *Less-than-Significant Impact.* The proposed project consists of installing a temporary drought salinity barrier, made of rock, across West False River. The drought salinity barrier may be installed in response to drought conditions up to two times over the 10-year period of 2022–2031. Construction activities at the drought salinity barrier site would begin no sooner than April 1 of the installation year. Transit to and from stockpile locations and mobilization may occur before April 1. Placement of rock would occur for up to 45 working days, during which DWR contractors may be required to work on a 24-hour basis as needed. Removal of rock could also occur continuously (i.e., 24 hours per day, 7 days per week) for up to 60 days and would be completed by November 30 of the same year. A notch may also be placed in the middle portion of the barrier in early January of the second year of installation and refilled as early as the first week of April.

Chapter 2, *Project Description*, of the Draft EIR identifies the construction equipment that would be used for installation and removal of the drought salinity barrier.

Table 4 shows the noise levels from project construction activities at the nearest residential property, located approximately 1,800 feet east of the site of the proposed drought salinity barrier. Noise levels were estimated using the Federal Highway Administration's Roadway Construction Noise Model, assuming simultaneous operation of a crane and a tugboat to generate the highest noise levels during installation and removal of the barrier. The combined noise levels during these phases would be 50 dBA L_{eq}. As discussed previously, no local policies or standards have been specified by Contra Costa County to quantitatively assess the significance of a short-term increase in ambient noise levels from construction activities. Policy 11-8 of the Contra Costa County General Plan's Noise Element restricts construction activities to the daylight hours to provide relative quiet during the more sensitive evening and early morning periods. Because installation and removal of the drought salinity barrier could take place 24 hours a day, the impact during nighttime hours was compared to the Federal Transit Administration's (FTA) nighttime one-hour L_{eq} of 80 dBA, at residential land uses. This is the level at which adverse community reaction could occur (FTA 2018). Estimated noise from barrier construction and removal activities would be below FTA's 80 dBA nighttime threshold at the nearest receptors.

TABLE 4
ESTIMATED CONSTRUCTION NOISE LEVELS AT THE NEAREST RECEPTORS

Project Site/Component	Equipment Used	Distance to Nearest Sensitive Receptor	Noise Level at Receptor[a] (L_{eq}, dBA)	Duration of Activity
Barrier installation at West False River	Dump scows, radial stackers, excavator, derrick barge, tugboats, water truck	1,800 feet	50	45 days/up to 24 hours a day
Barrier removal at West False River	Derrick barge, excavators, crane, water truck, dump trucks, backhoe, loaders, material scows, tugboats	1,800 feet	50	60 days/up to 24 hours a day
Installation of water quality monitoring stations in San Joaquin County	Vibratory pile driver	1,400 feet	65	A few days/ daytime hours

NOTES: dBA = A-weighted decibels; L_{eq} = equivalent sound level (an average of the sound energy occurring over a specified time period)

a Represents the combined noise level of the two noisiest pieces of equipment adjusted to account for attenuation with distance to the receptor, as estimated using the Roadway Construction Noise Model.

SOURCE: FHWA 2006

Installation of the three water quality monitoring stations at Railroad Cut and Woodward Cut in San Joaquin County would involve the use of a vibratory pile driver to drive piles to a depth of up to 40 feet. Vibratory penetration rates are typically limited to 20 inches per minute, which would result in approximately 24 minutes of driving per pile for 40 feet of ground penetration, assuming normal driving conditions; this a conservative estimate because DWR has observed that piles can typically be driven more quickly in the Delta than elsewhere. Noise levels from vibratory pile driving could be as high as 95 dBA L_{eq} at 50 feet. With the nearest residences being 1,400–2,400 feet from the three pile driving locations, the noise levels from pile driving would be 65 and 60 dBA L_{eq}, respectively. Because pile driving would take place during daytime hours, it would be exempt from the San Joaquin County noise standards.

No substantial temporary or permanent increase in ambient noise levels would result in the vicinity of the project. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

b) **Would the project result in generation of excessive groundborne vibration or groundborne noise levels?** *Less-than-Significant Impact.* No permanent increase in groundborne vibration would result from the proposed project. Construction may cause varying degrees of temporary ground vibration, depending on the equipment used and the activities occurring.

Construction activities at the project site would produce negligible levels of groundborne vibration. The types of construction equipment used for project activities would include cranes, excavators, loaders, and trucks. This type of equipment is not identified by the California Department of Transportation (Caltrans 2013) or FTA (2018) as generating notable vibration. Additionally, construction activities would take place 1,800 feet or more from the nearest receptors, which would provide ample separation for attenuation if any vibration were to occur. For example, FTA identifies a reference vibration level of 87 vibration decibels at 25 feet from operations of a large bulldozer. Using vibration attenuation equations, the resultant vibration at 1,000 feet would be 40 vibration decibels. This is a vibration level of 50–55 vibration decibels, which is considered a typical background level.

Because construction for the installation of the water quality monitoring stations would take place during the daytime, it would be exempt from San Joaquin County's noise standards. Nevertheless, vibration from vibratory pile driving would attenuate to below the threshold beyond about 300 feet from the construction activities. The nearest residences are approximately 1,400 feet from the site of the proposed Woodward Cut monitoring station.

For these reasons, the proposed project would not generate excessive groundborne vibration or groundborne noise levels, and this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?** *No Impact.* Rio Vista Municipal Airport is approximately 9.5 miles to the north and the Delta Air Park is approximately 4.7 miles south of the project site. The three proposed water quality monitoring stations also are not located within 2 miles of a public airport. Because the project site is not located within 2 miles of a public or private airport, and because project activities would not involve any aircraft uses for construction or while the drought salinity barrier is in place, the proposed project would not affect any airport operations or expose people on- or off-site to excessive noise levels. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

References

California Department of Transportation (Caltrans). 2013. *Transportation and Construction Vibration Guidance Manual.* Sept. 2013.

Contra Costa County. 2005. *Contra Costa County General Plan 2005–2020.* Chapter 11, Noise Element. January 18, 2005 (reprint July 2010).

Federal Highway Administration (FHWA). 2006. *Roadway Construction Noise Model (RCNM) Version 1.0 and Users Guide.* Feb. 2006.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. Sept. 2018.

San Joaquin County. 2016. *San Joaquin County General Plan—Policy Document*. Dec. 2016.

Population and Housing

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
POPULATION AND HOUSING — Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Environmental Setting

The project site spans West False River from Bradford Island to Jersey Island in the Delta and in an unincorporated area of Contra Costa County. The populations of Jersey Island and Bradford Island are 3 and 63 residents, respectively (Contra Costa County Grand Jury 2016). Scattered residences are also present in the project vicinity along West False River. One residence is located approximately 1,800 feet east of the site of the proposed drought salinity barrier. The closest residences to the Railroad Cut and Woodward Cut water quality monitoring stations are approximately 2,400 feet east and 1,400 feet east, respectively.

The nearest community to the project site is on Bethel Island, located in unincorporated Contra Costa County approximately 8,500 feet to the south. Bethel Island has an estimated population of 2,379 (U.S. Census Bureau 2017). A recreational vehicle community is located approximately 1,200 feet from the existing off-loading and stockpile sites. The community of Discovery Bay is located approximately 2.9 miles southwest and 2 miles west of the water quality monitoring stations located at Railroad Cut and Woodward Cut, respectively.

Discussion

a) **Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?** *No Impact.* The proposed project would not involve constructing new homes or businesses or extending roadways or other infrastructure that could increase the population in the project vicinity. Project construction activities would be performed within approximately 45 days, and removal of the drought salinity barrier would take up to 60 days. A notch may also be placed the middle portion of the barrier in early January of the second year of installation and refilled as early as the first week of April. Construction and removal are anticipated to require approximately 21 workers. The source of the construction labor force is unknown at this time, but some of the workers would likely come from the local labor pool, with the remainder coming from nearby locations in the region.

No new additional workers are expected for maintenance of the drought salinity barrier. Project-related maintenance would require a minimal staff to inspect the barrier regularly and inform the permitting agencies if any major maintenance activities are required. DWR would maintain the navigational aids (e.g., signage, buoy lines) and coordinate with the California Department of Parks and Recreation, Division of Boating and Waterways, for the removal of nonnative invasive freshwater plants, including water hyacinth, as needed, while the drought salinity barrier is in place.

Implementing the proposed project would not directly or indirectly induce substantial unplanned population growth. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

b) **Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?** *No Impact.* None of the proposed project activities would displace existing residences or people, and the proposed project would not necessitate construction of replacement housing elsewhere. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

References

Contra Costa County Grand Jury. 2016. *Delta Levees in Contra Costa County: How Well Do We Protect This Vital Safety System?* Contra Costa County 2015–2016 Grand Jury Report 1607. Martinez (CA). May 31, 2016. Viewed online at: https://www.cc-courts.org/civil/docs/grandjury/1607_ReportSigned.pdf. Accessed: Jan. 9, 2020.

U.S. Census Bureau. 2017. Community Facts. Bethel Island CDP.

Public Services

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
PUBLIC SERVICES —				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Environmental Setting

Some Delta islands such as Bethel Island have fire protection services, and others do not, including Bradford Island. The East Contra Costa Fire Protection District consists of three stations that provide emergency medical services, fire suppression, rescue, and hazardous materials response to the cities of Brentwood and Oakley and the unincorporated communities of Bethel Island, Discovery Bay, Knightsen, and Byron (ECCFPD 2020). The closest East Contra Costa Fire Protection District station to the project site is Station 93, located approximately 6 miles southwest in the city of Oakley. Bradford Island is not within the service area of any fire protection district and firefighting is the responsibility of property owners. However, East Contra Costa Fire Protection District aids in evacuation during fire emergencies, if necessary, to preserve lives (Dreier et al. 2010).

The Contra Costa County Sheriff's Department provides law enforcement services in the unincorporated portions of Contra Costa County and in special districts, as well as contracted services with the Contra Costa County Housing Authority, AC Transit, Contra Costa Water District, and Contra Costa Regional Medical Center (Contra Costa County Sheriff's Department 2020). The Sheriff's Department headquarters and dispatch office is in the city of Martinez, approximately 25 miles southwest of the project site.

Discussion

The three new water quality monitoring stations in Railroad Cut and Woodward Cut would be similar to other existing water quality monitoring stations used by DWR in the Delta and would not affect public services. The off-loading and stockpile sites that would be used for the proposed project are currently in use, and proposed activities would be consistent with existing operations.

Therefore, neither the water quality monitoring station locations nor the off-loading and stockpile sites would affect public services, and they are not discussed further in this section.

a.i) **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection?** *Less-than-Significant Impact.* Access to the project site would be maintained during project activities, and in the event of a fire at the project site, Jersey Island Road, Bethel Island Road, and other local roadways could accommodate firefighting crews and equipment.

Bradford Island is located north of the project site. Emergency services access to the island is provided via the ferry slip located on the island's southwest tip, or by helicopter. The Bradford Island ferry slip would remain open during construction and would not be obstructed while the barrier is in place, and Bradford Island would remain accessible by helicopter.

In addition, the proposed project would not generate new residents in the project area, nor would it involve constructing any structures that would require additional fire protection services. Therefore, implementing the proposed project would not require the construction of new or expansion of existing fire protection services and facilities, the construction of which could cause significant physical environmental effects, in order to maintain response times. This impact would be less than significant and this issue will not be evaluated in the Draft EIR.

a.ii) **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection?** *Less-than-Significant Impact.* The proposed project would not include any new housing, businesses, or other development that would increase demand for police protection services and facilities.

Law enforcement for the project site would be provided by the Contra Costa County Sheriff's Department. Bradford Island is located north of the project site, and the island is accessible only via the ferry slip located on the island's southwest tip or by helicopter. The Contra Costa County Sheriff's Department provides law enforcement services to Bradford Island via marine patrol.

The Bradford Island ferry slip would remain open during construction and would not be obstructed while the drought salinity barrier is in place, and Bradford Island would remain accessible by helicopter.

The proposed project could affect emergency response times upstream and downstream of the barrier location because the barrier would block passage through West False River. Boats would have to detour around the drought salinity barrier, using Fisherman's Cut or Taylor Slough to access West False River. Given the temporary nature of the proposed project and the availability of alternate routes, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

a.iii) **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for schools?** *No Impact.* The proposed project would not provide any new housing that would generate new students in the community. Therefore, implementing the proposed project would not increase the demand for school services and facilities. No impact would occur and this issue will not be evaluated in the Draft EIR.

a.iv) **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for parks?** *No Impact.* The proposed project would not provide any new housing that would generate new residents who would require new or expanded park facilities. No impact would occur and this issue will not be evaluated in the Draft EIR.

a.v) **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for other public facilities?** *No Impact.* No other public facilities exist in the project area that would be affected by implementing the proposed project. No impact would occur and this issue will not be evaluated in the Draft EIR.

References

Contra Costa County Sheriff's Department. 2020. About the District. Viewed online at: https://www.cocosheriff.org/. Accessed: Jan. 9, 2020.

Dreier H, Coetsee R, Salonga R. 2010. "Bradford Island Residents Fight Blaze without Aid of Firefighters." Contra Costa Times, Jul. 6, 2010. Viewed online at: https://www.eastbaytimes.com/2010/07/06/bradford-island-residents-fight-blaze-without-aid-of-firefighters/. Accessed: Jan. 9, 2020.

East Contra Costa Fire Protection District (ECCFPD). 2020. About the District. Viewed online at: https://www.eccfpd.org/about-the-district. Accessed: Jan. 9, 2020.

Recreation

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
RECREATION —				
a) Would the project 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?	☒	☐	☐	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☒	☐	☐	☐

The environmental setting and potential impacts of the Proposed Project related to recreation are discussed in greater detail in Draft EIR Section 3.6, *Recreation*.

Environmental Setting

West False River provides direct waterway access from the San Joaquin River to Franks Tract State Recreation Area, which is accessible only by boat. Because of the limited access, exposure to strong winds and shallow fluctuating water levels, recreational use of Franks Tract is primarily by anglers and waterfowl hunters (State Parks 2020).

Nine marinas operate on the southwest side of Franks Tract, approximately 1.5 to 4.5 miles east of the project site. Three other marinas are along Taylor Slough, approximately 1.5 to 2.1 miles to the south. All of the marinas support extensive recreational opportunities, including boating, swimming, fishing, golfing, and hiking. In addition, dozens more marinas and other facilities offer boat access to the Sacramento River and other channels in the Delta, for access to the project vicinity (Delta Recreation 2006).

Discussion

The off-loading and stockpile sites that would be used for the proposed project are currently in use, and these sites are closed to public access; activities would be consistent with existing operations. Therefore, the off-loading and stockpile sites would not affect recreation, and they are not discussed further in this section.

a) **Would the project 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?** *Potentially Significant Impact.* The proposed project is not anticipated to increase the use of existing neighborhood and regional parks or other recreational facilities. However, implementation of the proposed project has the potential to affect recreational use around the project site temporarily while the barrier is installed and in place in West False River.

b) **Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on**

the environment? *Potentially Significant Impact.* The proposed project would not generate any additional population that would increase demand on recreational facilities. The proposed drought salinity barrier, which could be present from April 1 to November 30 (with removal the same year or subsequent year) in up to two in 10 years during the period from 2023 to 2032, without a notch, would result in the closure of boat traffic through West False River to and from the San Joaquin River, nearby marinas, and Franks Tract State Recreation Area. Although West False River access would be restricted, alternative routes to and from the San Joaquin River, nearby marinas, and Franks Tract State Recreation Area would be available.

During construction and installation of the drought salinity barrier, signs would be posted at both entrances to False River informing boaters of the closure, and a notice of the availability of alternative routes (e.g., Stockton Deep Water Ship Channel in the San Joaquin River for navigation between Antioch and eastern Delta locations, or via Fisherman's Cut to South Delta destinations) would be posted on DWR's website.

DWR would also install signs on each side of the barrier and float lines with orange ball floats across the width of the channel to deter boaters from approaching the barrier, along with solar-powered warning buoys with flashing lights on the barrier crest to prevent nighttime accidents. Navigation signage would comply with requirements set forth by the U.S. Aids to Navigation System and the California Waterway Marker System, as appropriate. DWR would coordinate with U.S. Coast Guard District 11 and the California Department of Parks and Recreation, Division of Boating and Waterways, regarding safe vessel passage procedures. DWR or the contractor would post a notice to mariners, which would include information on the location, date, and duration of channel closure. After removal of the drought salinity barrier in November, full recreational boat access would resume in the waterway.

The DEIR will evaluate the potential for the proposed project to require the construction or expansion of recreational facilities that might have an adverse effect on the environment.

References

California Department of Parks and Recreation (State Parks). 2020. Franks Tract State Recreation Area. Viewed online at: https://www.parks.ca.gov/?page_id=490. Accessed: Jan. 9, 2020.

Delta Recreation. 2016. Sacramento Delta Recreation Map. Viewed online at: https://www.deltarecreation.com/. Accessed: Jan. 9, 2020.

Transportation

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
TRANSPORTATION — Would the project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☒	☐

Environmental Setting

Roads in the project vicinity include Jersey Island Road, Airport Road, SR 160, and SR 84 (River Road).

State Highways

SR 160 is the primary State highway that provides access to the portion of the Delta located in the project vicinity. It is a north-south conventional highway. In the project vicinity, SR 160 begins in Antioch and mostly parallels the Sacramento River to its intersection with SR 220 near Walnut Grove. SR 160 is located about 3.6 miles west of the proposed drought salinity barrier site.

SR 84, another State highway in the project vicinity, is a two-lane conventional highway that extends from the Solano County line to the West Sacramento city limits. SR 84 is located about 7.25 miles north of the proposed drought salinity barrier site and intersects with SR 12 approximately 1 mile south of the off-loading site.

Local Roadways

The project site can be accessed via land by Jersey Island Road. Jersey Island Road is a two-lane levee road that extends from East Cypress Road in the south. Jersey Island Road extends to the north, crosses Dutch Slough, then heads north parallel to Taylor Slough for approximately 3 miles to a point where it turns east and parallels West False River. The portion of the project site located on Bradford Island is accessible only via boat.

The rock stockpile site in Rio Vista is accessed by vehicle from Airport Road via SR 84 (River Road) and to the north along SR 84 to the off-loading site on the Sacramento River; however, rock would be transported to/from the project site by barge. SR 84 (River Road) is a split-section California State highway. The first section is an east-west arterial road running from San Gregorio to Menlo Park, across the Dumbarton Bridge through Fremont and Newark, and ending at Interstate 580 in Livermore. The other section (which is in the project area) is a north-south arterial road that begins at SR 12 in Rio Vista, passes through Ryer Island (where it connects to

SR 220), and ends at the Interstate 80 interchange in West Sacramento. Airport Road is a two-lane road that extends from River Road (SR 84) to Liberty Island Road to the northeast. The stockpile is located along Airport Road.

Navigation

West False River provides a connection between the San Joaquin River and Fisherman's Cut and Franks Tract State Recreation Area (Figure 2-1 in Draft EIR Chapter 2, *Project Description*). West False River is approximately 18–35 feet deep as measured at mean lower low water, North American Datum of 1983, and 815 feet wide (NOAA 2005). Mariner warnings are posted indicating that unknown pipes, snags, and other submerged dangers may be present (NOAA 2005).

Nine marinas operate on the southwest side of Franks Tract, approximately 1.5 to 4.5 miles east of the project site. Three other marinas are located along Taylor Slough, approximately 1.5 to 2.1 miles to the south. Each marina supports a variety of recreational opportunities, including boating, swimming, fishing, and other water-related public uses. In addition, dozens more marinas and other facilities offer boat access to the Sacramento River and other channels in the Delta, which provide boating access to the project vicinity.

The rock for barrier material would be sourced either from a commercially operated quarry located near San Rafael or from DWR's Rio Vista or Weber stockpile. Rock sourced from near the San Rafael quarry would transported by barge to the project site from San Pablo Bay, through the Carquinez Strait and Suisun Bay, to Broad Slough and the San Joaquin River past the SR 160 Bridge and Big Break Recreation Area, before reaching West False River.

The off-loading sites for rock during barrier removal would be located on the west shoreline of the Sacramento River north of the SR 12 bridge or off West Weber Avenue in Stockton (accessible by barge). During barrier removal, barges traveling to the Rio Vista stockpile site from the project site would travel to the San Joaquin River, north through Threemile Slough to the Sacramento River, and then to the off-loading site. Threemile Slough is one of the most heavily used waterways within the western Delta because it is a major shortcut between the Sacramento and San Joaquin rivers. This waterway enables watercraft to avoid the longer, 20-nautical-mile route from the Sacramento River through Broad Slough (located between Winter and Kimball islands) to the San Joaquin River. Barges traveling to the Weber stockpile site from the project site would travel along the Stockton Deep Water Channel.

All waterways of San Francisco Bay, San Pablo Bay, the Carquinez Strait, Suisun Bay, the Sacramento River, and the San Joaquin River are designated as Regulated Navigation Areas by the U.S. Coast Guard. Navigation within Regulated Navigation Areas and shipping channels is governed by U.S. Coast Guard regulations. The U.S. Coast Guard's inland water navigation rules also require large vessels (1,600 or more gross tons) and naval vessels to navigate within designated traffic lanes when traveling in inland waterways, including portions of the Sacramento and San Joaquin rivers.

Bicycle Facilities, Public Transit Facilities, and Airports

No bicycle facilities or airports exist in the project vicinity.

The *Victory II* is a free-running (no cable) ferry operated by the Delta Ferry Authority to transport vehicles from Jersey Island to both Webb Tract and Bradford Island. The ferry operates through a joint-powers agreement between Bradford Island Reclamation District 2059 and Webb Tract. The *Victory II* ferry runs on the hour (except noon) from 9 a.m. to 5 p.m. Monday through Friday, and on the hour from 8 a.m. to 12 noon on Saturday and 11 a.m. to 3 p.m. on Sunday (Bradford Island Reclamation District 2059 2022).

During the 2015 EDB project, the ferry became grounded several times, resulting in a damaged propeller and cessation of ferry operations (Gafni 2015) while the EDB was in place. The difficulties were mainly a result of increased velocity flows at the Bradford Island ferry slip (Gafni 2015). However, to address this issue, the *Victory II* ferry was upgraded with new engines and propellers, which were funded by DWR.

Discussion

a) **Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?**
Less-than-Significant Impact. Construction activities for the proposed project would not adversely affect road traffic or transportation patterns. Most materials and construction equipment would be brought to the project site by barge, and most construction work would take place in the water; transporting materials and heavy equipment for construction would require a minimal number of truck trips. Equipment and workers would use existing roadways to travel to the project area. No new access roads would be required. Therefore, the proposed project would not result in a substantial increase in traffic levels compared to existing conditions.

Materials hauled to the site by road would travel along local roadways, such as River Road and Airport Road. Roadway traffic would return to existing conditions after completion of the project. This analysis used the recommended screening criterion from the Institute of Transportation Engineers (ITE Transportation Planners Council 1988) for assessing the effects of construction projects that create temporary increases in traffic levels.

Daily truck traffic volumes were estimated using the maximum number of haul trucks anticipated for the proposed project, about 134 truck trips per day during 8- to 24-hour operations. Therefore, hourly volumes of haul trucks for the assigned route segments (River Road to Airport Road to the staging area) were estimated based on an even distribution of truck trips throughout the 8- to 24-hour construction work window, for a total of 12–17 truck trips per hour. Therefore, the proposed project is not anticipated to cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

Boat traffic on West False River would be temporarily restricted upstream and downstream of the barrier. Alternative routes are available via the Stockton Deep Water Ship Channel in the San Joaquin River for navigation between Antioch and locations in the eastern Delta, or via Fisherman’s Cut for travel to South Delta destinations.

In the South Delta (Discovery Bay to the San Joaquin River), large-mast vessels leaving from Discovery Bay would likely travel north to Old River, keep right at Franks Tract, then navigate north up to the San Joaquin River (Deep Water Channel). Smaller vessels leaving Discovery Bay would travel north to Old River, turn west to Sand Mound Slough, then navigate west on Dutch Slough toward the San Joaquin River past Big Break. Travel times for these detours would be approximately 40–50 minutes.

In the Central Delta (Bethel Island to the San Joaquin River), large-mast and smaller vessels would leave from the Taylor Slough or Piper Slough marinas, travel north toward False River, and then navigate north up Fisherman's Cut. From the Bethel Island marinas, large-mast and smaller vessels would travel south to Sand Mound Slough, then continue west on Dutch Slough toward the San Joaquin River past Big Break. Travel times for these detours would be approximately 30–40 minutes. Before the start of construction, U.S. Coast Guard District 11 and the California Department of Parks and Recreation, Division of Boating and Waterways, would be notified of construction activities and issue a notice to mariners about navigational restrictions within West False River. Boat traffic that normally uses West False River would be required to use other waterways during construction and while the barrier is in use. As detailed in Protective Environmental Measure 2.5.4, *Install In-Water Navigational Buoys, Lights, and Signage*, in EIR Chapter 2, *Project Description,* as part of the contract specifications, DWR would install navigational buoys, lights, and signage in West False River upstream and downstream of the West False River barrier, and near Fisherman's Cut, to advise boaters of the presence of the temporary barrier and maintain navigation along both waterways.

Access to the Bradford Island ferry slip would be maintained during project activities. Navigational buoys, lights, and signage would be installed in West False River and near Fisherman's Cut to advise boaters of the emergency barrier and maintain navigation. The notice to mariners would include information regarding the channel closure. Therefore, the impact on boat traffic would be mainly navigation delays caused by the detours.

The proposed project would not result in any substantial increase in traffic levels along the local roadways, nor would it conflict with a plan, ordinance, or policy addressing the circulation system, including transit, or designated bicycle and pedestrian facilities. Boat traffic may be temporarily affected, but alternative navigation routes would be provided and the proposed project would not substantially affect boat traffic. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

b) **Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?** *Less-than-Significant Impact.* State CEQA Guidelines Section 15064.3(a) states, "For the purposes of this section, 'vehicle miles traveled' refers to the amount and distance of automobile travel attributable to a project," where, in accordance with guidance provided by the California Governor's Office of Planning and Research (OPR 2018), "automobiles" refers to on-road passenger vehicles, specifically cars and light trucks. For this reason, this analysis of vehicle miles traveled (VMT) focuses on trips by passenger vehicles (i.e., cars and light trucks) generated by the proposed project. However, this Initial Study Environmental Checklist also includes an analysis of GHG emissions associated with heavy truck traffic generated by the proposed project (as well as other traffic), and addresses potential significant impacts of all proposed project vehicles—including heavy trucks—related to air quality, noise, and safety.

State CEQA Guidelines Section 15064.3(b)(3) refers to the use of a qualitative analysis of construction-related VMT. The *Contra Costa County Transportation Analysis Guidelines* (Contra Costa County 2020) provide a vehicle trip screening criterion that could be used to determine whether a VMT analysis is warranted for "small projects," defined as projects that would generate fewer than 110 trips per day and may generally be assumed to result in a less-than-significant VMT impact. The proposed project would require a work crew of approximately 21 workers, generating a maximum of 42 worker trips per day (assuming no carpooling). Therefore, daily passenger vehicle trips generated by the proposed project would be well below Contra Costa County's trip generation screening threshold of 110 trips per day. As a result, construction impacts related to a potential conflict with State CEQA Guidelines Section 15064.3(b) would be less than significant.

Public services (e.g., police protection, fire stations, public utilities) do not generally generate VMT. Instead, land uses related to public services are often built in response to the development of other land uses (e.g., office and residential). Upon completion of project construction, the proposed project would not generate any new trips, except for occasional maintenance similar to that conducted under existing conditions. Therefore, VMT with project operations would not differ from existing VMT, and operational impacts related to a potential conflict with State CEQA Guidelines Section 15064.3(b) would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?** *No Impact.* The proposed project would not include any change to roadway geometric design features in the project vicinity or introduce incompatible uses. Thus, the safety of the local transportation network would not be affected. The project's presence would not result in any changes to land uses and would not alter the compatibility of uses served by the roadway network. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

d) **Would the project result in inadequate emergency access?** *Less-than-Significant Impact.* Implementation of the proposed project would not require any road closures. Most project construction activities would occur in West False River; therefore, no traffic flow on any roadway would be substantially interrupted. Construction-related traffic increases would be minimal relative to roadway capacity, would be temporary, and would occur in an area with low levels of existing traffic.

Vessel traffic would be blocked at the proposed drought salinity barrier, thereby affecting emergency access on West False River. The Contra Costa Sheriff's Department, Marine

Patrol Division, provides emergency services to islands adjacent to West False River, including Bradford Island and Bethel Island. Marine patrols would detour around the barrier, using Fisherman's Cut or Taylor Slough to access West False River. Access to West False River would be affected, but the proposed project would be temporary and alternative routes would be available.

Therefore, the proposed project would not result in long-term impairment of or interference with emergency access to local roads and waterways, and would not substantially increase emergency response times or reduce emergency vehicle access in the long term. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

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California Governor's Office of Planning and Research (OPR). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Dec. 2018. Viewed online at: https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf. Accessed: Mar. 30, 2022.

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Tribal Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
TRIBAL CULTURAL RESOURCES —				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources. Code Section 5020.1(k), or	☒	☐	☐	☐
ii) 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☒	☐	☐	☐

The environmental setting and potential impacts of the Proposed Project on tribal cultural resources are discussed in greater detail in Draft EIR Section 3.7, *Tribal Cultural Resources*.

Environmental Setting

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, California Register of Historical Resources, or a local register of historical resources.

Discussion

a.i-ii) **Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k) and/or that is 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 Public Resources Code Section 5024.1?** *Potentially Significant Impact.* Based on the results of correspondence with the NAHC and the records search (described in Draft EIR Section 3.7, *Tribal Cultural Resources*), the proposed project would not affect any known tribal cultural resources that are listed or determined eligible for listing in the California

Register, or included in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), pursuant to Public Resources Code Section 21074(a)(1). DWR did not determine any resource potentially affected by the proposed project to be a tribal cultural resource considered significant under the criteria set forth in Public Resources Code Section 5024.1(c). Therefore, the proposed project is not anticipated to affect any such resources.

Although there is no substantial evidence of the presence of any tribal cultural resources in the project area, including those that meet the definition under Public Resources Code 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, as defined in Public Resources Code Section 21074, that were not identified on the surface. Any impacts of the proposed project on tribal cultural resources would be potentially significant, and these issues will be evaluated in the EIR.

References

No references cited in this section.

Utilities and Service Systems

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
UTILITIES AND SERVICE SYSTEMS — Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Environmental Setting

The proposed project would involve installing a temporary drought salinity barrier in West False River and installing three new water quality monitoring stations. None of the project's activities would require or result in the construction, expansion, or relocation of electric power, natural gas, or telecommunication facilities. Therefore, the following discussion is limited to water, wastewater, and solid waste facilities.

The project site is not served by any public water supply system or municipal wastewater collection and treatment systems. In addition, there are no stormwater drainage facilities in the project vicinity.

Solid waste generated during project construction would be disposed of at the Keller Canyon Landfill in Contra Costa County. The Keller Canyon Landfill is permitted to accept general residential, commercial, and industrial refuse for disposal, including municipal solid waste, construction and demolition debris, green materials, agricultural debris, and other debris designated as nonhazardous. The landfill can accept a maximum of 3,500 tons per day of solid waste. According to the California Department of Resources Recycling and Recovery, the Keller Canyon Landfill has permitted capacity to accept solid waste through December 31, 2050 (CalRecycle 2021).

Discussion

a) **Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?** *No Impact.* The proposed project would not include any new development that would require expanded water or wastewater treatment. Construction activities could generate a very minor amount of wastewater, associated primarily with worker sanitation. Portable restroom units would be available at the staging area for worker use. Wastewater would be collected and disposed of at a suitable facility located near the project site. The proposed project does not include the relocation, expansion, or construction of new water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects. Therefore, no impact would occur and this issue will not be evaluated in the Draft EIR.

b) **Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?** *Less-than-Significant Impact.* Construction activities would require water for dust suppression. The proposed project would require only a minimal amount of water, which would be supplied by water trucks and obtained at an existing nearby municipal source. In addition, the proposed project would not introduce any new development that would require public water supplies. Because existing water supplies are available and sufficient to support construction of the proposed project, and no new or expanded water facilities are required, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

c) **Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?** *No Impact.* As discussed in question a), construction activities could generate a minor amount of wastewater, associated primarily with worker sanitation. Portable restroom units would be available at the staging area for worker use. Wastewater would be collected and disposed of at a suitable facility located near the project site. The small amount of wastewater that would be generated temporarily during construction would not exceed any applicable wastewater treatment requirement of the Central Valley Regional Water Quality Control Board. In addition, the proposed project would not introduce any new development that would require wastewater treatment. Thus, the proposed project would not exceed a wastewater treatment provider's capacity. No impact would occur and this issue will not be evaluated in the Draft EIR.

d) **Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?** *Less-than-Significant Impact.* The proposed project would generate minimal amounts of solid waste during construction, and would not generate any solid waste during maintenance. It is anticipated that any solid waste generated during project activities would be disposed of in the Keller Canyon Landfill. Solid waste generated during project construction would be incidental, and this landfill has sufficient permitted capacity to accommodate the proposed project's solid waste disposal needs. Construction and maintenance of the proposed project and removal of the temporary drought salinity barrier would not generate solid waste in excess of State or local standards or the capacity of local infrastructure, or impair the attainment of soil waste reduction goals. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

e) **Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?** *Less-than-Significant Impact.* As discussed in question d) above, the proposed project would generate minimal amounts of solid waste during construction, but would not generate any solid waste during maintenance. Construction solid waste would be disposed of in compliance with federal, State, and local statutes and regulations. Solid waste generated during project activities would be incidental and is anticipated to be disposed in the Keller Canyon Landfill. Therefore, this impact would be less than significant and this issue will not be evaluated in the Draft EIR.

References

California Department of Resources Recycling and Recovery (CalRecycle). 2021. Keller Canyon Landfill (07-AA-0032).

Wildfire

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
WILDFIRE — If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

Environmental Setting

The project site is located in a Local Responsibility Area that is not within a designated fire hazard severity zone (CAL FIRE 2020). Bethel Island is included as part of the *Contra Costa County Emergency Operations Plan* (Contra Costa County 2015). Bradford Island is not within the service area of any fire protection district, and firefighting is the responsibility of property owners. However, the project site falls within the East Contra Costa Fire Protection District's 5-mile response time and the district aids in evacuation during fire emergencies, if necessary (ECCFPD 2022).

Discussion

a) **If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?** *Less-than-Significant Impact.* The proposed project would require limited hauling of material along public access routes on land (most material would be barged to the project site), and the construction footprint on land is anticipated to be approximately 0.2 acre, used for staging purposes only. Access to the project site would be maintained during project activities; in the event of a fire at the project site, Jersey Island Road, Bethel Island Road, and other local roadways could accommodate firefighting crews and equipment. Thus, the proposed project would not substantially increase traffic in the area that would impair any adopted emergency response or evacuation plan. The proposed project would temporarily block passage through West False River; however, boats could detour around the barrier using Fisherman's Cut or Taylor Slough (discussed in the "Transportation" section). Therefore, impacts would be less than significant and this issue will not be evaluated in the Draft EIR.

b–c) **Due to slope, prevailing winds, and other factors, would the project exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, or require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?** *No Impact.* Construction activities for the proposed project would require the use of heavy vehicles and heavy equipment both onshore and offshore. However, a majority of construction activities would occur on the river, and land-based activities in the staging area would occur on approximately 0.37 acre of land. Therefore, the proposed project would not exacerbate wildfire risks. No impact would occur and this issue will not be evaluated in the Draft EIR.

d) **Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?** *No Impact.* Project construction would include erosion control measures that would reduce and manage the potential for erosion. The drought salinity barrier would be in the river and would not affect runoff and drainage. Furthermore, the proposed project would be temporary and would be removed no later than November 30, which coincides with the start of the rainy season in which freshwater runoff and flood risk increases. No impact would occur and this issue will not be evaluated in the Draft EIR.

References

California Department of Forestry and Fire Protection (CAL FIRE). 2020. FHSZ Viewer. Fire and Resource Assessment Program. Viewed online at: https://egis.fire.ca.gov/FHSZ/. Accessed: Jan. 9, 2020.

Contra Costa County. 2015. *Contra Costa County Emergency Operations Plan.* Approval date: Jun. 16, 2015. Viewed online at: https://www.cocosheriff.org/home/showpublisheddocument/168/637284267426930000. Accessed: Mar. 31, 2022.

East Contra Costa Fire Protection District (ECCFPD). 2022. About the District. Viewed online at: https://www.eccfpd.org/about-the-district. Accessed: Mar. 31, 2022.

Mandatory Findings of Significance

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
MANDATORY FINDINGS OF SIGNIFICANCE —				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Discussion

a) **Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?** *Potentially Significant Impact.* As described in this Initial Study Environmental Checklist, implementation of the proposed project has the potential to adversely affect sensitive natural communities, special-status animals, and previously undiscovered cultural resources and/or human remains. Therefore, the Draft EIR will analyze the potential for the proposed project to substantially degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major period of California history or prehistory.

b) **Does the project have impacts that are individually limited, but cumulatively considerable?** *Potentially Significant Impact.* The proposed project would result in temporary impacts that would be limited to the project site and its immediate vicinity. As discussed in this Initial Study Environmental Checklist, the proposed project would result in less-than-significant impacts or no impacts related to aesthetics, agriculture and forestry resources, energy, geology and soils, hazards and hazardous materials, land use and planning, mineral resources, noise, population and housing, public services, transportation and traffic, utilities and services systems, and wildfire. However, the proposed project's impacts on air quality and GHG emissions, biological resources, cultural resources, hydrology and water quality, recreation, and tribal cultural resources could be potentially significant. The Draft EIR will analyze the potential for the proposed project to have impacts both individually and on a cumulatively considerable basis, when viewed in connection with the effect of past, current, and probable future projects.

c) **Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?** *Potentially Significant Impact.* The Draft EIR will analyze the potential for the proposed project to have environmental effects which will cause substantial adverse effects on human beings, both directly and indirectly, and on an individual and cumulative basis, when viewed in connection with the effect of past, current, and probable future projects.

References

No references cited in this section.

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Appendix C
Air Quality Modeling

Installation Scenario	Year 1 (2023)	Year 2 (2024)
Scenario 1	Barrier Installation	Barrier Removal
Scenario 2	Barrier Installation + Notching	
Scenario 3	Barrier Installation + Removal	

Option 1	Origin of rock is San Rafael Quarry, destination upon removal is Weber stockpile in Stockton, for notching and closing the notch under Scenario 2 rock would be transported to and brought back from the Weber stockpile
Option 2	Origin of rock is San Rafael Quarry, destination upon removal is Rio Vista stockpile, for notching and closing the notch under Scenario 2 rock would be transported to and brought back from the Weber

		Construction Year	Option 1								Option 2							
			Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
			ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Scenario 1																		
BAAQMD	Unmitigated	Year 1 (2023)	31.7	458.9	13.3	12.7	0.5	10.0	0.3	0.3	31.3	450.1	13.1	12.5	0.5	10.0	0.3	0.3
		Year 2 (2024)					1.1	14.1	0.4	0.4					1.1	13.6	0.4	0.4
	Mitigated	Year 1 (2023)	14.0	330.8	6.6	6.5	0.3	8.4	0.2	0.2	13.8	323.4	6.5	6.3	0.3	8.4	0.2	0.2
		Year 2 (2024)					0.5	9.0	0.19	0.18					0.5	8.6	0.18	0.18
SMAQMD	Unmitigated	Year 1 (2023)		--	--	--			--	--		--	--	--			--	--
		Year 2 (2024)		--	--	--			--	--		10.2	0.3	0.3			0.01	0.01
	Mitigated	Year 1 (2023)		--	--	--			--	--		--	--	--			--	--
		Year 2 (2024)		--	--	--			--	--		8.6	0.1	0.1			0.01	0.01
SJVAPCD	Unmitigated	Year 1 (2023)					--	--	--	--					--	--	--	--
		Year 2 (2024)					0.2	2.4	0.1	0.1					--	--	--	--
	Mitigated	Year 1 (2023)					--	--	--	--					--	--	--	--
		Year 2 (2024)					0.1	1.2	0.03	0.02					--	--	--	--
YSAQMD	Unmitigated	Year 1 (2023)					--	--	--	--			--		--	--		
		Year 2 (2024)					--	--	--	--			1.6		0.1	1.1		
	Mitigated	Year 1 (2023)					--	--	--	--			--		--	--		
		Year 2 (2024)					--	--	--	--			0.3		0.03	0.2		
Scenario 2																		
BAAQMD	Unmitigated	Year 1 (2023)	32.3	490.3	13.9	13.4	0.7	13.0	0.3	0.3	31.9	483.2	13.8	13.2	0.7	13.0	0.3	0.3
		Year 2 (2024)					1.4	18.6	0.5	0.5					1.3	18.2	0.5	0.5
	Mitigated	Year 1 (2023)	14.6	365.6	7.3	7.1	0.3	10.7	0.2	0.2	14.4	359.5	7.2	7.0	0.3	10.7	0.2	0.2
		Year 2 (2024)					0.6	12.9	0.26	0.26					0.6	12.5	0.26	0.25
SMAQMD	Unmitigated	Year 1 (2023)		--	--	--			--	--		--	--	--			--	--
		Year 2 (2024)		--	--	--			--	--		10.2	0.3	0.3			0.01	0.01
	Mitigated	Year 1 (2023)		--	--	--			--	--		--	--	--			--	--
		Year 2 (2024)		--	--	--			--	--		8.6	0.1	0.1			0.01	0.01
SJVAPCD	Unmitigated	Year 1 (2023)					0.1	0.6	0.02	0.02					0.1	0.6	0.02	0.02
		Year 2 (2024)					0.1	1.5	0.06	0.05					0.0	0.2	0.005	0.005
	Mitigated	Year 1 (2023)					0.0	0.2	0.01	0.005					0.01	0.2	0.004	0.004
		Year 2 (2024)					0.1	1.4	0.03	0.03					0.0	0.2	0.003	0.003
YSAQMD	Unmitigated	Year 1 (2023)					--	--	--	--			--		--	--		
		Year 2 (2024)					--	--	--	--			1.6		0.1	1.1		
	Mitigated	Year 1 (2023)					--	--	--	--			--		--	--		
		Year 2 (2024)					--	--	--	--			0.3		0.03	0.2		
Scenario 3																		
BAAQMD	Unmitigated	Year 1 (2023)	32.0	465.8	13.6	13.0	1.7	24.5	0.7	0.7	22.7	289.2	8.9	8.4	1.2	15.2	0.5	0.4
	Mitigated	Year 1 (2023)	14.0	330.9	6.6	6.5	0.7	17.4	0.3	0.3	14.0	330.9	6.6	6.5	0.7	17.4	0.3	0.3
SMAQMD	Unmitigated	Year 1 (2023)		--	--	--			--	--		10.2	0.3	0.3			0.01	0.01
	Mitigated	Year 1 (2023)		--	--	--			--	--		8.6	0.1	0.1			0.01	0.01
SJVAPCD	Unmitigated	Year 1 (2023)					0.2	2.5	0.1	0.1					--	--	--	--
	Mitigated	Year 1 (2023)					0.1	1.2	0.03	0.02					--	--	--	--
YSAQMD	Unmitigated	Year 1 (2023)					--	--	--	--			1.6		0.1	1.2		
	Mitigated	Year 1 (2023)					--	--	--	--			0.3		0.03	0.2		

No Thresholds

"--" = No Emissions

Criteria Air Pollutant Emission Summaries

Scenario 1 - Barrier installation Year 1 and removal in Year 2

Option 1: Rock is transported from quarry in Marin to DSB location and back to Stockton stockpile

BAAQMD Emissions

Source	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Marine equipment at DSB location	14.7	284.5	7.5	7.3	0.3	6.4	0.2	0.2	2023
					0.4	8.6	0.2	0.2	2024
Off-road equipment at DSB location	23.3	178.7	6.8	6.3	0.1	0.4	0.0	0.0	2023
					0.6	4.8	0.2	0.2	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	3.9	74.8	2.0	1.9	0.2	3.2	0.1	0.1	2023
					0.04	0.7	0.02	0.02	2024
Total					0.5	10.0	0.3	0.3	2023
					1.1	14.1	0.4	0.4	2024
Number of Workdays	105								
Average Daily Emissions	**31.7**	**458.9**	**13.3**	**12.7**					
Mitigated									
Marine equipment at DSB location	8.0	249.5	4.9	4.8	0.2	5.6	0.1	0.1	2023
					0.2	7.5	0.1	0.1	2024
Off-road equipment at DSB location	7.5	32.6	1.0	1.0	0.0	0.1	0.0	0.0	2023
					0.2	0.9	0.0	0.0	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	1.7	62.9	1.1	1.1	0.1	2.7	0.0	0.0	2023
					0.0	0.6	0.0	0.0	2024
Total					0.3	8.4	0.2	0.2	2023
					0.5	9.0	0.2	0.2	2024
Number of Workdays	105								
Average Daily Emissions	**14.0**	**330.8**	**6.6**	**6.5**					

SJVAPCD Emissions

Source	Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated					
Off-road equipment at Stockton stockpile	--	--	--	--	2023
	0.13	1.09	0.05	0.04	2024
On-road worker trips	--	--	--	--	2023
	0.002	0.008	0.002	0.001	2024
Rock Transport by barge	--	--	--	--	2023
	0.07	1.28	0.03	0.03	2024
Total	--	--	--	--	2023
	0.2	2.4	0.08	0.08	2024
Mitigated					
Off-road equipment at Stockton stockpile	--	--	--	--	2023
	0.03	0.15	0.005	0.005	2024
On-road worker trips	--	--	--	--	2023
	0.002	0.008	0.002	0.001	2024
Rock Transport by barge	--	--	--	--	2023
	0.03	1.08	0.02	0.02	2024
Total	--	--	--	--	2023
	0.1	1.2	0.03	0.02	2024

Option 2: Rock is transported from quarry in Marin to DSB location and back to Rio Vista stockpile

BAAQMD Emissions

Source	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Marine equipment at DSB location	14.7	284.5	7.5	7.3	0.3	6.4	0.2	0.2	2023
					0.4	8.6	0.2	0.2	2024
Off-road equipment at DSB location	23.3	178.7	6.8	6.3	0.1	0.4	0.0	0.0	2023
					0.6	4.8	0.2	0.2	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	3.5	65.9	1.7	1.7	0.2	3.2	0.1	0.1	2023
					0.0	0.2	0.0	0.0	2024
Total	41.6	529.6	16.1	15.3	0.5	10.0	0.3	0.3	2023
					1.1	13.6	0.4	0.4	2024
Number of Workdays	105								
Average Daily Emissions	**31.3**	**450.1**	**13.1**	**12.5**					
Mitigated									
Marine equipment at DSB location	8.0	249.5	4.9	4.8	0.2	5.6	0.1	0.1	2023
					0.2	7.5	0.1	0.1	2024
Off-road equipment at DSB location	7.5	32.6	1.0	1.0	0.0	0.1	0.0	0.0	2023
					0.2	0.9	0.0	0.0	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	1.5	55.5	1.0	0.9	0.1	2.7	0.0	0.0	2023
					0.0	0.2	0.0	0.0	2024
Total	17.1	338.1	7.0	6.8	0.3	8.4	0.2	0.2	2023
					0.5	8.6	0.2	0.2	2024
Number of Workdays	105								
Average Daily Emissions	**13.8**	**323.4**	**6.5**	**6.3**					

YSAQMD Emissions

Source	Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Unmitigated								
Off-road equipment at Rio Vista stockpile	4.25	36.48	1.51	1.40	0.1	1.1	0.05	0.04
On-road truck trips	0.06	0.83	0.11	0.04	0.000	0.017	0.001	0.001
Total	4.31	37.31	1.63	1.44	0.1	1.1	0.05	0.04
Mitigated								
Off-road equipment at Rio Vista stockpile	1.15	4.96	0.15	0.15	0.03	0.1	0.005	0.005
On-road truck trips	0.06	0.83	0.11	0.04	0.000	0.017	0.001	0.001
Total	1.21	5.79	0.26	0.20	0.03	0.2	0.006	0.005

SMAQMD Emissions

Source	Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Unmitigated								
Rock Transport	0.5	10.2	0.3	0.3	0.0	0.5	0.0	0.0
Mitigated								
Rock Transport	0.2	8.6	0.1	0.1	0.0	0.5	0.0	0.0

Scenario 2 - Barrier installation and notching Year 1, notch closing and removal in Year 2

Notch removes 13,000 of the total 84,000 cuyd of rock in the barrier 0.15

Option 1: Rock is transported from quarry in Marin to DSB for installation and to Stockton stockpile upon removal

BAAQMD Emissions

Source	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Marine equipment at DSB location	20.9	411.2	10.7	10.5	0.4	8.7	0.2	0.2	2023
					0.7	12.9	0.3	0.3	2024
Off-road equipment at DSB location	37.1	288.7	11.2	10.3	0.1	0.9	0.0	0.0	2023
					0.7	4.9	0.2	0.2	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	4.1	79.0	2.1	2.0	0.2	3.3	0.1	0.1	2023
					0.0	0.8	0.0	0.0	2024
Total	62.2	779.4	24.1	22.8	0.7	13.0	0.3	0.3	2023
					1.4	18.6	0.5	0.5	2024
Number of Workdays	129								
Average Daily Emissions	**32.3**	**490.3**	**13.9**	**13.4**					
Mitigated									
Marine equipment at DSB location	11.4	361.7	7.1	7.0	0.2	7.7	0.2	0.1	2023
					0.4	11.3	0.2	0.2	2024
Off-road equipment at DSB location	11.9	55.2	1.6	1.6	0.04	0.2	0.005	0.005	2023
					0.2	0.9	0.03	0.03	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	1.7	66.5	1.2	1.1	0.1	2.8	0.05	0.05	2023
					0.02	0.7	0.01	0.01	2024
Total	25.1	483.8	10.0	9.7	0.3	10.7	0.2	0.2	2023
					0.6	12.9	0.26	0.26	2024
Number of Workdays	129								
Average Daily Emissions	**14.6**	**365.6**	**7.3**	**7.1**					

SJVAPCD Emissions

Source	Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated					
Off-road equipment at Stockton stockpile	0.04	0.38	0.02	0.01	2023
	0.13	1.09	0.05	0.04	2024
On-road worker trips	0.002	0.008	0.002	0.001	2023
	0.002	0.008	0.002	0.001	2024
Rock Transport by barge	0.01	0.20	0.01	0.01	2023
	0.02	0.37	0.01	0.01	2024
Total	0.05	0.58	0.02	0.02	2023
	0.1	1.5	0.06	0.05	2024
Mitigated					
Off-road equipment at Stockton stockpile	0.01	0.05	0.00	0.00	2023
	0.03	0.15	0.00	0.00	2024
On-road worker trips	0.002	0.008	0.002	0.001	2023
	0.002	0.008	0.002	0.001	2024
Rock Transport by barge	0.00	0.17	0.00	0.00	2023
	0.03	1.25	0.02	0.02	2024
Total	0.02	0.22	0.01	0.00	2023
	0.1	1.4	0.03	0.03	2024

Option 2: Rock is transported from quarry in Marin to DSB for installation and to Rio Vista stockpile upon removal

BAAQMD Emissions

Source	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Marine equipment at DSB location	20.9	411.2	10.7	10.5	0.4	8.7	0.2	0.2	2023
					0.7	12.9	0.3	0.3	2024
Off-road equipment at DSB location	37.1	288.7	11.2	10.3	0.1	0.9	0.04	0.03	2023
					0.7	4.9	0.2	0.2	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	3.7	70.1	1.8	1.8	0.2	3.3	0.1	0.1	2023
					0.02	0.4	0.01	0.01	2024
Total	61.8	770.6	23.9	22.6	0.7	13.0	0.3	0.3	2023
					1.3	18.2	0.5	0.5	2024
Number of Workdays	129								
Average Daily Emissions	**31.9**	**483.2**	**13.8**	**13.2**					
Mitigated									
Marine equipment at DSB location	11.4	361.7	7.1	7.0	0.2	7.7	0.2	0.1	2023
					0.36	11.29	0.22	0.22	2024
Off-road equipment at DSB location	11.9	55.2	1.6	1.6	0.04	0.16	0.005	0.005	2023
					0.2	0.9	0.0	0.0	2024
On-road worker trips	0.12	0.6	0.1	0.05	0.001	0.007	0.002	0.001	2023
					0.002	0.008	0.002	0.001	2024
Rock transport by barge	1.6	59.0	1.0	1.0	0.1	2.8	0.05	0.05	2023
					0.01	0.3	0.01	0.01	2024
Total	25.0	476.4	9.8	9.6	0.3	10.7	0.2	0.2	2023
					0.6	12.5	0.26	0.25	2024
Number of Workdays	129								
Average Daily Emissions	**14.4**	**359.5**	**7.2**	**7.0**					

YSAQMD Emissions

Source	Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Unmitigated								
Off-road equipment at Rio Vista stockpile	4.25	36.48	1.51	1.40	0.1	1.1	0.05	0.04
On-road truck trips	0.06	0.83	0.11	0.04	0.000	0.017	0.001	0.001
Total	4.31	37.31	1.63	1.44	0.1	1.1	0.05	0.04
Mitigated								
Off-road equipment at Rio Vista stockpile	1.15	4.96	0.15	0.15	0.03	0.1	0.005	0.005
On-road truck trips	0.06	0.83	0.11	0.04	0.000	0.017	0.001	0.001
Total	1.21	5.8	0.264	0.196	0.03	0.2	0.006	0.005

SMAQMD Emissions

Source	Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Unmitigated								
Rock Transport	0.5	10.2	0.3	0.3	0.0	0.5	0.0	0.0
Mitigated								
Rock Transport	0.2	8.6	0.1	0.1	0.0	0.5	0.0	0.0

SJVAPCD Emissions

Source	Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated					
Off-road equipment at Stockton stockpile	0.04	0.4	0.02	0.01	2023
	--	--	--	--	2024
Rock Transport by barge	0.010	0.199	0.005	0.005	2023
	0.010	0.199	0.005	0.005	2024
Total	0.1	0.6	0.02	0.02	2023
	0.0	0.2	0.01	0.01	2024
Mitigated					
Off-road equipment at Stockton stockpile	0.01	0.045	0.001	0.001	2023
	--	--	--	--	2024
Rock Transport by barge	0.004	0.2	0.003	0.003	2023
	0.004	0.2	0.003	0.003	2024
Total	0.015	0.213	0.004	0.004	2023
	0.004	0.167	0.003	0.003	2024

Scenario 3 - Barrier installation and removal in Year 1

Option 1: Rock is transported from quarry in Marin to DSB location and back to Stockton stockpile

BAAQMD Emissions

Source	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Marine equipment at DSB location	14.7	284.5	7.5	7.3	0.8	14.9	0.4	0.4	2023
									2024
Off-road equipment at DSB location	23.8	190.7	7.3	6.7	0.7	5.6	0.2	0.2	2023
									2024
On-road worker trips	0.12	0.6	0.1	0.05	0.003	0.015	0.004	0.001	2023
									2024
Rock transport by barge	3.9	74.8	2.0	1.9	0.2	3.9	0.1	0.1	2023
									2024
Total Maximum Daily Emissions	42.6	550.5	16.9	16.0	1.7	24.5	0.7	0.7	2023
									2024
Number of Workdays	105								
Average Daily Emissions	**32.0**	**465.8**	**13.6**	**13.0**					
Mitigated									
Marine equipment at DSB location	8.0	249.5	4.9	4.8	0.4	13.1	0.3	0.3	2023
									2024
Off-road equipment at DSB location	7.5	32.6	1.0	1.0	0.2	1.0	0.0	0.0	2023
									2024
On-road worker trips	0.12	0.6	0.1	0.05	0.003	0.015	0.004	0.001	2023
									2024
Rock transport by barge	1.7	62.9	1.1	1.1	0.1	3.3	0.1	0.1	2023
									2024
Total	17.3	345.5	7.2	6.9	0.7	17.4	0.3	0.3	2023
									2024
Number of Workdays	105								
Average Daily Emissions	**14.0**	**330.9**	**6.6**	**6.5**					

SJVAPCD Emissions

Source	Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated					
Off-road equipment at Stockton stockpile	0.13	1.17	0.05	0.04	2023
On-road worker trips	0.002	0.009	0.002	0.001	2023
Rock Transport by barge	0.07	1.28	0.03	0.03	2023
Total	0.2	2.5	0.08	0.08	2023
Mitigated					
Off-road equipment at Stockton stockpile	0.03	0.15	0.00	0.00	2023
On-road worker trips	0.002	0.009	0.002	0.001	2023
Rock Transport by barge	0.03	1.08	0.02	0.02	2023
Total	0.1	1.2	0.03	0.02	2023

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Option 2: Rock is transported from quarry in Marin to DSB location and back to Rio Vista stockpile

BAAQMD Emissions

Source	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/year)				Year
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Marine equipment at DSB location	14.7	284.5	7.5	7.3	0.3	6.4	0.2	0.2	2023
									2024
Off-road equipment at DSB location	23.8	190.7	7.3	6.7	0.7	5.6	0.2	0.2	2023
									2024
On-road worker trips	0.12	0.6	0.1	0.05	0.003	0.015	0.004	0.001	2023
									2024
Rock transport by barge	3.5	65.9	1.7	1.7	0.2	3.2	0.1	0.1	2023
									2024
Total	42.1	541.7	16.6	15.8	1.2	15.2	0.5	0.4	2023
									2024
Number of Workdays	105								
Average Daily Emissions	**22.7**	**289.2**	**8.9**	**8.4**					
Mitigated									
Marine equipment at DSB location	8.0	249.5	4.9	4.8	0.4	13.1	0.3	0.3	2023
									2024
Off-road equipment at DSB location	7.5	32.6	1.0	1.0	0.2	1.0	0.0	0.0	2023
									2024
On-road worker trips	0.12	0.6	0.1	0.05	0.003	0.015	0.004	0.001	2023
									2024
Rock transport by barge	1.5	55.5	1.0	0.9	0.1	3.3	0.1	0.1	2023
									2024
Total	17.1	338.1	7.0	6.8	0.7	17.4	0.3	0.3	2023
									2024
Number of Workdays	105								
Average Daily Emissions	**14.0**	**330.9**	**6.6**	**6.5**					

YSAQMD Emissions

Source	Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Unmitigated								
Off-road equipment at Rio Vista stockpile	4.25	36.48	1.51	1.40	0.1	1.2	0.05	0.04
On-road truck trips	0.07	0.88	0.11	0.04	0.000	0.018	0.001	0.001
Total	4.3	37.4	1.63	1.44	0.1	1.2	0.05	0.05
Mitigated								
Off-road equipment at Rio Vista stockpile	1.15	4.96	0.15	0.15	0.03	0.1	0.005	0.005
On-road truck trips	0.07	0.88	0.11	0.04	0.000	0.018	0.001	0.001
Total	1.21	5.8	0.265	0.196	0.03	0.2	0.006	0.005

SMAQMD Emissions

Source	Daily Emissions (lbs/day)				Annual Emissions (tons/year)				
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	
Unmitigated									
Rock Transport	0.5	10.2	0.3	0.3	0.0	0.5	0.0	0.0	7.5
Mitigated									
Rock Transport	0.2	8.6	0.1	0.1	0.0	0.5	0.0	0.0	

Scenario	Average Daily Emissions (lbs/day)				Annual Emissions (tons/year)			
	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Unmitigated	41.9	549.3	16.8	16.0	1.6	24.1	0.7	0.7
Mitigated with DB Tier 4f	15.7	302.4	6.1	5.9	0.7	15.1	0.3	0.3
Mitigated w/o DB Tier 4f	16.8	332.9	7.0	6.7	0.7	16.7	0.3	0.3

GHG Summaries

Installation Scenario 1 - Barrier installation Year 1 and removal in Year 2

Option 1: Rock is transported from quarry in Marin to DSB location and back to Stockton stockpile

Source	Construction	Emissions (MT/year)			
	Yesr	CO_2	CH_4	N_2O	CO_2e
Marine Construction	2023	884.7	0.01	0.0	897.8
	2024	1179.6	0.01	0.1	1197.0
Off-road equipment	2023	915.6	0.01	0.00	915.9
	2024	730.8	0.01	0.00	731.0
On-road trips	2023	24.7	0.000	0.001	24.9
	2024	32.4	0.000	0.001	32.6
Rock Transport by barge	2023	287.0	0.002	0.01	291.3
	2024	178.6	0.001	0.01	181.2
Total emissions	**2023**	**2112.1**	**0.02**	**0.1**	**2129.8**
	2024	**2121.5**	**0.02**	**0.1**	**2141.9**
Emissions over 10 years		**8467.1**	**0.1**	**0.2**	**8543.4**

Option 2: Rock is transported from quarry in Marin to DSB location and back to Rio Vista stockpile

Source	Construction	Emissions (MT/year)			
	Yesr	CO_2	CH_4	N_2O	CO_2e
Marine Construction	2023	884.7	0.01	0.0	897.8
	2024	1179.6	0.01	0.1	1197.0
Off-road equipment	2023	915.6	0.01	0.0	915.9
	2024	730.8	0.01	0.0	731.0
On-road trips	2023	24.7	0.000	0.001	24.9
	2024	45.6	0.000	0.003	46.4
Rock Transport by barge	2023	287.0	0.002	0.01	291.3
	2024	22.3	0.0	0.0	22.7
Total emissions	**2023**	**2112.1**	**0.02**	**0.1**	**2129.8**
	2024	**1978.3**	**0.02**	**0.1**	**1997.1**
Emissions over 10 years		**8180.8**	**0.1**	**0.2**	**8253.7**

Installation Scenario 2 - Barrier installation and notching Year 1, notch closing and removal in Year 2

Notch removes 13,000 of the total 84,000 cuyd of rock in the barrier

Option 1: Rock is transported from quarry in Marin to DSB for installation and to Stockton stockpile upon removal

Source	Construction Yesr	Emissions (MT/year)			
		CO_2	CH_4	N_2O	CO_2e
Marine Construction	2023	1255.3	0.01	0.1	1281.4
	2024	1791.8	0.02	0.1	1826.6
Off-road equipment	2023	1062.5	0.01	0.00	1062.8
	2024	755.6	0.01	0.00	755.8
On-road trips	2023	24.7	0.000	0.001	24.9
	2024	32.4	0.000	0.001	32.6
Rock Transport by barge	2023	314.7	0.003	0.02	319.3
	2024	206.2	0.002	0.01	209.3
Total emissions	**2023**	**2657.2**	**0.03**	**0.1**	**2688.4**
	2024	**2786.1**	**0.03**	**0.1**	**2824.3**
Emissions over 10 years		**10886.6**	**0.1**	**0.5**	**11025.5**

Option 2: Rock is transported from quarry in Marin to DSB location and back to Rio Vista stockpile

Source	Construction Yesr	Emissions (MT/year)			
		CO_2	CH_4	N_2O	CO_2e
Marine Construction	2023	1255.3	0.01	0.1	1281.4
	2024	1791.8	0.02	0.1	1826.6
Off-road equipment	2023	1062.5	0.01	0.00	1062.8
	2024	755.6	0.01	0.00	755.8
On-road trips	2023	24.7	0.000	0.001	24.9
	2024	45.6	0.000	0.003	46.4
Rock Transport by barge	2023	314.7	0.003	0.02	319.3
	2024	97.8	0.001	0.00	209.3
Total emissions	**2023**	**2657.2**	**0.03**	**0.1**	**2688.4**
	2024	**2690.8**	**0.03**	**0.1**	**2838.1**
Emissions over 10 years		**10696.0**	**0.1**	**0.5**	**11053.0**

Installation Scenario 3 - Barrier installation and removal in Year 1

Option 1: Rock is transported from quarry in Marin to DSB location and back to Stockton stockpile

Source	Construction	Emissions (MT/year)			
	Yesr	CO_2	CH_4	N_2O	CO_2e
Marine Construction	2023	2064.4	0.01	0.1	2094.8
Off-road equipment	2023	1646.3	0.02	0.00	1646.8
On-road trips	2023	57.7	0.001	0.001	58.1
Rock Transport by barge	2023	465.6	0.004	0.02	472.5
Total emissions	**2023**	**4234.0**	**0.04**	**0.1**	**4272.2**
Emissions over 10 years		**8468.0**	**0.1**	**0.2**	**8544.3**

Option 2: Rock is transported from quarry in Marin to DSB location and back to Rio Vista stockpile

Source	Construction	Emissions (MT/year)			
	Yesr	CO_2	CH_4	N_2O	CO_2e
Marine Construction	2023	2064.4	0.01	0.1	2094.8
Off-road equipment	2023	1646.3	0.02	0.00	1646.8
On-road trips	2023	71.0	0.001	0.003	72.0
Rock Transport by barge	2023	357.2	0.0	0.0	472.5
Total emissions	**2023**	**4138.9**	**0.04**	**0.1**	**4286.1**
Emissions over 10 years		**8277.8**	**0.1**	**0.2**	**8572.2**

West False River Drought Salinity Barrier Project

Construction Schedule

Construction Phase	Start Date	End Date	No. of Workdays
Scenario 1			
Installation	4/1/2023	5/16/2023	45
Removal	10/1/2023	11/30/2023	60
Scenario 2			
Installation	4/1/2023	5/16/2023	45
Removal	10/1/2024	11/30/2024	60
Scenario 3			
Installation	4/1/2023	5/16/2023	45
Notching	2023	2023	12
Notch Closing	2024	2024	12
Removal	10/1/2024	11/30/2024	60

Land-based Equipment

Barrier Installation

At West False River Barrier Location - Unmitigated

1 gram = 0.0022046 pound **1 ton = 907185 g** **1 MT = 1000000 g**

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/phase	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Caterpillar 938 M	Rubber Tired Loaders	2023	1	182	0.36	45	108	0.21	2.06	0.07	0.06	469.82	0.15	0.07	0.71	0.02	0.02	0.00	0.02	0.00	0.00	26.60	0.00	0.00	26.60
Caterpillar 938 M	Rubber Tired Loaders	2023	1	187	0.36	45	108	0.21	2.06	0.07	0.06	469.82	0.15	0.07	0.73	0.02	0.02	0.00	0.02	0.00	0.00	27.33	0.00	0.00	27.33
Caterpillar 938 M	Tractors/Loaders/Backhoes	2023	1	187	0.37	45	108	0.17	1.59	0.06	0.05	469.75	0.15	0.06	0.58	0.02	0.02	0.00	0.01	0.00	0.00	28.08	0.00	0.00	28.09
Caterpillar 930 H	Rubber Tired Loaders	2023	1	152	0.36	45	108	0.27	2.20	0.12	0.11	470.66	0.15	0.08	0.64	0.03	0.03	0.00	0.01	0.00	0.00	22.25	0.00	0.00	22.26
Caterpillar 938 M	Rubber Tired Loaders	2023	1	182	0.36	45	108	0.21	2.06	0.07	0.06	469.82	0.15	0.07	0.71	0.02	0.02	0.00	0.02	0.00	0.00	26.60	0.00	0.00	26.60
Caterpillar 966 M	Tractors/Loaders/Backhoes	2023	1	311	0.37	45	72	0.15	1.25	0.05	0.04	469.47	0.15	0.06	0.51	0.02	0.02	0.00	0.01	0.00	0.00	31.12	0.00	0.00	31.12
Caterpillar 980 M	Rubber Tired Loaders	2023	1	420	0.36	45	432	0.22	1.87	0.07	0.06	468.47	0.15	0.69	5.97	0.22	0.20	0.02	0.13	0.00	0.00	244.80	0.00	0.00	244.86
Caterpillar 980 M	Rubber Tired Loaders	2023	1	420	0.36	45	432	0.22	1.87	0.07	0.06	468.47	0.15	0.69	5.97	0.22	0.20	0.02	0.13	0.00	0.00	244.80	0.00	0.00	244.86
Caterpillar 374 FL	Excavators	2023	1	489	0.38	45	378	0.12	0.89	0.03	0.03	469.89	0.15	0.42	3.07	0.10	0.10	0.01	0.07	0.00	0.00	264.04	0.00	0.00	264.11
2023 TOTAL - Unmitigated														**2.2**	**18.9**	**0.7**	**0.6**	**0.05**	**0.43**	**0.02**	**0.01**	**915.6**	**0.01**	**0.00**	**915.9**

At West False River Barrier Location - Mitigated with all Tier 4

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/phase	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Caterpillar 938 M	Rubber Tired Loaders	2023	1	182	0.36	45	108	0.06	0.26	0.01	0.01	469.82	0.15	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	26.60	0.00	0.00	26.60
Caterpillar 938 M	Rubber Tired Loaders	2023	1	187	0.36	45	108	0.06	0.26	0.01	0.01	469.82	0.15	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	27.33	0.00	0.00	27.33
Caterpillar 938 M	Tractors/Loaders/Backhoes	2023	1	187	0.37	45	108	0.06	0.26	0.01	0.01	469.75	0.15	0.02	0.10	0.00	0.00	0.00	0.00	0.00	0.00	28.08	0.00	0.00	28.09
Caterpillar 930 H	Rubber Tired Loaders	2023	1	152	0.36	45	108	0.06	0.26	0.01	0.01	470.66	0.15	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	22.25	0.00	0.00	22.26
Caterpillar 938 M	Rubber Tired Loaders	2023	1	182	0.36	45	108	0.06	0.26	0.01	0.01	469.82	0.15	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	26.60	0.00	0.00	26.60
Caterpillar 966 M	Tractors/Loaders/Backhoes	2023	1	311	0.37	45	72	0.06	0.26	0.01	0.01	469.47	0.15	0.02	0.11	0.00	0.00	0.00	0.00	0.00	0.00	31.12	0.00	0.00	31.12
Caterpillar 980 M	Rubber Tired Loaders	2023	1	420	0.36	45	432	0.06	0.26	0.01	0.01	468.47	0.15	0.19	0.83	0.03	0.03	0.00	0.02	0.00	0.00	244.80	0.00	0.00	244.86
Caterpillar 980 M	Rubber Tired Loaders	2023	1	420	0.36	45	432	0.06	0.26	0.01	0.01	468.47	0.15	0.19	0.83	0.03	0.03	0.00	0.02	0.00	0.00	244.80	0.00	0.00	244.86
Caterpillar 374 FL	Excavators	2023	1	489	0.38	45	378	0.06	0.26	0.01	0.01	469.89	0.15	0.21	0.89	0.03	0.03	0.00	0.02	0.00	0.00	264.04	0.00	0.00	264.11
2023 TOTAL - Mitigated with Tier 4 Final														**0.7**	**3.1**	**0.1**	**0.1**	**0.02**	**0.07**	**0.00**	**0.00**	**915.6**	**0.01**	**0.00**	**915.9**

Barrier Removal

1.71 0.29

1.2884715 0.2209882

At West False River Barrier Location - Unmitigated

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Water Truck (2000 gallon)	Off-Highway Trucks	2023	1	210	0.38	60	24	0.21	1.46	0.06	0.05	469.45	0.15	0.87	6.15	0.25	0.23	0.03	0.18	0.01	0.01	18.0	0.0	0.0	18.0
CAT backhoe	Tractors/Loaders/Backhoes	2023	1	97	0.37	60	24	0.24	2.43	0.12	0.11	476.43	0.15	0.45	4.61	0.23	0.21	0.01	0.14	0.01	0.01	8.2	0.0	0.0	8.2
End Dump Trucks	Off-Highway Trucks	2023	6	402	0.38	60	24	0.19	1.32	0.05	0.04	475.05	0.15	9.07	64.22	2.33	2.13	0.27	1.93	0.07	0.06	209.0	0.0	0.0	209.1
980 Loaders	Rubber Tired Loaders	2023	3	386	0.36	60	24	0.22	1.87	0.07	0.06	468.47	0.15	4.79	41.17	1.52	1.41	0.14	1.23	0.05	0.04	93.7	0.0	0.0	93.8
Lattice Boom Crane	Cranes	2023	1	350	0.29	60	24	0.24	2.51	0.10	0.09	472.29	0.15	1.27	13.48	0.55	0.50	0.04	0.40	0.02	0.01	23.0	0.0	0.0	23.0
CAT 345 Excavator	Excavators	2023	1	346	0.38	60	24	0.12	0.89	0.03	0.03	469.89	0.15	0.85	6.21	0.21	0.19	0.03	0.19	0.01	0.01	29.7	0.0	0.0	29.7
CAT 140G Motor Grader	Graders	2023	1	150	0.41	60	24	0.39	3.55	0.20	0.18	478.46	0.16	1.27	11.54	0.63	0.59	0.04	0.35	0.02	0.02	14.1	0.0	0.0	14.1
CAT 390 Excavator	Excavators	2023	2	524	0.38	60	24	0.14	1.16	0.04	0.04	468.68	0.15	3.03	24.41	0.91	0.84	0.09	0.73	0.03	0.03	89.6	0.0	0.0	89.6
2023 TOTAL - Unmitigated														**21.6**	**171.8**	**6.6**	**6.1**	**0.65**	**5.15**	**0.20**	**0.18**	**485.3**	**0.01**	**0.00**	**485.4**
Water Truck (2000 gallon)	Off-Highway Trucks	2024	1	210	0.38	60	24	0.20	1.36	0.05	0.05	469.11	0.15	0.85	5.72	0.23	0.21	0.03	0.17	0.01	0.01	18.0	0.0	0.0	18.0
CAT backhoe	Tractors/Loaders/Backhoes	2024	1	97	0.37	60	24	0.23	2.29	0.11	0.10	476.73	0.15	0.43	4.34	0.20	0.18	0.01	0.13	0.01	0.01	8.2	0.0	0.0	8.2
End Dump Trucks	Off-Highway Trucks	2024	6	402	0.38	60	24	0.18	1.24	0.04	0.04	475.22	0.15	8.92	59.90	2.13	1.99	0.27	1.80	0.06	0.06	209.1	0.0	0.0	209.1
980 Loaders	Rubber Tired Loaders	2024	3	386	0.36	60	24	0.21	1.70	0.06	0.06	468.51	0.15	4.61	37.53	1.39	1.28	0.14	1.13	0.04	0.04	93.8	0.0	0.0	93.8
Lattice Boom Crane	Cranes	2024	1	350	0.29	60	24	0.23	2.38	0.10	0.09	472.07	0.15	1.24	12.80	0.52	0.48	0.04	0.38	0.02	0.01	23.0	0.0	0.0	23.0
CAT 345 Excavator	Excavators	2024	1	346	0.38	60	24	0.12	0.83	0.03	0.03	469.71	0.15	0.84	5.78	0.20	0.18	0.03	0.17	0.01	0.01	29.6	0.0	0.0	29.7
CAT 140G Motor Grader	Graders	2024	1	150	0.41	60	24	0.36	3.20	0.18	0.16	478.50	0.16	1.18	10.42	0.58	0.53	0.04	0.31	0.02	0.02	14.1	0.0	0.0	14.1
CAT 390 Excavator	Excavators	2024	2	524	0.38	60	24	0.14	1.10	0.04	0.04	468.65	0.15	2.99	23.28	0.86	0.78	0.09	0.70	0.03	0.02	89.6	0.0	0.0	89.6
2024 TOTAL - Unmitigated														**21.1**	**159.8**	**6.1**	**5.6**	**0.63**	**4.79**	**0.18**	**0.17**	**485.36**	**0.01**	**0.00**	**485.49**

At West False River Barrier Location - Mitigated with Tier 4 Final

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Water Truck (2000 gallon)	Off-Highway Trucks	2023	1	210	0.38	60	24	0.06	0.26	0.01	0.01	469.45	0.15	0.25	1.10	0.03	0.03	0.01	0.03	0.00	0.00	18.0	0.0	0.0	18.0
CAT backhoe	Tractors/Loaders/Backhoes	2023	1	97	0.37	60	24	0.06	0.26	0.01	0.01	476.43	0.15	0.11	0.49	0.02	0.02	0.00	0.01	0.00	0.00	8.2	0.0	0.0	8.2
End Dump Trucks	Off-Highway Trucks	2023	6	402	0.38	60	24	0.06	0.26	0.01	0.01	475.05	0.15	2.91	12.61	0.39	0.39	0.09	0.38	0.01	0.01	209.0	0.0	0.0	209.1
980 Loaders	Rubber Tired Loaders	2023	3	386	0.36	60	24	0.06	0.26	0.01	0.01	468.47	0.15	1.32	5.73	0.18	0.18	0.04	0.17	0.01	0.01	93.7	0.0	0.0	93.8
Lattice Boom Crane	Cranes	2023	1	350	0.29	60	24	0.06	0.26	0.01	0.01	472.29	0.15	0.32	1.40	0.04	0.04	0.01	0.04	0.00	0.00	23.0	0.0	0.0	23.0
CAT 345 Excavator	Excavators	2023	1	346	0.38	60	24	0.06	0.26	0.01	0.01	469.89	0.15	0.42	1.81	0.06	0.06	0.01	0.05	0.00	0.00	29.7	0.0	0.0	29.7
CAT 140G Motor Grader	Graders	2023	1	150	0.41	60	24	0.06	0.26	0.01	0.01	478.46	0.16	0.20	0.85	0.03	0.03	0.01	0.03	0.00	0.00	14.1	0.0	0.0	14.1
CAT 390 Excavator	Excavators	2023	2	524	0.38	60	24	0.06	0.26	0.01	0.01	468.68	0.15	1.26	5.48	0.17	0.17	0.04	0.16	0.01	0.01	89.6	0.0	0.0	89.6
2023 TOTAL - Mitigated with Tier 4 Final														**6.8**	**29.5**	**0.9**	**0.9**	**0.20**	**0.88**	**0.03**	**0.03**	**485.3**	**0.01**	**0.00**	**485.4**
Water Truck (2000 gallon)	Off-Highway Trucks	2024	1	210	0.38	60	24	0.06	0.26	0.01	0.01	469.11	0.15	0.25	1.10	0.03	0.03	0.01	0.03	0.00	0.00	18.0	0.0	0.0	18.0
CAT backhoe	Tractors/Loaders/Backhoes	2024	1	97	0.37	60	24	0.06	0.26	0.01	0.01	476.73	0.15	0.11	0.49	0.02	0.02	0.00	0.01	0.00	0.00	8.2	0.0	0.0	8.2
End Dump Trucks	Off-Highway Trucks	2024	6	402	0.38	60	24	0.06	0.26	0.01	0.01	475.22	0.15	2.91	12.61	0.39	0.39	0.09	0.38	0.01	0.01	209.1	0.0	0.0	209.1
980 Loaders	Rubber Tired Loaders	2024	3	386	0.36	60	24	0.06	0.26	0.01	0.01	468.51	0.15	1.32	5.73	0.18	0.18	0.04	0.17	0.01	0.01	93.8	0.0	0.0	93.8
Lattice Boom Crane	Cranes	2024	1	350	0.29	60	24	0.06	0.26	0.01	0.01	472.07	0.15	0.32	1.40	0.04	0.04	0.01	0.04	0.00	0.00	23.0	0.0	0.0	23.0
CAT 345 Excavator	Excavators	2024	1	346	0.38	60	24	0.06	0.26	0.01	0.01	469.71	0.15	0.42	1.81	0.06	0.06	0.01	0.05	0.00	0.00	29.6	0.0	0.0	29.7
CAT 140G Motor Grader	Graders	2024	1	150	0.41	60	24	0.06	0.26	0.01	0.01	478.50	0.16	0.20	0.85	0.03	0.03	0.01	0.03	0.00	0.00	14.1	0.0	0.0	14.1
CAT 390 Excavator	Excavators	2024	2	524	0.38	60	24	0.06	0.26	0.01	0.01	468.65	0.15	1.26	5.48	0.17	0.17	0.04	0.16	0.01	0.01	89.6	0.0	0.0	89.6
2024 TOTAL - Mitigated with Tier 4 Final														**6.8**	**29.5**	**0.9**	**0.9**	**0.20**	**0.88**	**0.03**	**0.03**	**485.36**	**0.01**	**0.00**	**485.49**

At Rio Vista/Stockton Storage Yard - Unmitigated

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
CAT 563 Compactor	Other Construction Equipment	2023	1	145	0.42	60	8	0.27	2.70	0.14	0.13	469.56	0.15	0.29	2.90	0.15	0.14	0.01	0.09	0.00	0.00	13.7	0.0	0.0	13.7
CAT 623 Scraper	Scrapers	2023	1	359	0.48	60	8	0.25	2.67	0.11	0.10	473.18	0.15	0.77	8.10	0.32	0.29	0.02	0.24	0.01	0.01	39.1	0.0	0.0	39.1
CAT 621 Water Pull	Off-Highway Trucks	2023	1	365	0.38	60	8	0.19	1.32	0.05	0.04	475.05	0.15	0.46	3.24	0.12	0.11	0.01	0.10	0.00	0.00	31.6	0.0	0.0	31.6
CAT D6H Dozer	Rubber Tired Dozers	2023	1	179	0.4	60	8	0.39	4.09	0.18	0.17	474.60	0.15	0.50	5.17	0.23	0.21	0.01	0.15	0.01	0.01	16.3	0.0	0.0	16.3
Peterbilt Water Truck	Off-Highway Trucks	2023	1	350	0.38	60	8	0.19	1.32	0.05	0.04	475.05	0.15	0.44	3.11	0.11	0.10	0.01	0.09	0.00	0.00	30.3	0.0	0.0	30.3
CAT 140G Motor Grader	Graders	2023	1	150	0.41	60	8	0.39	3.55	0.20	0.18	478.46	0.16	0.42	3.85	0.21	0.20	0.01	0.12	0.01	0.01	14.1	0.0	0.0	14.1
CASE 580 Backhoe	Tractors/Loaders/Backhoes	2023	1	95	0.37	60	8	0.24	2.43	0.12	0.11	476.43	0.15	0.15	1.50	0.07	0.07	0.00	0.05	0.00	0.00	8.0	0.0	0.0	8.0
980 Loaders	Rubber Tired Loaders	2023	2	386	0.36	60	8	0.22	1.87	0.07	0.06	468.47	0.15	1.06	9.15	0.34	0.31	0.03	0.27	0.01	0.01	62.5	0.0	0.0	62.5
CAT 345 Excavator	Excavators	2023	1	346	0.38	60	8	0.12	0.89	0.03	0.03	469.89	0.15	0.28	2.07	0.07	0.06	0.01	0.06	0.00	0.00	29.7	0.0	0.0	29.7
2023 TOTAL - Unmitigated														**4.4**	**39.1**	**1.6**	**1.5**	**0.13**	**1.17**	**0.05**	**0.04**	**245.4**	**0.00**	**0.00**	**245.5**
CAT 563 Compactor	Other Construction Equipment	2024	1	145	0.42	60	8	0.26	2.52	0.13	0.12	469.54	0.15	0.28	2.71	0.14	0.13	0.01	0.08	0.00	0.00	13.7	0.0	0.0	13.7
CAT 623 Scraper	Scrapers	2024	1	359	0.48	60	8	0.25	2.48	0.10	0.09	472.85	0.15	0.74	7.53	0.30	0.27	0.02	0.23	0.01	0.01	39.1	0.0	0.0	39.1
CAT 621 Water Pull	Off-Highway Trucks	2024	1	365	0.38	60	8	0.18	1.24	0.04	0.04	475.22	0.15	0.45	3.02	0.11	0.10	0.01	0.09	0.00	0.00	31.6	0.0	0.0	31.6
CAT D6H Dozer	Rubber Tired Dozers	2024	1	179	0.4	60	8	0.40	4.09	0.18	0.17	474.59	0.15	0.50	5.17	0.23	0.21	0.02	0.15	0.01	0.01	16.3	0.0	0.0	16.3
Peterbilt Water Truck	Off-Highway Trucks	2024	1	350	0.38	60	8	0.18	1.24	0.04	0.04	475.22	0.15	0.43	2.90	0.10	0.10	0.01	0.09	0.00	0.00	30.3	0.0	0.0	30.3
CAT 140G Motor Grader	Graders	2024	1	150	0.41	60	8	0.36	3.20	0.18	0.16	478.50	0.16	0.39	3.47	0.19	0.18	0.01	0.10	0.01	0.01	14.1	0.0	0.0	14.1
CASE 580 Backhoe	Tractors/Loaders/Backhoes	2024	1	95	0.37	60	8	0.23	2.29	0.11	0.10	476.73	0.15	0.14	1.42	0.07	0.06	0.00	0.04	0.00	0.00	8.0	0.0	0.0	8.0
980 Loaders	Rubber Tired Loaders	2024	2	386	0.36	60	8	0.21	1.70	0.06	0.06	468.51	0.15	1.02	8.34	0.31	0.28	0.03	0.25	0.01	0.01	62.5	0.0	0.0	62.5
CAT 345 Excavator	Excavators	2024	1	346	0.38	60	8	0.12	0.83	0.03	0.03	469.71	0.15	0.28	1.93	0.07	0.06	0.01	0.06	0.00	0.00	29.6	0.0	0.0	29.7
2024 TOTAL - Unmitigated														**4.3**	**36.5**	**1.5**	**1.4**	**0.13**	**1.09**	**0.05**	**0.04**	**245.44**	**0.00**	**0.00**	**245.50**

At Rio Vista/Stockton Storage Yard - Mitigated with Tier 4 Final

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
CAT 563 Compactor	Other Construction Equipment	2023	1	145	0.42	60	8	0.06	0.26	0.01	0.01	469.56	0.15	0.06	0.28	0.01	0.01	0.00	0.01	0.00	0.00	13.7	0.0	0.0	13.7
CAT 623 Scraper	Scrapers	2023	1	359	0.48	60	8	0.06	0.26	0.01	0.01	473.18	0.15	0.18	0.79	0.02	0.02	0.01	0.02	0.00	0.00	39.1	0.0	0.0	39.1
CAT 621 Water Pull	Off-Highway Trucks	2023	1	365	0.38	60	8	0.06	0.26	0.01	0.01	475.05	0.15	0.15	0.64	0.02	0.02	0.00	0.02	0.00	0.00	31.6	0.0	0.0	31.6
CAT D6H Dozer	Rubber Tired Dozers	2023	1	179	0.4	60	8	0.06	0.26	0.01	0.01	474.60	0.15	0.08	0.33	0.01	0.01	0.00	0.01	0.00	0.00	16.3	0.0	0.0	16.3
Peterbilt Water Truck	Off-Highway Trucks	2023	1	350	0.38	60	8	0.06	0.26	0.01	0.01	475.05	0.15	0.14	0.61	0.02	0.02	0.00	0.02	0.00	0.00	30.3	0.0	0.0	30.3
CAT 140G Motor Grader	Graders	2023	1	150	0.41	60	8	0.06	0.26	0.01	0.01	478.46	0.16	0.07	0.28	0.01	0.01	0.00	0.01	0.00	0.00	14.1	0.0	0.0	14.1
CASE 580 Backhoe	Tractors/Loaders/Backhoes	2023	1	95	0.37	60	8	0.06	0.26	0.01	0.01	476.43	0.15	0.04	0.16	0.00	0.00	0.00	0.00	0.00	0.00	8.0	0.0	0.0	8.0
980 Loaders	Rubber Tired Loaders	2023	2	386	0.36	60	8	0.06	0.26	0.01	0.01	468.47	0.15	0.29	1.27	0.04	0.04	0.01	0.04	0.00	0.00	62.5	0.0	0.0	62.5
CAT 345 Excavator	Excavators	2023	1	346	0.38	60	8	0.06	0.26	0.01	0.01	469.89	0.15	0.14	0.60	0.02	0.02	0.00	0.02	0.00	0.00	29.7	0.0	0.0	29.7
2023 TOTAL - Mitigated with Tier 4 Final														**1.1**	**5.0**	**0.2**	**0.2**	**0.03**	**0.15**	**0.00**	**0.00**	**245.4**	**0.00**	**0.00**	**245.5**

Barrier Notching

0.22 0.03

0.1288122 0.022091

At West False River Barrier Location - Unmitigated

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
CAT 390 Excavator	Excavators	2023	2	523	0.38	12	12	0.14	1.16	0.04	0.04	468.68	0.15	1.51	12.18	0.45	0.42	0.01	0.07	0.00	0.00	17.9	0.0	0.0	17.9
CAT 345 Excavator	Excavators	2023	1	346	0.38	12	12	0.12	0.89	0.03	0.03	469.89	0.15	0.42	3.11	0.10	0.10	0.00	0.02	0.00	0.00	5.9	0.0	0.0	5.9
Lattice Boom Crane	Cranes	2023	1	350	0.29	12	12	0.24	2.51	0.10	0.09	472.29	0.15	0.63	6.74	0.27	0.25	0.00	0.04	0.00	0.00	4.6	0.0	0.0	4.6
Water Truck (2000 Gallon)	Off-Highway Trucks	2023	1	210	0.38	12	12	0.21	1.46	0.06	0.05	469.45	0.15	0.44	3.07	0.12	0.11	0.00	0.02	0.00	0.00	3.6	0.0	0.0	3.6
End Dump Trucks	Off-Highway Trucks	2023	6	402	0.38	12	12	0.19	1.32	0.05	0.04	475.05	0.15	4.53	32.11	1.16	1.07	0.03	0.19	0.01	0.01	41.8	0.0	0.0	41.8
CAT backhoe	Tractors/Loaders/Backhoes	2023	1	97	0.37	12	12	0.24	2.43	0.12	0.11	476.43	0.15	0.23	2.30	0.11	0.10	0.00	0.01	0.00	0.00	1.6	0.0	0.0	1.6
980 Loader	Rubber Tired Loaders	2023	3	386	0.36	12	12	0.22	1.87	0.07	0.06	468.47	0.15	2.39	20.58	0.76	0.71	0.01	0.12	0.00	0.00	18.7	0.0	0.0	18.8
CAT 140G Motor Grader	Graders	2023	1	150	0.41	12	12	0.39	3.55	0.20	0.18	478.46	0.16	0.63	5.77	0.32	0.29	0.00	0.03	0.00	0.00	2.8	0.0	0.0	2.8
2023 TOTAL - Unmitigated														**10.8**	**85.9**	**3.3**	**3.1**	**0.06**	**0.52**	**0.02**	**0.02**	**97.0**	**0.00**	**0.00**	**97.1**

At West False River Barrier Location - Mitigated with Tier 4 Final

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
CAT 390 Excavator	Excavators	2023	2	523	0.38	12	12	0.06	0.26	0.01	0.01	468.68	0.15	0.63	2.73	0.08	0.08	0.00	0.02	0.00	0.00	17.9	0.0	0.0	17.9
CAT 345 Excavator	Excavators	2023	1	346	0.38	12	12	0.06	0.26	0.01	0.01	469.89	0.15	0.21	0.90	0.03	0.03	0.00	0.01	0.00	0.00	5.9	0.0	0.0	5.9
Lattice Boom Crane	Cranes	2023	1	350	0.29	12	12	0.06	0.26	0.01	0.01	472.29	0.15	0.16	0.70	0.02	0.02	0.00	0.00	0.00	0.00	4.6	0.0	0.0	4.6
Water Truck (2000 Gallon)	Off-Highway Trucks	2023	1	210	0.38	12	12	0.06	0.26	0.01	0.01	469.45	0.15	0.13	0.55	0.02	0.02	0.00	0.00	0.00	0.00	3.6	0.0	0.0	3.6
End Dump Trucks	Off-Highway Trucks	2023	6	402	0.38	12	12	0.06	0.26	0.01	0.01	475.05	0.15	1.45	6.30	0.19	0.19	0.01	0.04	0.00	0.00	41.8	0.0	0.0	41.8
CAT backhoe	Tractors/Loaders/Backhoes	2023	1	97	0.37	12	12	0.06	0.26	0.01	0.01	476.43	0.15	0.06	0.25	0.01	0.01	0.00	0.00	0.00	0.00	1.6	0.0	0.0	1.6
980 Loader	Rubber Tired Loaders	2023	3	386	0.36	12	12	0.06	0.26	0.01	0.01	468.47	0.15	0.66	2.87	0.09	0.09	0.00	0.02	0.00	0.00	18.7	0.0	0.0	18.8
CAT 140G Motor Grader	Graders	2023	1	150	0.41	12	12	0.06	0.26	0.01	0.01	478.46	0.16	0.10	0.42	0.01	0.01	0.00	0.00	0.00	0.00	2.8	0.0	0.0	2.8
2023 TOTAL - Mitigated with Tier 4 Final														**3.4**	**14.7**	**0.5**	**0.5**	**0.02**	**0.09**	**0.00**	**0.00**	**97.0**	**0.00**	**0.00**	**97.1**

At Stockton Storage Yard - Unmitigated

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Compactor	Other Construction Equipment	2023	1	172	0.42	12	12	0.27	2.70	0.14	0.13	469.56	0.15	0.52	5.16	0.27	0.25	0.00	0.03	0.00	0.00	3.3	0.0	0.0	3.3
Scraper	Scrapers	2023	1	367	0.48	12	12	0.25	2.67	0.11	0.10	473.18	0.15	1.18	12.43	0.49	0.45	0.01	0.07	0.00	0.00	8.0	0.0	0.0	8.0
Water Pull	Off-Highway Trucks	2023	1	402	0.38	12	12	0.19	1.32	0.05	0.04	475.05	0.15	0.76	5.35	0.19	0.18	0.00	0.03	0.00	0.00	7.0	0.0	0.0	7.0
Dozer	Rubber Tired Dozers	2023	1	247	0.4	12	12	0.39	4.09	0.18	0.17	474.60	0.15	1.03	10.69	0.48	0.44	0.01	0.06	0.00	0.00	4.5	0.0	0.0	4.5
Water Truck (2,000 Gallon)	Off-Highway Trucks	2023	1	210	0.38	12	12	0.21	1.46	0.06	0.05	469.45	0.15	0.44	3.07	0.12	0.11	0.00	0.02	0.00	0.00	3.6	0.0	0.0	3.6
Motor Grader	Graders	2023	1	187	0.41	12	12	0.28	3.44	0.11	0.10	473.93	0.15	0.58	6.98	0.23	0.21	0.00	0.04	0.00	0.00	3.5	0.0	0.0	3.5
CAT Backhoe	Tractors/Loaders/Backhoes	2023	1	97	0.37	12	12	0.24	2.43	0.12	0.11	476.43	0.15	0.23	2.30	0.11	0.10	0.00	0.01	0.00	0.00	1.6	0.0	0.0	1.6
CAT 345 Excavator	Excavators	2023	1	346	0.38	12	12	0.12	0.89	0.03	0.03	469.89	0.15	0.42	3.11	0.10	0.10	0.00	0.02	0.00	0.00	5.9	0.0	0.0	5.9
980 Loader	Rubber Tired Loaders	2023	2	386	0.36	12	12	0.22	1.87	0.07	0.06	468.47	0.15	1.60	13.72	0.51	0.47	0.01	0.08	0.00	0.00	12.5	0.0	0.0	12.5
2023 TOTAL - Unmitigated														**6.7**	**62.8**	**2.5**	**2.3**	**0.04**	**0.38**	**0.02**	**0.01**	**49.9**	**0.00**	**0.00**	**49.9**

At Stockton Storage Yard - Mitigated with Tier 4 Final

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Compactor	Other Construction Equipment	2023	1	172	0.42	12	12	0.06	0.26	0.01	0.01	469.56	0.15	0.11	0.50	0.02	0.02	0.00	0.00	0.00	0.00	3.3	0.0	0.0	3.3
Scraper	Scrapers	2023	1	367	0.48	12	12	0.06	0.26	0.01	0.01	473.18	0.15	0.28	1.21	0.04	0.04	0.00	0.01	0.00	0.00	8.0	0.0	0.0	8.0
Water Pull	Off-Highway Trucks	2023	1	402	0.38	12	12	0.06	0.26	0.01	0.01	475.05	0.15	0.24	1.05	0.03	0.03	0.00	0.01	0.00	0.00	7.0	0.0	0.0	7.0
Dozer	Rubber Tired Dozers	2023	1	247	0.4	12	12	0.06	0.26	0.01	0.01	474.60	0.15	0.16	0.68	0.02	0.02	0.00	0.00	0.00	0.00	4.5	0.0	0.0	4.5
Water Truck (2,000 Gallon)	Off-Highway Trucks	2023	1	210	0.38	12	12	0.06	0.26	0.01	0.01	469.45	0.15	0.13	0.55	0.02	0.02	0.00	0.00	0.00	0.00	3.6	0.0	0.0	3.6
Motor Grader	Graders	2023	1	187	0.41	12	12	0.06	0.26	0.01	0.01	473.93	0.15	0.12	0.53	0.02	0.02	0.00	0.00	0.00	0.00	3.5	0.0	0.0	3.5
CAT Backhoe	Tractors/Loaders/Backhoes	2023	1	97	0.37	12	12	0.06	0.26	0.01	0.01	476.43	0.15	0.06	0.25	0.01	0.01	0.00	0.00	0.00	0.00	1.6	0.0	0.0	1.6
CAT 345 Excavator	Excavators	2023	1	346	0.38	12	12	0.06	0.26	0.01	0.01	469.89	0.15	0.21	0.90	0.03	0.03	0.00	0.01	0.00	0.00	5.9	0.0	0.0	5.9
980 Loader	Rubber Tired Loaders	2023	2	386	0.36	12	12	0.06	0.26	0.01	0.01	468.47	0.15	0.44	1.91	0.06	0.06	0.00	0.01	0.00	0.00	12.5	0.0	0.0	12.5
2023 TOTAL - Mitigated with Tier 4 Final														**1.7**	**7.6**	**0.2**	**0.2**	**0.01**	**0.05**	**0.00**	**0.00**	**49.9**	**0.00**	**0.00**	**49.9**

Closing the Notch

At West False River Barrier Location - Unmitigated

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Radial Stacker	Other Construction Equipment	2024	2	74	0.42	12	12	0.38	3.58	0.24	0.22	472.13	0.15	0.63	5.89	0.39	0.36	0.00	0.04	0.00	0.00	2.8	0.0	0.0	2.8
CAT 345 Excavator	Excavators	2024	1	346	0.38	12	12	0.12	0.83	0.03	0.03	469.71	0.15	0.42	2.89	0.10	0.09	0.00	0.02	0.00	0.00	5.9	0.0	0.0	5.9
980 Loader	Rubber Tired Loaders	2024	2	386	0.36	12	12	0.21	1.70	0.06	0.06	468.51	0.15	1.54	12.51	0.46	0.43	0.01	0.08	0.00	0.00	12.5	0.0	0.0	12.5
Water Truck (2000 Gallon)	Off-Highway Trucks	2024	1	210	0.38	12	12	0.20	1.36	0.05	0.05	469.11	0.15	0.43	2.86	0.11	0.11	0.00	0.02	0.00	0.00	3.6	0.0	0.0	3.6
2024 TOTAL - Unmitigated														**3.0**	**24.2**	**1.1**	**1.0**	**0.02**	**0.14**	**0.01**	**0.01**	**24.8**	**0.00**	**0.00**	**24.8**

At West False River Barrier Location - Mitigated with Tier 4 Final

Land Equipment	OFFROAD Equipment	Analysis Year	Number	Hp	Load Factor	Phase duration	Hours/day used	OFFROAD Emission factors (g/hp-hr)						Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Radial Stacker	Other Construction Equipment	2024	2	74	0.42	12	12	0.12	2.74	0.01	0.01	472.13	0.15	0.20	4.51	0.01	0.01	0.00	0.03	0.00	0.00	2.8	0.0	0.0	2.8
CAT 345 Excavator	Excavators	2024	1	346	0.38	12	12	0.06	0.26	0.01	0.01	469.71	0.15	0.21	0.90	0.03	0.03	0.00	0.01	0.00	0.00	5.9	0.0	0.0	5.9
980 Loader	Rubber Tired Loaders	2024	2	386	0.36	12	12	0.06	0.26	0.01	0.01	468.51	0.15	0.44	1.91	0.06	0.06	0.00	0.01	0.00	0.00	12.5	0.0	0.0	12.5
Water Truck (2000 Gallon)	Off-Highway Trucks	2024	1	210	0.38	12	12	0.06	0.26	0.01	0.01	469.11	0.15	0.13	0.55	0.02	0.02	0.00	0.00	0.00	0.00	3.6	0.0	0.0	3.6
2024 TOTAL - Mitigated with Tier 4 Final														**1.0**	**7.9**	**0.1**	**0.1**	**0.01**	**0.05**	**0.00**	**0.00**	**24.8**	**0.00**	**0.00**	**24.8**

West False River Drought Salinity Barrier Project

On-road Sources

Barrier Installation

Number of workers/day 37 *Email from Robert dated July 6, 2020 12.08 p.m.*

Number of truck trips/day 0

1 pound = 453.592 g 1 ton = 907185 g 1 MT = 1000000 g

Onroad Trips	EMFAC Vehicle Category	Fuel	Analysis Year	Number of one-way trips/day	Miles/one-way trip	miles/day	Phase duration	EMFAC2017 Emission factors (g/mile)							Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Worker trips	LDA	GSL		56	25	1388	45	0.01	0.05	0.02	0.01	283.8	0.00	0.01	0.03	0.15	0.05	0.02	0.00	0.00	0.00	0.00	17.7	0.0	0.0	17.8
Worker trips	LDT1	GSL	2023	19	25	463	45	0.03	0.14	0.02	0.01	336.2	0.01	0.01	0.03	0.14	0.02	0.01	0.00	0.00	0.00	0.00	7.0	0.0	0.0	7.1
Truck trips	HHDT	DSL		0	0	0	45	0.02	2.01	0.14	0.06	1654.0	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0
2023 Onroad Total															**0.06**	**0.29**	**0.07**	**0.02**	**0.00**	**0.01**	**0.00**	**0.00**	**24.7**	**0.0**	**0.0**	**24.9**

Barrier Removal

Number of workers/day 37 *Email from Robert dated July 6, 2020 12.08 p.m.*

Number of truck trips/day 134 *From traffic section*

1 pound = 453.592 g 1 ton = 907185 g 1 MT = 1000000 g

Onroad Trips	EMFAC Vehicle Category	Fuel	Analysis Year	Number of one-way trips/day	Miles/one-way trip	miles/day	Phase duration	EMFAC2017 Emission factors (g/mile)							Emissions (pounds per day)				Emissions (tons per year)				Emissions (MT per year)			
								ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	NOx	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Worker trips	LDA	GSL		56	25	1388	60	0.01	0.05	0.02	0.01	283.8	0.00	0.01	0.03	0.15	0.05	0.02	0.00	0.00	0.00	0.00	23.6	0.0	0.0	23.8
Worker trips	LDT1	GSL	2023	19	25	463	60	0.03	0.14	0.02	0.01	336.2	0.01	0.01	0.03	0.14	0.02	0.01	0.00	0.00	0.00	0.00	9.3	0.0	0.0	9.4
Truck trips	HHDT	DSL		134	1	134	60	0.02	2.01	0.14	0.06	1654.0	0.00	0.26	0.01	0.59	0.04	0.02	0.00	0.02	0.00	0.00	13.3	0.0	0.0	13.9
2023 Onroad Total															**0.07**	**0.88**	**0.11**	**0.04**	**0.00**	**0.03**	**0.00**	**0.00**	**46.3**	**0.0**	**0.0**	**47.1**
Worker trips	LDA	GSL		56	25	1388	60	0.01	0.04	0.02	0.01	279.1	0.00	0.00	0.03	0.13	0.05	0.02	0.00	0.00	0.00	0.00	23.2	0.0	0.0	23.4
Worker trips	LDT1	GSL	2024	19	25	463	60	0.03	0.13	0.02	0.01	331.8	0.01	0.01	0.03	0.13	0.02	0.01	0.00	0.00	0.00	0.00	9.2	0.0	0.0	9.3
Truck trips	HHDT	DSL		134	1	134	60	0.02	1.93	0.14	0.06	1631.9	0.00	0.26	0.01	0.57	0.04	0.02	0.00	0.02	0.00	0.00	13.1	0.0	0.0	13.7
2024 Onroad Total															**0.06**	**0.83**	**0.11**	**0.04**	**0.00**	**0.02**	**0.00**	**0.00**	**45.6**	**0.0**	**0.0**	**46.4**

Tug Emissions Estimates

Use	Mode	Engine Group	Activity (hr)	Tier	Propulsion Power (kW)	Load	NOx (g)	PM10 (g)	PM2.5 (g)	BC (g)	HC (g)	VOC (g)	CH4 (g)	CO (g)	CO2 (g)	SO2 (g)	N2O (g)
Installation	Tender	Propulsion	972	Tier 2	1123.5	0.68	4189966.2	109941.6	106643.7	82115.6	208475.3	219524.4	4169.5	682252.7	504576142.8	4638.3	24675.2
Installation	Tender	Auxiliary	972	Tier 2	136.5	0.43	321813.3	8444.1	8190.8	6306.9	16012.1	16860.7	320.2	52400.9	38754323.9	356.2	1895.2
Installation	Transport	Propulsion	393.75	Tier 2	1491.4	0.68	2253085.3	59119.3	57345.9	44156.3	112104.1	118045.7	2242.1	366870.2	271327510.4	2494.2	13268.7
Installation	Transport	Auxiliary	393.75	Tier 2	136.5	0.43	130364.2	3420.7	3318.0	2554.9	6486.4	6830.2	129.7	21227.2	15699089.6	144.3	767.7
Decommissioning	Tender	Propulsion	1296	Tier 2	1123.5	0.68	5586621.6	146588.7	142191.6	109487.5	277967.0	292699.3	5559.3	909670.3	672768190.4	6184.4	32900.3
Decommissioning	Tender	Auxiliary	1296	Tier 2	136.5	0.43	429084.4	11258.9	10921.1	8409.3	21349.5	22481.0	427.0	69867.9	51672431.9	475.0	2526.9
Decommissioning	Transport	Propulsion	87.5	Tier 2	1491.4	0.68	500685.6	13137.6	12743.5	9812.5	24912.0	26232.4	498.2	81526.7	60295002.3	554.3	2948.6
Decommissioning	Transport	Auxiliary	87.5	Tier 2	136.5	0.43	28969.8	760.1	737.3	567.8	1441.4	1517.8	28.8	4717.2	3488686.6	32.1	170.6
Installation - Mitigated	Tender	Propulsion	972	Tier 3	1123.5	0.68	3526778.3	61617.4	59769.1	46022.2	88010.7	92675.3	1760.2	682252.7	504576142.8	4638.3	24675.2
Installation - Mitigated	Tender	Auxiliary	972	Tier 3	136.5	0.43	270876.7	4732.6	4590.6	3534.8	6759.7	7118.0	135.2	52400.9	38754323.9	356.2	1895.2
Installation - Mitigated	Transport	Propulsion	393.75	Tier 3	1491.4	0.68	1896467.0	33133.8	32139.9	24747.7	47326.3	49834.6	946.5	366870.2	271327510.4	2494.2	13268.7
Installation - Mitigated	Transport	Auxiliary	393.75	Tier 3	136.5	0.43	109730.1	1917.1	1859.6	1431.9	2738.3	2883.4	54.8	21227.2	15699089.6	144.3	767.7
Decommissioning - Mitigated	Tender	Propulsion	1296	Tier 3	1123.5	0.68	4702371.1	82156.6	79692.1	61363.0	117347.7	123567.1	2347.0	909670.3	672768190.4	6184.4	32900.3
Decommissioning - Mitigated	Tender	Auxiliary	1296	Tier 3	136.5	0.43	361168.9	6310.1	6120.8	4713.0	9013.0	9490.7	180.3	69867.9	51672431.9	475.0	2526.9
Decommissioning - Mitigated	Transport	Propulsion	87.5	Tier 3	1491.4	0.68	421437.1	7363.1	7142.2	5499.5	10517.0	11074.4	210.3	81526.7	60295002.3	554.3	2948.6
Decommissioning - Mitigated	Transport	Auxiliary	87.5	Tier 3	136.5	0.43	24384.5	426.0	413.2	318.2	608.5	640.8	12.2	4717.2	3488686.6	32.1	170.6

Combined Summary											
Use	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	BC (tpy)	HC (tpy)	VOC (tpy)	CH4 (tpy)	CO (tpy)	CO2 (tpy)	SO2 (tpy)	N2O (tpy)
Installation	7.60	0.20	0.19	0.15	0.38	0.40	0.01	1.24	915.31	0.01	0.04
Decommissioning	7.22	0.19	0.18	0.14	0.36	0.38	0.01	1.17	868.87	0.01	0.04
Installation - Mitigated	6.40	0.11	0.11	0.08	0.16	0.17	0.00	1.24	915.31	0.01	0.04
Decommissioning - Mitigated	6.07	0.11	0.10	0.08	0.15	0.16	0.00	1.17	868.87	0.01	0.04

Tender Only											
Use	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	BC (tpy)	HC (tpy)	VOC (tpy)	CH4 (tpy)	CO (tpy)	CO2 (tpy)	SO2 (tpy)	N2O (tpy)
Installation	4.97	0.13	0.13	0.10	0.25	0.26	0.00	0.81	598.92	0.01	0.03
Decommissioning	6.63	0.17	0.17	0.13	0.33	0.35	0.01	1.08	798.56	0.01	0.04
Installation - Mitigated	4.19	0.07	0.07	0.05	0.10	0.11	0.00	0.81	598.92	0.01	0.03
Decommissioning - Mitigated	5.58	0.10	0.09	0.07	0.14	0.15	0.00	1.08	798.56	0.01	0.04
Unmitigated	**11.60**	**0.30**	**0.30**	**0.23**	**0.58**	**0.61**	**0.01**	**1.89**	**1397.48**	**0.01**	**0.07**
Mitigated	**9.77**	**0.17**	**0.17**	**0.13**	**0.24**	**0.26**	**0.00**	**1.89**	**1397.48**	**0.01**	**0.07**

Transport Only											
Use	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	BC (tpy)	HC (tpy)	VOC (tpy)	CH4 (tpy)	CO (tpy)	CO2 (tpy)	SO2 (tpy)	N2O (tpy)
Installation	2.63	0.07	0.07	0.05	0.13	0.14	0.00	0.43	316.39	0.00	0.02
Decommissioning	0.58	0.02	0.01	0.01	0.03	0.03	0.00	0.10	70.31	0.00	0.00
Installation - Mitigated	2.21	0.04	0.04	0.03	0.06	0.06	0.00	0.43	316.39	0.00	0.02
Decommissioning - Mitigated	0.49	0.01	0.01	0.01	0.01	0.01	0.00	0.10	70.31	0.00	0.00
Unmitigated	**3.21**	**0.08**	**0.08**	**0.06**	**0.16**	**0.17**	**0.00**	**0.52**	**386.70**	**0.00**	**0.02**
Mitigated	**2.70**	**0.05**	**0.05**	**0.04**	**0.07**	**0.07**	**0.00**	**0.52**	**386.70**	**0.00**	**0.02**

Tug Activity Estimates

Use	Mode	Engine Group	Number of Tugs	Activity	Activity Units	Rate	Rate Units	Scale	Scale Units	Activity (hr)
Installation	Tender	Propulsion	2	45	Days	21.6	hr/day	50%	Tender fraction of dredge hours	972
Installation	Tender	Auxiliary	2	45	Days	21.6	hr/day	50%	Tender fraction of dredge hours	972
Installation	Transport	Propulsion	1	45	Nautical Miles	8	knots	70	Trip Count	393.75
Installation	Transport	Auxiliary	1	45	Nautical Miles	8	knots	70	Trip Count	393.75
Decommissioning	Tender	Propulsion	2	60	Days	21.6	hr/day	50%	Tender fraction of dredge hours	1296
Decommissioning	Tender	Auxiliary	2	60	Days	21.6	hr/day	50%	Tender fraction of dredge hours	1296
Decommissioning	Transport	Propulsion	1	10	Nautical Miles	8	knots	70	Trip Count	87.5
Decommissioning	Transport	Auxiliary	1	10	Nautical Miles	8	knots	70	Trip Count	87.5
Installation - Mitigated	Tender	Propulsion	2	45	Days	21.6	hr/day	50%	Tender fraction of dredge hours	972
Installation - Mitigated	Tender	Auxiliary	2	45	Days	21.6	hr/day	50%	Tender fraction of dredge hours	972
Installation - Mitigated	Transport	Propulsion	1	45	Nautical Miles	8	knots	70	Trip Count	393.75
Installation - Mitigated	Transport	Auxiliary	1	45	Nautical Miles	8	knots	70	Trip Count	393.75
Decommissioning - Mitigated	Tender	Propulsion	2	60	Days	21.6	hr/day	50%	Tender fraction of dredge hours	1296
Decommissioning - Mitigated	Tender	Auxiliary	2	60	Days	21.6	hr/day	50%	Tender fraction of dredge hours	1296
Decommissioning - Mitigated	Transport	Propulsion	1	10	Nautical Miles	8	knots	70	Trip Count	87.5
Decommissioning - Mitigated	Transport	Auxiliary	1	10	Nautical Miles	8	knots	70	Trip Count	87.5

Tending Notes:

Assumes 2 tugs support ongoing dredging activity
Assumes 45 days of operation for installation, 60 for decommissioning
Assumes 21.6 hours per day of dredge operation (EPA 2020)
Assumes tugs only required to operate 50% of the time that the dredge is operating

Transport Notes:

Assumes 1 tug required per trip
Assumes a travel distance of 45 nautical miles to San Rafel to remain conservative
Assumes a travel speed of 8 knots (POAK 2016 EI)
Assumes 70 trips occur to complete the installation

Representative Tug Fleet Information

Use	Name	Propulsion Power (hp)	Propulsion Power (kW)	Auxiliary Power (hp)	Auxiliary Power (kW)	Propulsion Load	Auxiliary Load
Transp	Solana (Westar)	2000	1491.4	183	136.5	0.68	0.43
Tend	Bearcat (Westar)	1320	984.3	183	136.5	0.68	0.43
Tend	Sarah Reed (Dutra)	1700	1267.7	132	98.4	0.68	0.43
Tend	Cassie Lind (Deforge Maritime)	1500	1118.5	234	174.5	0.68	0.43

Modeled Fleet Characteristics

Use	Engine	Propulsion Power (kW)	Load
Tender	Propulsion	1123.5	0.68
Tender	Auxiliary	136.5	0.43
Transport	Propulsion	1491.4	0.68
Transport	Auxiliary	136.5	0.43

Notes:

Engine loads taken from EPA 2020

Tender tugs engine power characterized as average of Westar's Bearcat, Dutra's Sarah Reed, and Deforge's Cassie Lind

Westar's Solana tug specifications are considered representative of a tug used to transport the embankment rock

EPA Tier-based Harbor Craft Emission Factors

Tier	NOx (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	BC (g/kWh)	HC (g/kWh)	VOC (g/kWh)	CH4 (g/kWh)	CO (g/kWh)	CO2 (g/kWh)	SO2 (g/kWh)	N2O (g/kWh)
Tier 2	5.6423	0.1480	0.1436	0.1106	0.2807	0.2956	0.0056	0.9187	679.4700	0.0062	0.0332
Tier 3	4.7492	0.0830	0.0805	0.0620	0.1185	0.1248	0.0024	0.9187	679.4700	0.0062	0.0332
Tier 4	1.3000	0.0300	0.0291	0.0224	0.1185	0.1248	0.0024	0.9187	679.4700	0.0062	0.0332

Source: US EPA Port Emission Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions

Offroad Emission Estimates for Derrick Barge

								Offroad Emission Factor Lookup									Fuel Corr.		
Assessment Year	**Equip**	**Use**	**Activity (hr)**	**MY**	**Eng**	**HP**	**Load**	**HP Bin**	**NOXzh**	**NOXdr**	**PMzh**	**PMdr**	**THCzh**	**THCdr**	**COzh**	**COdr**	**PM_fcf**	**Nox_fcf**	**HC_fcf**
2022	DB Oakland	Installation	972	2015	Main	1372	0.29	9999	3.039846	3.94E-05	0.064436	3.58E-06	0.05	0.0000117	0.92	0.0000182	0.9	0.95	0.9
2022	DB Oakland	Installation	972	2018	Hoist	215	0.29	300	0.120781	1.59E-06	0.009321	3.45E-07	0.05	0.0000117	0.92	0.0000243	0.9	0.95	0.9
2022	DB Oakland	Installation	972	2018	Gen	135	0.42	175	0.954	0.0000126	0.014	0.000000654	0.05	0.0000117	2.7	0.0000714	0.9	0.95	0.9
2022	DB Oakland	Decommissioning	1296	2015	Main	1372	0.29	9999	3.039846	3.94E-05	0.064436	3.58E-06	0.05	0.0000117	0.92	0.0000182	0.9	0.95	0.9
2022	DB Oakland	Decommissioning	1296	2018	Hoist	215	0.29	300	0.120781	1.59E-06	0.009321	3.45E-07	0.05	0.0000117	0.92	0.0000243	0.9	0.95	0.9
2022	DB Oakland	Decommissioning	1296	2018	Gen	135	0.42	175	0.954	0.0000126	0.014	0.000000654	0.05	0.0000117	2.7	0.0000714	0.9	0.95	0.9
2022	DB Oakland	Installation - Mitigated	972	2015	Main	1372	0.29	9999	3.039846	3.94E-05	0.064436	3.58E-06	0.05	0.0000117	0.92	0.0000182	0.9	0.95	0.9
2022	DB Oakland	Installation - Mitigated	972	2018	Hoist	215	0.29	300	0.120781	1.59E-06	0.009321	3.45E-07	0.05	0.0000117	0.92	0.0000243	0.9	0.95	0.9
2022	DB Oakland	Installation - Mitigated	972	2018	Gen	135	0.42	175	0.954	0.0000126	0.014	0.000000654	0.05	0.0000117	2.7	0.0000714	0.9	0.95	0.9
2022	DB Oakland	Decommissioning - Mitigated	1296	2015	Main	1372	0.29	9999	3.039846	3.94E-05	0.064436	3.58E-06	0.05	0.0000117	0.92	0.0000182	0.9	0.95	0.9
2022	DB Oakland	Decommissioning - Mitigated	1296	2018	Hoist	215	0.29	300	0.120781	1.59E-06	0.009321	3.45E-07	0.05	0.0000117	0.92	0.0000243	0.9	0.95	0.9
2022	DB Oakland	Decommissioning - Mitigated	1296	2018	Gen	135	0.42	175	0.954	0.0000126	0.014	0.000000654	0.05	0.0000117	2.7	0.0000714	0.9	0.95	0.9

								Efs (g/hphr)							Emission (tpy)						
Assessment Year	**Equip**	**Use**	**Activity (hr)**	**MY**	**Eng**	**HP**	**Load**	**Nox_EF**	**PM_EF**	**THC_EF**	**CO_EF**	**CO2_EF**	**N2O_EF**	**SO2_EF**	**Nox_tpy**	**PM_tpy**	**THC_tpy**	**CO_tpy**	**CO2_tpy**	**N2O_tpy**	**SO2_tpy**
2022	DB Oakland	Installation	972	2015	Main	1372	0.29	3.143	0.080	0.117	1.044	679.470	0.033	0.003	1.340	0.034	0.050	0.445	289.663	0.014	0.001
2022	DB Oakland	Installation	972	2018	Hoist	215	0.29	0.121	0.010	0.086	1.014	679.470	0.033	0.003	0.008	0.001	0.006	0.068	45.392	0.002	0.0002
2022	DB Oakland	Installation	972	2018	Gen	135	0.42	0.953	0.015	0.086	2.978	679.470	0.033	0.003	0.058	0.001	0.005	0.181	41.278	0.002	0.0002
2022	DB Oakland	Decommissioning	1296	2015	Main	1372	0.29	3.227	0.087	0.141	1.085	679.470	0.033	0.003	1.834	0.050	0.080	0.617	386.217	0.019	0.002
2022	DB Oakland	Decommissioning	1296	2018	Hoist	215	0.29	0.123	0.010	0.100	1.046	679.470	0.033	0.003	0.011	0.001	0.009	0.093	60.522	0.003	0.0003
2022	DB Oakland	Decommissioning	1296	2018	Gen	135	0.42	0.968	0.016	0.100	3.070	679.470	0.033	0.003	0.078	0.001	0.008	0.249	55.038	0.003	0.0003
2022	DB Oakland	Installation - Mitigated	972	2015	Main	1372	0.29	3.143	0.080	0.117	1.044	679.470	0.033	0.003	1.340	0.034	0.050	0.445	289.663	0.014	0.001
2022	DB Oakland	Installation - Mitigated	972	2018	Hoist	215	0.29	0.121	0.010	0.086	1.014	679.470	0.033	0.003	0.008	0.001	0.006	0.068	45.392	0.002	0.0002
2022	DB Oakland	Installation - Mitigated	972	2018	Gen	135	0.42	0.953	0.015	0.086	2.978	679.470	0.033	0.003	0.058	0.001	0.005	0.181	41.278	0.002	0.0002
2022	DB Oakland	Decommissioning - Mitigated	1296	2015	Main	1372	0.29	3.227	0.087	0.141	1.085	679.470	0.033	0.003	1.834	0.050	0.080	0.617	386.217	0.019	0.002
2022	DB Oakland	Decommissioning - Mitigated	1296	2018	Hoist	215	0.29	0.123	0.010	0.100	1.046	679.470	0.033	0.003	0.011	0.001	0.009	0.093	60.522	0.003	0.0003
2022	DB Oakland	Decommissioning - Mitigated	1296	2018	Gen	135	0.42	0.968	0.016	0.100	3.070	679.470	0.033	0.003	0.078	0.001	0.008	0.249	55.038	0.003	0.0003

Notes:

Model year for DB Oakland and rated horsepower taken from information provided by Kiewit

Engine loads taken from CARB Offroad Emission Factor workbook tables

Summary Totals

Use	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	BC (tpy)	HC (tpy)	VOC (tpy)	CH4 (tpy)	CO (tpy)	CO2 (tpy)	SO2 (tpy)	N2O (tpy)
Installation	1.41	0.04	0.04	0.03	0.06	0.06	0.00	0.69	376.33	0.00	0.02
Decommissioning	1.92	0.05	0.05	0.04	0.10	0.10	0.00	0.96	501.78	0.00	0.02
Installation - Mitiga	1.41	0.04	0.04	0.03	0.06	0.06	0.00	0.69	376.33	0.00	0.02
Decommissioning -	1.92	0.05	0.05	0.04	0.10	0.10	0.00	0.96	501.78	0.00	0.02
Unmitigated	**3.33**	**0.09**	**0.09**	**0.07**	**0.16**	**0.17**	**0.00**	**1.65**	**878.11**	**0.00**	**0.04**
Mitigated	**3.33**	**0.09**	**0.09**	**0.07**	**0.16**	**0.17**	**0.00**	**1.65**	**878.11**	**0.00**	**0.04**

Greenhouse Gas(GHG) Emissions Reduction Plan Consistency Determination

For Projects Using Contractors or Other Outside Labor

This form is to be used by DWR project managers to document a DWR CEQA project's consistency with the DWR Greenhouse Gas Emissions Reduction Plan. This form is to be used only when DWR is the Lead Agency and when contractors or outside labor and equipment are used to implement the project.

Additional Guidance on filling out this form can be found at:
http://dwrclimatechange.water.ca.gov/guidance_resources.cfm

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at:
https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Climate-Action-Plan

Project Name:	West False River Drought Salinity Barrier Project
Environmental Document Type:	Environmental Impact Report
Manager's Name:	Robert Trang
Manager's E-mail:	robert.trang@water.ca.gov
Division:	DWR Division of Operations and Maintenance
Office, Branch, or Field Division:	

Short Project Description:

The West False River drought salinity barrier would consist of an approximately 800-foot-long trapezoid-shaped embankment rock structure, set perpendicular to the channel. The drought salinity barrier may be installed up to two times over 10 years, including consecutive years, for up to 20 months for each installation, should another drought occur during the period from 2023 to 2032 and should diminished water quality monitoring and low reservoir storage conditions capacity data indicate that a barrier in West False River is an effective tool to reduce saltwater intrusion into the Delta.

Project GHG Emissions Summary:

Total Construction Emissions	11,053	mtCO2e
Maximum Annual Construction Emissions	4,272	mtCO2e

☒ All other emissions from the project not accounted for above will occur as ongoing operational, maintenance, or business activity emissions and therefore have already been accounted for and analyzed in the GGERP.

Extraordinary Construction Project Determination:

Do total project construction emissions exceed 25,000 mtCO2e for the entire construction phase or exceed 12,500 mtCO2e in any single year of construction?

☒ No- Additional analysis not required

☐ Yes - Project specific emissions mitigation measures have been included in the environmental analysis document for the project

Project GHG Reduction Plan Checklist:

- [x] All Project Level GHG Emissions Reduction Measures have been incorporated into the design or implementation plan for the project. (Project Level GHG Emissions Reduction Measures)

Or

- [ ] All feasible Project Level GHG Emissions Reduction Measures have been incorporated into the design or implementation plan for the project and Measures not incorporated have been listed and determined not to apply to the proposed project (include as an attachment)

- [x] Project does not conflict with any of the Specific Action GHG Emissions Reduction Measures (Specific Action GHG Emissions Reduction Measures)

Would implementation of the project result in additional energy demands on the SWP system of 15 GWh/yr or greater?

☐ Yes ☒ No

If you answered Yes, attach a letter documenting that the project has consulted with the DWR SWP Power and Risk Office regarding the additional power requirements of the project.

Is there substantial evidence that the effects of the proposed project may be cumulatively considerable notwithstanding the proposed project's compliance with the requirements of the DWR GHG Reduction Plan?

☐ Yes ☒ No

If you answered Yes, the project is not eligible for streamlined analysis of GHG emissions using the DWR GHG Emissions Reduction Plan. (See CEQA Guidelines, section 15183.5, subdivision (b)(2).)

Based on the information provided above and information provided in associated environmental documentation completed pursuant to the above referenced project, the DWR CEQA Climate Change Committee has determined that:

- [x] The entire proposed project is consistent with the DWR Greenhouse Gas Reduction Plan and the greenhouse gases emitted by the project are covered by the plan's analysis.

- [ ] The operational and maintenance phase of the project is consistent with the DWR Greenhouse Gas Reduction Plan and the greenhouse gases emitted by the project are covered by the plan's analysis. Emissions from the construction phase of the project are not covered by the DWR Greenhouse Gas Emissions Reduction Plan and will be mitigated as part of the project.

Project Manager Signature: Robert Trang Date: 6/23/2022

C4 Approval Signature: Vanessa Velasco Date: 6/28/2022

Attachments:

☒ GHG Emissions Inventory ☐ List and Explanation of excluded Project level GHG Emissions Reduction Measures ☐ SWP Power and Risk Office Consultation Letter

Links:
https://current.water.ca.gov/programs/icc/SitePages/Home.aspx
https://water.ca.gov/Programs/All-Programs/Climate-Change-Program

Appendix D
Special-Status Species Lists

United States Department of the Interior

FISH AND WILDLIFE SERVICE
San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
Phone: (916) 930-5603 Fax: (916) 930-5654
http://kim_squires@fws.gov

In Reply Refer To: February 02, 2022
Project Code: 2022-0002507
Project Name: Emergency Drought Barriers Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

Project Summary

Project Code: 2022-0002507
Event Code: None
Project Name: Emergency Drought Barriers Project
Project Type: New Construction
Project Description: barrier
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.05759713912502,-121.67077741033165,14z

Counties: Contra Costa County, California

Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
California Clapper Rail *Rallus longirostris obsoletus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Delta Green Ground Beetle *Elaphrus viridis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2319	Threatened
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Soft Bird's-beak *Cordylanthus mollis ssp. mollis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8541	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* https://ecos.fws.gov/ecp/species/321#crithab	Final

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: February 02, 2022
Project Code: 2022-0002487
Project Name: West False River Drought Barrier offloading and rio vista site

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan &

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

Project Summary

Project Code: 2022-0002487
Event Code: None
Project Name: West False River Drought Barrier offloading and rio vista site
Project Type: New Construction
Project Description: off-loading and stockpile site
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.17292323758201,-121.68104037031365,14z

Counties: Solano County, California

Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
California Clapper Rail *Rallus longirostris obsoletus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Delta Green Ground Beetle *Elaphrus viridis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2319	Threatened
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* https://ecos.fws.gov/ecp/species/321#crithab	Final

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird *Selasphorus sasin* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31

NAME	BREEDING SEASON
Nuttall's Woodpecker *Picoides nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

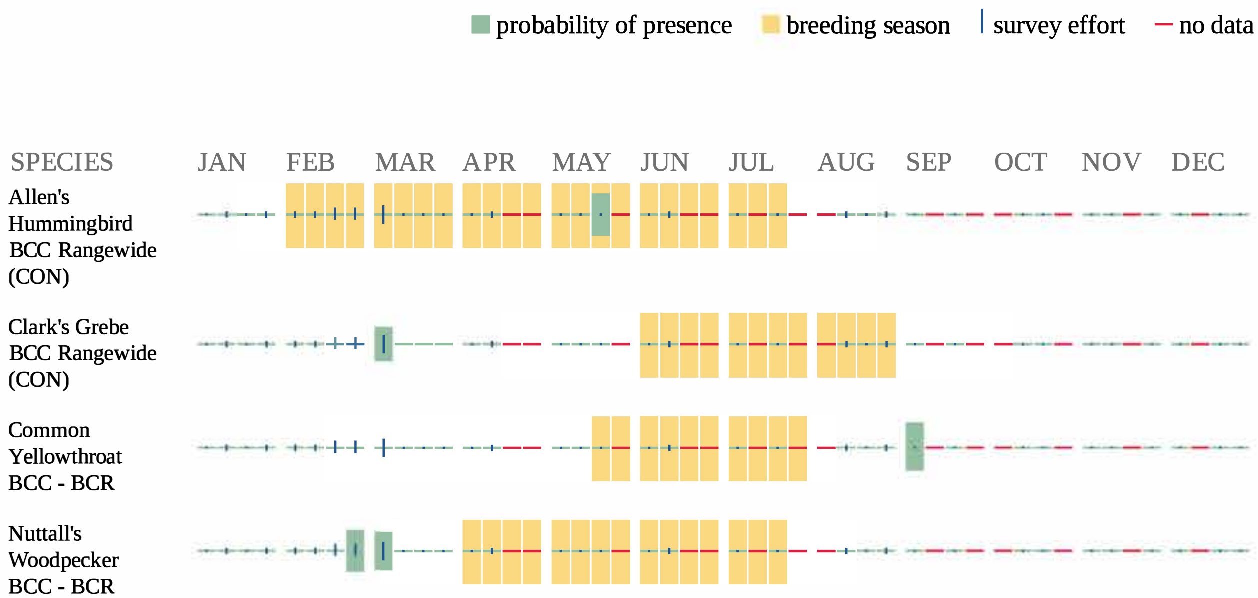
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);

2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities,

should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1C

RIVERINE

- R1UBV

United States Department of the Interior

FISH AND WILDLIFE SERVICE
San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
Phone: (916) 930-5603 Fax: (916) 930-5654
http://kim_squires@fws.gov

In Reply Refer To: February 02, 2022
Project Code: 2022-0002501
Project Name: EDB

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan
(http://www.fws.gov/windenergy/eagle_guidance.html

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

Project Summary

Project Code: 2022-0002501
Event Code: None
Project Name: EDB
Project Type: New Construction
Project Description: Drought Barrier
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.95190495,-121.31064143319075,14z

Counties: San Joaquin County, California

Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Riparian Brush Rabbit *Sylvilagus bachmani riparius* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6189	Endangered

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Large-flowered Fiddleneck *Amsinckia grandiflora* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5558	Endangered
Palmate-bracted Bird's Beak *Cordylanthus palmatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1616	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* https://ecos.fws.gov/ecp/species/321#crithab	Final

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Woodward Island (3712185) OR Brentwood (3712186) OR Antioch South (3712187) OR Bouldin Island (3812115) OR Jersey Island (3812116) OR Antioch North (3812117) OR Isleton (3812125) OR Rio Vista (3812126) OR Birds Landing (3812127) OR Courtland (3812135) OR Liberty Island (3812136) OR Dozier (3812137))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	6	None	Threatened	G1G2	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Alkali Meadow	Alkali Meadow	Herbaceous	CTT45310CA	8	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Alkali Seep	Alkali Seep	Herbaceous	CTT45320CA	10	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	Amphibians	AAAAA01181	1263	69	Threatened	Threatened	G2G3	S3	null	CDFW_WL-Watch List, IUCN_VU-Vulnerable	Cismontane woodland, Meadow & seep, Riparian woodland, Valley & foothill grassland, Vernal pool, Wetland
Ammodramus savannarum	grasshopper sparrow	Birds	ABPBXA0020	27	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Valley & foothill grassland
Amsinckia grandiflora	large-flowered fiddleneck	Dicots	PDBOR01050	9	3	Endangered	Endangered	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Cismontane woodland, Valley & foothill grassland
Andrena blennospermatis	Blennosperma vernal pool andrenid bee	Insects	IIHYM35030	15	3	None	None	G2	S2	null	null	Vernal pool
Anniella pulchra	Northern California legless lizard	Reptiles	ARACC01020	382	7	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Coastal dunes, Coastal scrub
Anomobryum julaceum	slender silver moss	Bryophytes	NBMUS80010	13	1	None	None	G5?	S2	4.2	null	Broadleaved upland forest, Lower montane coniferous forest, North coast coniferous forest
Anthicus antiochensis	Antioch Dunes anthicid beetle	Insects	IICOL49020	6	2	None	None	G1	S1	null	null	Interior dunes
Anthicus sacramento	Sacramento anthicid beetle	Insects	IICOL49010	13	3	None	None	G1	S1	null	IUCN_EN-Endangered	Interior dunes
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	1	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Apodemia mormo langei	Lange's metalmark	Insects	IILEPH7012	1	1	Endangered	None	G5T1	S1	null	null	Interior dunes

	butterfly											
Archoplites interruptus	Sacramento perch	Fish	AFCQB07010	5	1	None	None	G2G3	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Arctostaphylos auriculata	Mt. Diablo manzanita	Dicots	PDERI04040	17	6	None	None	G2	S2	1B.3	null	Chaparral, Cismontane woodland
Ardea alba	great egret	Birds	ABNGA04040	43	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	156	3	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	1	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Astragalus tener var. ferrisiae	Ferris' milk-vetch	Dicots	PDFAB0F8R3	18	1	None	None	G2T1	S1	1B.1	null	Meadow & seep, Valley & foothill grassland, Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	15	None	None	G2T1	S1	1B.2	null	Alkali playa, Valley & foothill grassland, Vernal pool, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2011	92	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	8	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland
Atriplex depressa	brittlescale	Dicots	PDCHE042L0	60	5	None	None	G2	S2	1B.2	null	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Atriplex persistens	vernal pool smallscale	Dicots	PDCHE042P0	41	3	None	None	G2	S2	1B.2	null	Vernal pool, Wetland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	53	23	None	None	G1G2	S1S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	437	1	None	None	G3G4	S1S2	null	null	null
Bombus occidentalis	western bumble bee	Insects	IIHYM24250	306	5	None	None	G2G3	S1	null	USFS_S-Sensitive	null
Branchinecta conservatio	Conservancy fairy shrimp	Crustaceans	ICBRA03010	53	8	Endangered	None	G2	S2	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	795	23	Threatened	None	G3	S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	144	12	None	None	G2	S2S3	null	null	Vernal pool, Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	43	2	None	None	G5	S3	2B.3	IUCN_LC-Least Concern	Marsh & swamp, Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2541	126	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley

												& foothill grassland
Calochortus pulchellus	Mt. Diablo fairy-lantern	Monocots	PMLIL0D160	52	6	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Riparian woodland, Valley & foothill grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	31	8	None	None	G5	S2	2B.1	IUCN_LC-Least Concern	Coastal prairie, Freshwater marsh, Marsh & swamp, Valley & foothill grassland, Wetland
Centromadia parryi ssp. congdonii	Congdon's tarplant	Dicots	PDAST4R0P1	98	1	None	None	G3T1T2	S1S2	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Centromadia parryi ssp. parryi	pappose tarplant	Dicots	PDAST4R0P2	39	4	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chaparral, Coastal prairie, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Charadrius montanus	mountain plover	Birds	ABNNB03100	90	4	None	None	G3	S2S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Chenopod scrub, Valley & foothill grassland
Chloropyron molle ssp. molle	soft salty bird's-beak	Dicots	PDSCR0J0D2	27	1	Endangered	Rare	G2T1	S1	1B.2	null	Marsh & swamp, Salt marsh, Wetland
Cicuta maculata var. bolanderi	Bolander's water-hemlock	Dicots	PDAPI0M051	17	5	None	None	G5T4T5	S2?	2B.1	null	Marsh & swamp, Salt marsh, Wetland
Cismontane Alkali Marsh	Cismontane Alkali Marsh	Marsh	CTT52310CA	4	1	None	None	G1	S1.1	null	null	Marsh & swamp, Wetland
Coastal Brackish Marsh	Coastal Brackish Marsh	Marsh	CTT52200CA	30	2	None	None	G2	S2.1	null	null	Marsh & swamp, Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	7	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	165	1	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Riparian forest
Coelus gracilis	San Joaquin dune beetle	Insects	IICOL4A020	11	1	None	None	G1	S1	null	BLM_S-Sensitive, IUCN_VU-Vulnerable	Interior dunes
Cryptantha hooveri	Hoover's cryptantha	Dicots	PDBOR0A190	4	1	None	None	GH	SH	1A	null	Interior dunes, Valley & foothill grassland
Downingia pusilla	dwarf downingia	Dicots	PDCAM060C0	132	19	None	None	GU	S2	2B.2	null	Valley & foothill grassland, Vernal pool, Wetland
Efferia antiochi	Antioch efferian robberfly	Insects	IIDIP07010	4	1	None	None	G1G2	S1S2	null	null	Interior dunes
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	6	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Elaphrus viridis	Delta green ground beetle	Insects	IICOL36010	7	3	Threatened	None	G1	S1	null	IUCN_CR-Critically Endangered	Vernal pool, Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1404	42	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern,	Aquatic, Artificial flowing waters, Klamath/North coast flowing

											IUCN_VU-Vulnerable, USFS_S-Sensitive	waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	Dicots	PDPGN0849Q	1	1	None	None	G5T1	S1	1B.1	null	Interior dunes
Eriogonum truncatum	Mt. Diablo buckwheat	Dicots	PDPGN085Z0	7	3	None	None	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Chaparral, Coastal scrub, Valley & foothill grassland
Eryngium jepsonii	Jepson's coyote-thistle	Dicots	PDAPI0Z130	19	1	None	None	G2	S2	1B.2	null	Valley & foothill grassland, Vernal pool
Eryngium racemosum	Delta button-celery	Dicots	PDAPI0Z0S0	26	1	None	Endangered	G1	S1	1B.1	null	Riparian scrub, Wetland
Erysimum capitatum var. angustatum	Contra Costa wallflower	Dicots	PDBRA16052	4	4	Endangered	Endangered	G5T1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Interior dunes
Eschscholzia rhombipetala	diamond-petaled California poppy	Dicots	PDPAP0A0D0	12	1	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Valley & foothill grassland
Eucerceris ruficeps	redheaded sphecid wasp	Insects	IIHYM18010	4	2	None	None	G1G3	S1S2	null	null	Interior dunes
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	127	17	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland
Falco peregrinus anatum	American peregrine falcon	Birds	ABNKD06071	58	1	Delisted	Delisted	G4T4	S3S4	null	CDF_S-Sensitive, CDFW_FP-Fully Protected, USFWS_BCC-Birds of Conservation Concern	null
Fritillaria agrestis	stinkbells	Monocots	PMLIL0V010	32	3	None	None	G3	S3	4.2	null	Chaparral, Cismontane woodland, Pinon & juniper woodlands, Ultramafic, Valley & foothill grassland
Fritillaria liliacea	fragrant fritillary	Monocots	PMLIL0V0C0	82	6	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Cismontane woodland, Coastal prairie, Coastal scrub, Ultramafic, Valley & foothill grassland
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	Birds	ABPBX1201A	112	4	None	None	G5T3	S3	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Marsh & swamp
Gonidea angulata	western ridged mussel	Mollusks	IMBIV19010	157	2	None	None	G3	S1S2	null	null	Aquatic
Gratiola heterosepala	Boggs Lake hedge-hyssop	Dicots	PDSCR0R060	99	6	None	Endangered	G2	S2	1B.2	BLM_S-Sensitive	Freshwater marsh, Marsh & swamp, Vernal pool, Wetland
Helianthella castanea	Diablo helianthella	Dicots	PDAST4M020	107	8	None	None	G2	S2	1B.2	null	Broadleaved upland forest, Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland

Helminthoglypta nickliniana bridgesi	Bridges' coast range shoulderband	Mollusks	IMGASC2362	6	1	None	None	G3T1	S1S2	null	IUCN_DD-Data Deficient	Valley & foothill grassland
Hesperolinon breweri	Brewer's western flax	Dicots	PDLIN01030	29	3	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Ultramafic, Valley & foothill grassland
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Dicots	PDMAL0H0R3	173	63	None	None	G5T3	S3	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Freshwater marsh, Marsh & swamp, Wetland
Hydrochara rickseckeri	Ricksecker's water scavenger beetle	Insects	IICOL5V010	13	3	None	None	G2?	S2?	null	null	Aquatic, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Hygrotus curvipes	curved-foot hygrotus diving beetle	Insects	IICOL38030	21	1	None	None	G1	S1	null	null	Aquatic
Hypomesus transpacificus	Delta smelt	Fish	AFCHB01040	29	16	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened, IUCN_EN-Endangered	Aquatic, Estuary
Idiostatus middlekauffi	Middlekauff's shieldback katydid	Insects	IIORT31010	1	1	None	None	G1G2	S1	null	IUCN_CR-Critically Endangered	Interior dunes
Isocoma arguta	Carquinez goldenbush	Dicots	PDAST57050	14	6	None	None	G1	S1	1B.1	null	Valley & foothill grassland
Lanius ludovicianus	loggerhead shrike	Birds	ABPBR01030	110	1	None	None	G4	S4	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands, Riparian woodland, Sonoran desert scrub
Lasiurus blossevillii	western red bat	Mammals	AMACC05060	128	5	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland
Lasiurus cinereus	hoary bat	Mammals	AMACC05030	238	2	None	None	G3G4	S4	null	IUCN_LC-Least Concern, WBWG_M-Medium Priority	Broadleaved upland forest, Cismontane woodland, Lower montane coniferous forest, North coast coniferous forest
Lasthenia chrysantha	alkali-sink goldfields	Dicots	PDAST5L030	55	3	None	None	G2	S2	1B.1	null	Vernal pool
Lasthenia conjugens	Contra Costa goldfields	Dicots	PDAST5L040	36	1	Endangered	None	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Alkali playa, Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	111	1	None	None	G4T2	S2	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Alkali playa, Marsh & swamp, Salt marsh, Vernal pool, Wetland
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	25	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland

											of Conservation Concern	
Lathyrus jepsonii var. jepsonii	Delta tule pea	Dicots	PDFAB250D2	133	50	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Legenere limosa	legenere	Dicots	PDCAM0C010	83	9	None	None	G2	S2	1B.1	BLM_S-Sensitive, SB_UCBG-UC Botanical Garden at Berkeley	Vernal pool, Wetland
Lepidium latipes var. heckardii	Heckard's pepper-grass	Dicots	PDBRA1M0K1	14	2	None	None	G4T1	S1	1B.2	null	Valley & foothill grassland, Vernal pool
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	329	16	Endangered	None	G4	S3S4	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Lilaeopsis masonii	Mason's lilaeopsis	Dicots	PDAPI19030	198	125	None	Rare	G2	S2	1B.1	null	Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Limosella australis	Delta mudwort	Dicots	PDSCR10030	59	48	None	None	G4G5	S2	2B.1	null	Brackish marsh, Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	508	20	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Lytta molesta	molestan blister beetle	Insects	IICOL4C030	17	2	None	None	G2	S2	null	null	Vernal pool, Wetland
Madia radiata	showy golden madia	Dicots	PDAST650E0	100	2	None	None	G3	S3	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Cismontane woodland, Valley & foothill grassland
Malacothamnus hallii	Hall's bush-mallow	Dicots	PDMAL0Q0F0	43	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub, Ultramafic
Masticophis lateralis euryxanthus	Alameda whipsnake	Reptiles	ARADB21031	167	7	Threatened	Threatened	G4T2	S2	null	null	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Melospiza melodia	song sparrow ("Modesto" population)	Birds	ABPBXA3010	92	37	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern	null
Melospiza melodia maxillaris	Suisun song sparrow	Birds	ABPBXA301K	36	6	None	None	G5T3	S3	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Marsh & swamp, Wetland
Metapogon hurdi	Hurd's metapogon robberfly	Insects	IIDIP08010	3	1	None	None	G1G2	S1S2	null	null	Interior dunes
Myrmosula pacifica	Antioch multilid wasp	Insects	IIHYM15010	3	1	None	None	GH	SH	null	null	Interior dunes
Nannopterum auritum	double-crested cormorant	Birds	ABNFD01020	39	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Dicots	PDPLM0C0E1	64	7	None	None	G4T2	S2	1B.1	null	Cismontane woodland, Lower montane coniferous forest, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Navarretia nigelliformis ssp. radians	shining navarretia	Dicots	PDPLM0C0J2	102	3	None	None	G4T2	S2	1B.2	BLM_S-Sensitive	Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Neostapfia colusana	Colusa grass	Monocots	PMPOA4C010	66	4	Threatened	Endangered	G1	S1	1B.1	null	Vernal pool, Wetland

Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	3	None	None	G1	S1.1	null	null	Vernal pool, Wetland
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Dicots	PDONA0C0B4	10	9	Endangered	Endangered	G5T1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Interior dunes
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	2	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Perdita scitula antiochensis	Antioch andrenid bee	Insects	IIHYM01031	2	2	None	None	G1T1	S1	null	null	Interior dunes
Perognathus inornatus	San Joaquin pocket mouse	Mammals	AMAFD01060	140	4	None	None	G2G3	S2S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Cismontane woodland, Mojavean desert scrub, Valley & foothill grassland
Philanthus nasalis	Antioch specid wasp	Insects	IIHYM20010	4	1	None	None	G1	S1	null	null	Interior dunes
Plagiobothrys hystriculus	bearded popcornflower	Dicots	PDBOR0V0H0	15	10	None	None	G2	S2	1B.1	null	Valley & foothill grassland, Vernal pool, Wetland
Pogonichthys macrolepidotus	Sacramento splittail	Fish	AFCJB34020	15	1	None	None	GNR	S3	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered	Aquatic, Estuary, Freshwater marsh, Sacramento/San Joaquin flowing waters
Potamogeton zosteriformis	eel-grass pondweed	Monocots	PMPOT03160	20	1	None	None	G5	S3	2B.2	null	Marsh & swamp, Wetland
Puccinellia simplex	California alkali grass	Monocots	PMPOA53110	80	1	None	None	G3	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool
Rana boylii	foothill yellow-legged frog	Amphibians	AAABH01050	2476	1	None	Endangered	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, USFS_S-Sensitive	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow & seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1671	19	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Reithrodontomys raviventris	salt-marsh harvest mouse	Mammals	AMAFF02040	144	7	Endangered	Endangered	G1G2	S1S2	null	CDFW_FP-Fully Protected, IUCN_EN-Endangered	Marsh & swamp, Wetland
Riparia riparia	bank swallow	Birds	ABPAU08010	298	1	None	Threatened	G5	S2	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Riparian scrub, Riparian woodland

Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	126	10	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Scutellaria galericulata	marsh skullcap	Dicots	PDLAM1U0J0	39	3	None	None	G5	S2	2B.2	null	Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	3	None	None	G5	S2	2B.2	IUCN_LC-Least Concern	Marsh & swamp, Meadow & seep, Wetland
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_CRES-San Diego Zoo CRES Native Gene Seed Bank	Chaparral, Cismontane woodland, Coastal scrub
Sidalcea keckii	Keck's checkerbloom	Dicots	PDMAL110D0	50	2	Endangered	None	G2	S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Cismontane woodland, Ultramafic, Valley & foothill grassland
Sphecodogastra antiochensis	Antioch Dunes halcitid bee	Insects	IIHYM78010	1	1	None	None	G1	S1	null	null	Interior dunes
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	46	14	Candidate	Threatened	G5	S1	null	null	Aquatic, Estuary
Stabilized Interior Dunes	Stabilized Interior Dunes	Dune	CTT23100CA	2	1	None	None	G1	S1.1	null	null	Interior dunes
Symphyotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	175	103	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Brackish marsh, Freshwater marsh, Marsh & swamp, Wetland
Taxidea taxus	American badger	Mammals	AMAJF04010	594	4	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland,

												Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	373	16	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp, Riparian scrub, Wetland
Trifolium hydrophilum	saline clover	Dicots	PDFAB400R5	56	3	None	None	G2	S2	1B.2	null	Marsh & swamp, Valley & foothill grassland, Vernal pool, Wetland
Tropidocarpum capparideum	caper-fruited tropidocarpum	Dicots	PDBRA2R010	20	2	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Valley & foothill grassland
Tuctoria mucronata	Crampton's tuctoria or Solano grass	Monocots	PMPOA6N020	4	2	Endangered	Endangered	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland, Vernal pool, Wetland
Valley Needlegrass Grassland	Valley Needlegrass Grassland	Herbaceous	CTT42110CA	45	2	None	None	G3	S3.1	null	null	Valley & foothill grassland
Viburnum ellipticum	oval-leaved viburnum	Dicots	PDCPR07080	39	1	None	None	G4G5	S3?	2B.3	null	Chaparral, Cismontane woodland, Lower montane coniferous forest
Vulpes macrotis mutica	San Joaquin kit fox	Mammals	AMAJA03041	1020	9	Endangered	Threatened	G4T2	S2	null	null	Chenopod scrub, Valley & foothill grassland

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Stockton West (3712183) OR Terminous (3812114) OR Lodi South (3812113) OR Waterloo (3812112) OR Holt (3712184) OR Stockton East (3712182) OR Union Island (3712174) OR Lathrop (3712173) OR Manteca (3712172))

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CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	8	None	Threatened	G1G2	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	Amphibians	AAAAA01181	1263	2	Threatened	Threatened	G2G3	S3	null	CDFW_WL-Watch List, IUCN_VU-Vulnerable	Cismontane woodland, Meadow & seep, Riparian woodland, Valley & foothill grassland, Vernal pool, Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	1	None	None	G2T1	S1	1B.2	null	Alkali playa, Valley & foothill grassland, Vernal pool, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2011	40	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	1	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	53	2	None	None	G1G2	S1S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	437	1	None	None	G3G4	S1S2	null	null	null
Bombus occidentalis	western bumble bee	Insects	IIHYM24250	306	2	None	None	G2G3	S1	null	USFS_S-Sensitive	null
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	144	2	None	None	G2	S2S3	null	null	Vernal pool, Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	43	1	None	None	G5	S3	2B.3	IUCN_LC-Least Concern	Marsh & swamp, Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2541	236	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	31	1	None	None	G5	S2	2B.1	IUCN_LC-Least Concern	Coastal prairie, Freshwater marsh, Marsh & swamp, Valley & foothill grassland, Wetland
Chloropyron palmatum	palmate-bracted bird's-beak	Dicots	PDSCR0J0J0	25	1	Endangered	Endangered	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho	Chenopod scrub, Meadow & seep, Valley &

											Santa Ana Botanic Garden	foothill grassland, Wetland
Cirsium crassicaule	slough thistle	Dicots	PDAST2E0U0	18	1	None	None	G1	S1	1B.1	null	Chenopod scrub, Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	7	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Delphinium recurvatum	recurved larkspur	Dicots	PDRAN0B1J0	119	1	None	None	G2?	S2?	1B.2	BLM_S-Sensitive, SB_SBBG-Santa Barbara Botanic Garden	Chenopod scrub, Cismontane woodland, Valley & foothill grassland
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	Insects	IICOL48011	271	3	Threatened	None	G3T2	S3	null	null	Riparian scrub
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	2	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1404	9	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eryngium racemosum	Delta button-celery	Dicots	PDAPI0Z0S0	26	1	None	Endangered	G1	S1	1B.1	null	Riparian scrub, Wetland
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	127	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland
Gonidea angulata	western ridged mussel	Mollusks	IMBIV19010	157	1	None	None	G3	S1S2	null	null	Aquatic
Great Valley Valley Oak Riparian Forest	Great Valley Valley Oak Riparian Forest	Riparian	CTT61430CA	33	2	None	None	G1	S1.1	null	null	Riparian forest
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Dicots	PDMAL0H0R3	173	27	None	None	G5T3	S3	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Freshwater marsh, Marsh & swamp, Wetland
Hypomesus transpacificus	Delta smelt	Fish	AFCHB01040	29	4	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened, IUCN_EN-Endangered	Aquatic, Estuary
Lanius ludovicianus	loggerhead shrike	Birds	ABPBR01030	110	1	None	None	G4	S4	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands, Riparian woodland,

												Sonoran desert scrub
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	8	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland
Lathyrus jepsonii var. jepsonii	Delta tule pea	Dicots	PDFAB250D2	133	5	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	329	1	Endangered	None	G4	S3S4	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Lilaeopsis masonii	Mason's lilaeopsis	Dicots	PDAPI19030	198	17	None	Rare	G2	S2	1B.1	null	Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Limosella australis	Delta mudwort	Dicots	PDSCR10030	59	4	None	None	G4G5	S2	2B.1	null	Brackish marsh, Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	508	1	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Lytta moesta	moestan blister beetle	Insects	IICOL4C020	12	1	None	None	G2	S2	null	null	Valley & foothill grassland
Melospiza melodia	song sparrow ("Modesto" population)	Birds	ABPBXA3010	92	17	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern	null
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	3	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Perognathus inornatus	San Joaquin pocket mouse	Mammals	AMAFD01060	140	1	None	None	G2G3	S2S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Cismontane woodland, Mojavean desert scrub, Valley & foothill grassland
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	126	2	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	2	None	None	G5	S2	2B.2	IUCN_LC-Least Concern	Marsh & swamp, Meadow & seep, Wetland
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1422	1	None	None	G2G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	46	5	Candidate	Threatened	G5	S1	null	null	Aquatic, Estuary
Sylvilagus bachmani riparius	riparian brush rabbit	Mammals	AMAEB01021	20	12	Endangered	Endangered	G5T1	S1	null	null	Riparian forest
Symphyotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	175	20	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Brackish marsh, Freshwater marsh, Marsh & swamp, Wetland
Taxidea taxus	American badger	Mammals	AMAJF04010	594	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal

												bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	373	8	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp, Riparian scrub, Wetland
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Dicots	PDAST9F031	12	1	None	None	G4T3	S1	2B.1	null	Marsh & swamp, Meadow & seep, Riparian forest, Vernal pool, Wetland
Trifolium hydrophilum	saline clover	Dicots	PDFAB400R5	56	1	None	None	G2	S2	1B.2	null	Marsh & swamp, Valley & foothill grassland, Vernal pool, Wetland
Tropidocarpum capparideum	caper-fruited tropidocarpum	Dicots	PDBRA2R010	20	2	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Valley & foothill grassland
Valley Oak Woodland	Valley Oak Woodland	Woodland	CTT71130CA	91	1	None	None	G3	S2.1	null	null	Cismontane woodland
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	503	1	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened, NABCI_YWL-Yellow Watch List	Riparian forest, Riparian scrub, Riparian woodland
Xanthocephalus xanthocephalus	yellow-headed blackbird	Birds	ABPBXB3010	13	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Marsh & swamp, Wetland

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Woodward Island (3712185) OR Brentwood (3712186) OR Antioch South (3712187) OR Bouldin Island (3812115) OR Jersey Island (3812116) OR Antioch North (3812117) OR Isleton (3812125) OR Rio Vista (3812126) OR Birds Landing (3812127) OR Courtland (3812135) OR Liberty Island (3812136) OR Dozier (3812137))

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CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	6	None	Threatened	G1G2	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Alkali Meadow	Alkali Meadow	Herbaceous	CTT45310CA	8	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Alkali Seep	Alkali Seep	Herbaceous	CTT45320CA	10	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	Amphibians	AAAAA01181	1263	69	Threatened	Threatened	G2G3	S3	null	CDFW_WL-Watch List, IUCN_VU-Vulnerable	Cismontane woodland, Meadow & seep, Riparian woodland, Valley & foothill grassland, Vernal pool, Wetland
Ammodramus savannarum	grasshopper sparrow	Birds	ABPBXA0020	27	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Valley & foothill grassland
Amsinckia grandiflora	large-flowered fiddleneck	Dicots	PDBOR01050	9	3	Endangered	Endangered	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Cismontane woodland, Valley & foothill grassland
Andrena blennospermatis	Blennosperma vernal pool andrenid bee	Insects	IIHYM35030	15	3	None	None	G2	S2	null	null	Vernal pool
Anniella pulchra	Northern California legless lizard	Reptiles	ARACC01020	382	7	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Coastal dunes, Coastal scrub
Anomobryum julaceum	slender silver moss	Bryophytes	NBMUS80010	13	1	None	None	G5?	S2	4.2	null	Broadleaved upland forest, Lower montane coniferous forest, North coast coniferous forest
Anthicus antiochensis	Antioch Dunes anthicid beetle	Insects	IICOL49020	6	2	None	None	G1	S1	null	null	Interior dunes
Anthicus sacramento	Sacramento anthicid beetle	Insects	IICOL49010	13	3	None	None	G1	S1	null	IUCN_EN-Endangered	Interior dunes
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	1	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Apodemia mormo langei	Lange's metalmark	Insects	IILEPH7012	1	1	Endangered	None	G5T1	S1	null	null	Interior dunes

	butterfly											
Archoplites interruptus	Sacramento perch	Fish	AFCQB07010	5	1	None	None	G2G3	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Arctostaphylos auriculata	Mt. Diablo manzanita	Dicots	PDERI04040	17	6	None	None	G2	S2	1B.3	null	Chaparral, Cismontane woodland
Ardea alba	great egret	Birds	ABNGA04040	43	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	156	3	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	1	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Astragalus tener var. ferrisiae	Ferris' milk-vetch	Dicots	PDFAB0F8R3	18	1	None	None	G2T1	S1	1B.1	null	Meadow & seep, Valley & foothill grassland, Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	15	None	None	G2T1	S1	1B.2	null	Alkali playa, Valley & foothill grassland, Vernal pool, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2011	92	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	8	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland
Atriplex depressa	brittlescale	Dicots	PDCHE042L0	60	5	None	None	G2	S2	1B.2	null	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Atriplex persistens	vernal pool smallscale	Dicots	PDCHE042P0	41	3	None	None	G2	S2	1B.2	null	Vernal pool, Wetland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	53	23	None	None	G1G2	S1S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	437	1	None	None	G3G4	S1S2	null	null	null
Bombus occidentalis	western bumble bee	Insects	IIHYM24250	306	5	None	None	G2G3	S1	null	USFS_S-Sensitive	null
Branchinecta conservatio	Conservancy fairy shrimp	Crustaceans	ICBRA03010	53	8	Endangered	None	G2	S2	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	795	23	Threatened	None	G3	S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland, Vernal pool, Wetland
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	144	12	None	None	G2	S2S3	null	null	Vernal pool, Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	43	2	None	None	G5	S3	2B.3	IUCN_LC-Least Concern	Marsh & swamp, Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2541	126	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley

												& foothill grassland
Calochortus pulchellus	Mt. Diablo fairy-lantern	Monocots	PMLIL0D160	52	6	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Riparian woodland, Valley & foothill grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	31	8	None	None	G5	S2	2B.1	IUCN_LC-Least Concern	Coastal prairie, Freshwater marsh, Marsh & swamp, Valley & foothill grassland, Wetland
Centromadia parryi ssp. congdonii	Congdon's tarplant	Dicots	PDAST4R0P1	98	1	None	None	G3T1T2	S1S2	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Centromadia parryi ssp. parryi	pappose tarplant	Dicots	PDAST4R0P2	39	4	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chaparral, Coastal prairie, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Charadrius montanus	mountain plover	Birds	ABNNB03100	90	4	None	None	G3	S2S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Chenopod scrub, Valley & foothill grassland
Chloropyron molle ssp. molle	soft salty bird's-beak	Dicots	PDSCR0J0D2	27	1	Endangered	Rare	G2T1	S1	1B.2	null	Marsh & swamp, Salt marsh, Wetland
Cicuta maculata var. bolanderi	Bolander's water-hemlock	Dicots	PDAPI0M051	17	5	None	None	G5T4T5	S2?	2B.1	null	Marsh & swamp, Salt marsh, Wetland
Cismontane Alkali Marsh	Cismontane Alkali Marsh	Marsh	CTT52310CA	4	1	None	None	G1	S1.1	null	null	Marsh & swamp, Wetland
Coastal Brackish Marsh	Coastal Brackish Marsh	Marsh	CTT52200CA	30	2	None	None	G2	S2.1	null	null	Marsh & swamp, Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	7	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	165	1	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Riparian forest
Coelus gracilis	San Joaquin dune beetle	Insects	IICOL4A020	11	1	None	None	G1	S1	null	BLM_S-Sensitive, IUCN_VU-Vulnerable	Interior dunes
Cryptantha hooveri	Hoover's cryptantha	Dicots	PDBOR0A190	4	1	None	None	GH	SH	1A	null	Interior dunes, Valley & foothill grassland
Downingia pusilla	dwarf downingia	Dicots	PDCAM060C0	132	19	None	None	GU	S2	2B.2	null	Valley & foothill grassland, Vernal pool, Wetland
Efferia antiochi	Antioch efferian robberfly	Insects	IIDIP07010	4	1	None	None	G1G2	S1S2	null	null	Interior dunes
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	6	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Elaphrus viridis	Delta green ground beetle	Insects	IICOL36010	7	3	Threatened	None	G1	S1	null	IUCN_CR-Critically Endangered	Vernal pool, Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1404	42	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern,	Aquatic, Artificial flowing waters, Klamath/North coast flowing

											IUCN_VU-Vulnerable, USFS_S-Sensitive	waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	Dicots	PDPGN0849Q	1	1	None	None	G5T1	S1	1B.1	null	Interior dunes
Eriogonum truncatum	Mt. Diablo buckwheat	Dicots	PDPGN085Z0	7	3	None	None	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Chaparral, Coastal scrub, Valley & foothill grassland
Eryngium jepsonii	Jepson's coyote-thistle	Dicots	PDAPI0Z130	19	1	None	None	G2	S2	1B.2	null	Valley & foothill grassland, Vernal pool
Eryngium racemosum	Delta button-celery	Dicots	PDAPI0Z0S0	26	1	None	Endangered	G1	S1	1B.1	null	Riparian scrub, Wetland
Erysimum capitatum var. angustatum	Contra Costa wallflower	Dicots	PDBRA16052	4	4	Endangered	Endangered	G5T1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Interior dunes
Eschscholzia rhombipetala	diamond-petaled California poppy	Dicots	PDPAP0A0D0	12	1	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Valley & foothill grassland
Eucerceris ruficeps	redheaded sphecid wasp	Insects	IIHYM18010	4	2	None	None	G1G3	S1S2	null	null	Interior dunes
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	127	17	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland
Falco peregrinus anatum	American peregrine falcon	Birds	ABNKD06071	58	1	Delisted	Delisted	G4T4	S3S4	null	CDF_S-Sensitive, CDFW_FP-Fully Protected, USFWS_BCC-Birds of Conservation Concern	null
Fritillaria agrestis	stinkbells	Monocots	PMLIL0V010	32	3	None	None	G3	S3	4.2	null	Chaparral, Cismontane woodland, Pinon & juniper woodlands, Ultramafic, Valley & foothill grassland
Fritillaria liliacea	fragrant fritillary	Monocots	PMLIL0V0C0	82	6	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Cismontane woodland, Coastal prairie, Coastal scrub, Ultramafic, Valley & foothill grassland
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	Birds	ABPBX1201A	112	4	None	None	G5T3	S3	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Marsh & swamp
Gonidea angulata	western ridged mussel	Mollusks	IMBIV19010	157	2	None	None	G3	S1S2	null	null	Aquatic
Gratiola heterosepala	Boggs Lake hedge-hyssop	Dicots	PDSCR0R060	99	6	None	Endangered	G2	S2	1B.2	BLM_S-Sensitive	Freshwater marsh, Marsh & swamp, Vernal pool, Wetland
Helianthella castanea	Diablo helianthella	Dicots	PDAST4M020	107	8	None	None	G2	S2	1B.2	null	Broadleaved upland forest, Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland

Helminthoglypta nickliniana bridgesi	Bridges' coast range shoulderband	Mollusks	IMGASC2362	6	1	None	None	G3T1	S1S2	null	IUCN_DD-Data Deficient	Valley & foothill grassland
Hesperolinon breweri	Brewer's western flax	Dicots	PDLIN01030	29	3	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Ultramafic, Valley & foothill grassland
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Dicots	PDMAL0H0R3	173	63	None	None	G5T3	S3	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Freshwater marsh, Marsh & swamp, Wetland
Hydrochara rickseckeri	Ricksecker's water scavenger beetle	Insects	IICOL5V010	13	3	None	None	G2?	S2?	null	null	Aquatic, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Hygrotus curvipes	curved-foot hygrotus diving beetle	Insects	IICOL38030	21	1	None	None	G1	S1	null	null	Aquatic
Hypomesus transpacificus	Delta smelt	Fish	AFCHB01040	29	16	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened, IUCN_EN-Endangered	Aquatic, Estuary
Idiostatus middlekauffi	Middlekauff's shieldback katydid	Insects	IIORT31010	1	1	None	None	G1G2	S1	null	IUCN_CR-Critically Endangered	Interior dunes
Isocoma arguta	Carquinez goldenbush	Dicots	PDAST57050	14	6	None	None	G1	S1	1B.1	null	Valley & foothill grassland
Lanius ludovicianus	loggerhead shrike	Birds	ABPBR01030	110	1	None	None	G4	S4	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands, Riparian woodland, Sonoran desert scrub
Lasiurus blossevillii	western red bat	Mammals	AMACC05060	128	5	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland
Lasiurus cinereus	hoary bat	Mammals	AMACC05030	238	2	None	None	G3G4	S4	null	IUCN_LC-Least Concern, WBWG_M-Medium Priority	Broadleaved upland forest, Cismontane woodland, Lower montane coniferous forest, North coast coniferous forest
Lasthenia chrysantha	alkali-sink goldfields	Dicots	PDAST5L030	55	3	None	None	G2	S2	1B.1	null	Vernal pool
Lasthenia conjugens	Contra Costa goldfields	Dicots	PDAST5L040	36	1	Endangered	None	G1	S1	1B.1	SB_UCBG-UC Botanical Garden at Berkeley	Alkali playa, Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	111	1	None	None	G4T2	S2	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Alkali playa, Marsh & swamp, Salt marsh, Vernal pool, Wetland
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	25	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland

											of Conservation Concern	
Lathyrus jepsonii var. jepsonii	Delta tule pea	Dicots	PDFAB250D2	133	50	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Legenere limosa	legenere	Dicots	PDCAM0C010	83	9	None	None	G2	S2	1B.1	BLM_S-Sensitive, SB_UCBG-UC Botanical Garden at Berkeley	Vernal pool, Wetland
Lepidium latipes var. heckardii	Heckard's pepper-grass	Dicots	PDBRA1M0K1	14	2	None	None	G4T1	S1	1B.2	null	Valley & foothill grassland, Vernal pool
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	329	16	Endangered	None	G4	S3S4	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Lilaeopsis masonii	Mason's lilaeopsis	Dicots	PDAPI19030	198	125	None	Rare	G2	S2	1B.1	null	Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Limosella australis	Delta mudwort	Dicots	PDSCR10030	59	48	None	None	G4G5	S2	2B.1	null	Brackish marsh, Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	508	20	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Lytta molesta	molestan blister beetle	Insects	IICOL4C030	17	2	None	None	G2	S2	null	null	Vernal pool, Wetland
Madia radiata	showy golden madia	Dicots	PDAST650E0	100	2	None	None	G3	S3	1B.1	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Cismontane woodland, Valley & foothill grassland
Malacothamnus hallii	Hall's bush-mallow	Dicots	PDMAL0Q0F0	43	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub, Ultramafic
Masticophis lateralis euryxanthus	Alameda whipsnake	Reptiles	ARADB21031	167	7	Threatened	Threatened	G4T2	S2	null	null	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Melospiza melodia	song sparrow ("Modesto" population)	Birds	ABPBXA3010	92	37	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern	null
Melospiza melodia maxillaris	Suisun song sparrow	Birds	ABPBXA301K	36	6	None	None	G5T3	S3	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Marsh & swamp, Wetland
Metapogon hurdi	Hurd's metapogon robberfly	Insects	IIDIP08010	3	1	None	None	G1G2	S1S2	null	null	Interior dunes
Myrmosula pacifica	Antioch multilid wasp	Insects	IIHYM15010	3	1	None	None	GH	SH	null	null	Interior dunes
Nannopterum auritum	double-crested cormorant	Birds	ABNFD01020	39	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Dicots	PDPLM0C0E1	64	7	None	None	G4T2	S2	1B.1	null	Cismontane woodland, Lower montane coniferous forest, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Navarretia nigelliformis ssp. radians	shining navarretia	Dicots	PDPLM0C0J2	102	3	None	None	G4T2	S2	1B.2	BLM_S-Sensitive	Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Neostapfia colusana	Colusa grass	Monocots	PMPOA4C010	66	4	Threatened	Endangered	G1	S1	1B.1	null	Vernal pool, Wetland

Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	3	None	None	G1	S1.1	null	null	Vernal pool, Wetland
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Dicots	PDONA0C0B4	10	9	Endangered	Endangered	G5T1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Interior dunes
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	2	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Perdita scitula antiochensis	Antioch andrenid bee	Insects	IIHYM01031	2	2	None	None	G1T1	S1	null	null	Interior dunes
Perognathus inornatus	San Joaquin pocket mouse	Mammals	AMAFD01060	140	4	None	None	G2G3	S2S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Cismontane woodland, Mojavean desert scrub, Valley & foothill grassland
Philanthus nasalis	Antioch specid wasp	Insects	IIHYM20010	4	1	None	None	G1	S1	null	null	Interior dunes
Plagiobothrys hystriculus	bearded popcornflower	Dicots	PDBOR0V0H0	15	10	None	None	G2	S2	1B.1	null	Valley & foothill grassland, Vernal pool, Wetland
Pogonichthys macrolepidotus	Sacramento splittail	Fish	AFCJB34020	15	1	None	None	GNR	S3	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered	Aquatic, Estuary, Freshwater marsh, Sacramento/San Joaquin flowing waters
Potamogeton zosteriformis	eel-grass pondweed	Monocots	PMPOT03160	20	1	None	None	G5	S3	2B.2	null	Marsh & swamp, Wetland
Puccinellia simplex	California alkali grass	Monocots	PMPOA53110	80	1	None	None	G3	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool
Rana boylii	foothill yellow-legged frog	Amphibians	AAABH01050	2476	1	None	Endangered	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, USFS_S-Sensitive	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow & seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1671	19	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Reithrodontomys raviventris	salt-marsh harvest mouse	Mammals	AMAFF02040	144	7	Endangered	Endangered	G1G2	S1S2	null	CDFW_FP-Fully Protected, IUCN_EN-Endangered	Marsh & swamp, Wetland
Riparia riparia	bank swallow	Birds	ABPAU08010	298	1	None	Threatened	G5	S2	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Riparian scrub, Riparian woodland

Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	126	10	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Scutellaria galericulata	marsh skullcap	Dicots	PDLAM1U0J0	39	3	None	None	G5	S2	2B.2	null	Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	3	None	None	G5	S2	2B.2	IUCN_LC-Least Concern	Marsh & swamp, Meadow & seep, Wetland
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_CRES-San Diego Zoo CRES Native Gene Seed Bank	Chaparral, Cismontane woodland, Coastal scrub
Sidalcea keckii	Keck's checkerbloom	Dicots	PDMAL110D0	50	2	Endangered	None	G2	S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Cismontane woodland, Ultramafic, Valley & foothill grassland
Sphecodogastra antiochensis	Antioch Dunes halcitid bee	Insects	IIHYM78010	1	1	None	None	G1	S1	null	null	Interior dunes
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	46	14	Candidate	Threatened	G5	S1	null	null	Aquatic, Estuary
Stabilized Interior Dunes	Stabilized Interior Dunes	Dune	CTT23100CA	2	1	None	None	G1	S1.1	null	null	Interior dunes
Symphyotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	175	103	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Brackish marsh, Freshwater marsh, Marsh & swamp, Wetland
Taxidea taxus	American badger	Mammals	AMAJF04010	594	4	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland,

												Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	373	16	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp, Riparian scrub, Wetland
Trifolium hydrophilum	saline clover	Dicots	PDFAB400R5	56	3	None	None	G2	S2	1B.2	null	Marsh & swamp, Valley & foothill grassland, Vernal pool, Wetland
Tropidocarpum capparideum	caper-fruited tropidocarpum	Dicots	PDBRA2R010	20	2	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Valley & foothill grassland
Tuctoria mucronata	Crampton's tuctoria or Solano grass	Monocots	PMPOA6N020	4	2	Endangered	Endangered	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland, Vernal pool, Wetland
Valley Needlegrass Grassland	Valley Needlegrass Grassland	Herbaceous	CTT42110CA	45	2	None	None	G3	S3.1	null	null	Valley & foothill grassland
Viburnum ellipticum	oval-leaved viburnum	Dicots	PDCPR07080	39	1	None	None	G4G5	S3?	2B.3	null	Chaparral, Cismontane woodland, Lower montane coniferous forest
Vulpes macrotis mutica	San Joaquin kit fox	Mammals	AMAJA03041	1020	9	Endangered	Threatened	G4T2	S2	null	null	Chenopod scrub, Valley & foothill grassland

California Native Plant Society

Search Results

23 matches found. Click on scientific name for details

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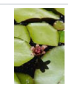
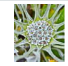
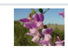
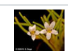
▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	GENERAL HABITATS	MICRO HABITATS	LOWEST ELEVATION (M)	HIGHEST ELEVATION (M)	LOWEST ELEVATION (FT)	HIGHEST ELEVATION (FT)	PHOTO
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	None	None	G2T1	S1	1B.2	Playas, Valley and foothill grassland, Vernal pools	Alkaline	1	60	5	195	No Photo Available
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G3T2	S2	1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland	Alkaline (sometimes)	0	560	0	1835	 © 1994 Robert E. Preston, Ph.D.
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	None	None	G1G2	S1S2	1B.1	Valley and foothill grassland	Clay (usually)	30	505	100	1655	No Photo Available
Brasenia schreberi	watershield	Cabombaceae	perennial rhizomatous herb (aquatic)	Jun-Sep	None	None	G5	S3	2B.3	Marshes and swamps		0	2200	0	7220	 ©2014 Kirsten Bovee
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	May-Sep	None	None	G5	S2	2B.1	Coastal prairie, Marshes and swamps, Valley and foothill grassland		0	625	0	2050	 Dean Wm. Taylor 1997
Centromadia parryi ssp. rudis	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	None	None	G3T3	S3	4.2	Valley and foothill grassland, Vernal pools	Alkaline, Roadsides (sometimes), Seeps, Vernally Mesic	0	100	0	330	No Photo Available
Chloropyron palmatum	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	FE	CE	G1	S1	1B.1	Chenopod scrub, Valley and foothill grassland	Alkaline	5	155	15	510	No Photo Available
Cirsium crassicaule	slough thistle	Asteraceae	annual/perennial herb	May-Aug	None	None	G1	S1	1B.1	Chenopod scrub, Marshes and swamps, Riparian scrub		3	100	10	330	No Photo Available
Delphinium recurvatum	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	None	None	G2?	S2?	1B.2	Chenopod scrub, Cismontane woodland, Valley and foothill grassland	Alkaline	3	790	10	2590	No Photo Available

Eryngium racemosum	Delta button-celery	Apiaceae	annual/perennial herb	(May)Jun-Oct	None	CE	G1	S1	1B.1	Riparian scrub		3	30	10	100	No Photo Available
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland	Alkaline	1	835	5	2740	No Photo Available
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	None	None	G3	S3	4.2	Valley and foothill grassland, Vernal pools	Alkaline (sometimes)	0	505	0	1655	 © 2017 John Doyen
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	None	None	G5T3	S3	1B.2	Marshes and swamps		0	120	0	395	 © 2020 Steven Perry
Lasthenia ferrisiae	Ferris' goldfields	Asteraceae	annual herb	Feb-May	None	None	G3	S3	4.2	Vernal pools		20	700	65	2295	 © 2009 Zoya Akulova
Lathyrus jepsonii var. jepsonii	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-Sep)	None	None	G5T2	S2	1B.2	Marshes and swamps		0	5	0	15	 © 2003 Mark Fogiel
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	None	CR	G2	S2	1B.1	Marshes and swamps, Riparian scrub		0	10	0	35	No Photo Available
Limosella australis	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	None	None	G4G5	S2	2B.1	Marshes and swamps, Riparian scrub		0	3	0	10	 © 2020 Richard Sage
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	G3	S3	1B.2	Marshes and swamps		0	650	0	2135	No Photo Available
Scutellaria lateriflora	side-flowering skullcap	Lamiaceae	perennial rhizomatous herb	Jul-Sep	None	None	G5	S2	2B.2	Marshes and swamps, Meadows and seeps		0	500	0	1640	No Photo Available
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	None	None	G2	S2	1B.2	Marshes and swamps		0	3	0	10	No Photo Available
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Asteraceae	annual herb	May-Sep	None	None	G4T3	S1	2B.1	Marshes and swamps, Meadows and seeps, Riparian forest, Vernal pools		5	435	15	1425	No Photo Available
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	None	None	G2	S2	1B.2	Marshes and swamps, Valley and foothill grassland, Vernal pools		0	300	0	985	No Photo Available

										pools					
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	None	None	G1	S1	1B.1	Valley and foothill grassland	1	455	5	1495	No Photo Available

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Send questions and comments to rareplants@cnps.org.

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CONTRIBUTORS

The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

Appendix E
Archaeological and Architectural Resources Inventory Report (CONFIDENTIAL APPENDIX)