GRIMES FLOODPLAIN RESTORATION AND LEVEE RESILIENCY PROJECT

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION, PROPOSED MITIGATED NEGATIVE DECLARATION, AND INITIAL STUDY

PREPARED FOR:

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Notice of Intent to Adopt a Mitigated Negative Declaration for the Grimes Floodplain Restoration and Levee Resiliency Project

The Sacramento River West Side Levee District (SRWSLD), acting as the California Environmental Quality Act (CEQA) lead agency, has made available for public review and comment an Initial Study and proposed Mitigated Negative Declaration (IS/MND) for the Grimes Floodplain Restoration and Levee Resiliency Project (proposed project).

SRWSLD, with funding from the California Department of Water Resources (DWR), is proposing this project, which would consist of constructing a 1.8-mile-long slurry cutoff wall in the existing Sacramento River West Bank Levee System (SRWBLS), encroachment remediation, waterside hardening, establishment of an operations and maintenance area, and restoration of approximately 11 acres of floodplain for salmonids. DWR investigations have determined that the section of the SRWBLS north and south of, and directly adjacent to, the town of Grimes in Colusa County is vulnerable to seepage. Currently, Grimes is not mapped within a Federal Emergency Management Agency (FEMA) special flood hazard area; however, FEMA has initiated a remapping process for Colusa County. Initial results indicate that without remediation of the Sacramento River levees, FEMA will model the area assuming no levees are present. The goal of the proposed project is to increase flood resiliency to a 100-year level of flood protection to the town of Grimes in a manner consistent with the 2012 Central Valley Flood Protection Plan and its 2017 update, including investments in multi-benefit flood projects (e.g., improvement of salmonid habitat). The construction phase will begin once the SRWSLD secures a State or Federal implementation grant. Construction is anticipated to begin no earlier than 2024.

The proposed project's IS/MND is available for review from August 30, 2022, to September 28, 2022, and may be viewed at the following locations:

- SRWSLD: 975 Wilson Bend Road, Grimes, CA 95950
- Grimes Library: 240 Main Street, Grimes, CA 95950
- Online at www.rd108.org

Lead Agency Contact: Questions, comments, or requests for digital or physical copies may be directed to Ms. Meegan Nagy by email at mnagy@rd108.org; or in writing care of Sacramento River West Side Levee District, PO Box 50, Grimes, CA 95950; or by telephone at 530-437-2221.

Proposed Mitigated Negative Declaration
Grimes Floodplain Restoration and Levee Resiliency Project

The Sacramento River West Side Levee District (SRWSLD), acting as the California Environmental Quality Act (CEQA) lead agency and project proponent, has reviewed the proposed project described below to determine whether substantial evidence supports a finding that project implementation could have a significant effect on the environment. "Significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land use, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Name of Project: Grimes Floodplain Restoration and Levee Resiliency Project

Project Location: The proposed project is located along approximately 1.8 miles of the Sacramento River west levee, directly adjacent to and north and south of the town of Grimes in Colusa County, California. The right (west) bank of the Sacramento River in the project area is a Sacramento River Flood Control Project (SRFCP) levee. The project area includes the levee itself, and areas on both the landside and waterside of the levee.

Project Description: SRWSLD, with funding from the California Department of Water Resources (DWR), is proposing this project, which would consist of constructing a 1.8-mile-long slurry cutoff wall in the existing Sacramento River West Bank Levee System (SRWBLS), encroachment remediation, waterside hardening, establishment of an operations and maintenance area, and restoration of approximately 11 acres of floodplain for salmonids. DWR investigations have determined that the section of the SRWBLS north and south of, and directly adjacent to, the town of Grimes in Colusa County is vulnerable to seepage. Currently, Grimes is not mapped within a Federal Emergency Management Agency (FEMA) special flood hazard area; however, FEMA has initiated a remapping process for Colusa County. Initial results indicate that without remediation of the Sacramento River levees, FEMA will model the area assuming no levees are present. The goal of the proposed project is to increase flood resiliency a 100-year level of flood protection to the town of Grimes in a manner consistent with the 2012 Central Valley Flood Protection Plan and its 2017 update, including investments in multi-benefit flood projects (e.g., improvement of salmonid habitat). The construction phase will begin once the SRWSLD secures a State or Federal implementation grant. Construction is anticipated to begin no earlier than 2024.

Findings: The attached initial study identifies one or more potentially significant effects on the environment that are listed in the table below. After consideration of the analysis contained in the initial study, SRWSLD finds that the proposed project as described above would not have a significant effect on the environment following implementation of mitigation measures described therein and listed below.

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
3.3 Hydrology and Water Quality			
Impact HYD-1: Degradation of surface water quality	Significant	Less than Significant	**Mitigation Measure HYD-MM-1:** Implement a Spill Prevention, Control, and Countermeasure Plan **Mitigation Measure HYD-MM-2:** Implement Construction Best Management Practices

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
			Mitigation Measure HYD-MM-3: Turbidity Monitoring **Mitigation Measure HYD-MM-4:** Implement a Bentonite Slurry Spill Contingency Plan
Impact HYD-2: Site Erosion	Significant	Less than significant	**Mitigation Measure HYD-MM-1** (described above) **Mitigation Measure HYD-MM-2** (described above) **Mitigation Measure HYD-MM-3** (described above)
3.5 Biological Resources			
Impact BIO-1: Potential mortality or disturbance of valley elderberry longhorn beetle	Significant	Less than significant	**Mitigation Measure BIO-MM-1a:** Conduct Mandatory Biological Resources Awareness Training **Mitigation Measure BIO-MM-1b:** Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources **Mitigation Measure BIO-MM-1c:** Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat **Mitigation Measure BIO-MM-1d:** Fence Elderberry Shrubs to be Protected **Mitigation Measure BIO-MM-1e:** Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and Its Habitat **Mitigation Measure BIO-MM-1f:** Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use
Impact BIO-2: Potential mortality or disturbance of monarch butterfly and Crotch bumble bee	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-1f** (described above) **Mitigation Measure BIO-MM-16a:** Protect Valley Oak Trees during Construction **Mitigation Measure BIO-MM-16b:** Compensate for Loss of Valley Oak Woodland **Mitigation Measure BIO-MM-17a:** Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
Impact BIO-3: Potential mortality or disturbance of western pond turtle	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-3:** Conduct Pre-construction Surveys for Western Pond Turtle and Monitor Construction Activities if Turtles are Observed
Impact BIO-4: Potential mortality or disturbance of and loss of suitable habitat for giant garter snake	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-4:** Avoid and Minimize Impacts on Giant Garter Snake
Impact BIO-5: Potential mortality or disturbance of and loss of suitable nesting and foraging habitat for Swainson's hawk and white-tailed kite	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-5a:** Conduct Focused Surveys for Nesting Swainson's Hawk, White-tailed Kite, and Other Raptors Prior to Construction and Implement Protective Measures during Construction **Mitigation Measure BIO-MM-5b:** Compensate for the Permanent Loss of Nesting Habitat for Swainson's Hawk and White-tailed Kite **Mitigation Measure BIO-MM-16a** (described above) **Mitigation Measure BIO-MM-16b** (described above) **Mitigation Measure BIO-MM-17a** (described above)
Impact BIO-6: Potential disturbance of western yellow-billed cuckoo	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-5b** (described above) **Mitigation Measure BIO-MM-7a:** Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds **Mitigation Measure BIO-MM-16a** (described above) **Mitigation Measure BIO-MM-16b** (described above)

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
			Mitigation Measure BIO-MM-17a (described above)
Impact BIO-7: Potential mortality or disturbance of and loss of suitable nesting and foraging habitat for special-status and non-special-status migratory birds	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-7a:** Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds **Mitigation Measure BIO-MM-7b:** Conduct Pre-construction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found **Mitigation Measure BIO-MM-7c:** Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found **Mitigation Measure BIO-MM-16a** (described above) **Mitigation Measure BIO-MM-16b** (described above) **Mitigation Measure BIO-MM-17a** (described above)
Impact BIO-8: Potential disturbance of greater sandhill crane and other foraging waterbirds	Less than significant	N/A	N/A
Impact BIO-9: Potential injury, mortality, or disturbance of tree-roosting bats and removal of roosting habitat	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-9:** Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal **Mitigation Measure BIO-MM-16a** (described above) **Mitigation Measure BIO-MM-16b** (described above) **Mitigation Measure BIO-MM-17a** (described above)
Impact BIO-10: Acoustic effects on candidate, sensitive, or special-status fish species	Significant	Less than significant	**Mitigation Measure BIO-MM-10a:** Implement Seasonal and Daily In- and Near-Water Work Restrictions **Mitigation Measure BIO-MM-10b:** Implement Measures to Minimize Exceedance of Interim Threshold Sound Levels during Pile Driving **Mitigation Measure BIO-MM-10c:**

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
			Develop and Implement a Hydroacoustic Monitoring Plan
Impact BIO-11: Direct mortality of candidate, sensitive, or special-status fish species	Significant	Less than significant	**Mitigation Measure BIO-MM-10a** (described above) **Mitigation Measure BIO-MM-11:** Implement Fish Exclusion Devices on Temporary Water Intakes.
Impact BIO-12: Water quality impacts on candidate, sensitive, or special-status fish species	Significant	Less than significant	**Mitigation Measure BIO-MM-10a** (described above) **Mitigation Measure BIO-MM-12:** Protect Water Quality and Prevent Erosion and Sedimentation in Drainages and Wetlands
Impact BIO-13: Loss of riparian vegetation (including SRA cover) and potential for increased water temperature	Significant	Less than significant	**Mitigation Measure BIO-MM-13:** Implement Onsite and Offsite Compensation Measures to Replace Riparian and SRA Cover Losses **Mitigation Measure BIO-MM-17a** (described above)
Impact BIO-14: Increases in aquatic habitat associated with lowered floodplain area	Less than significant	N/A	N/A
Impact BIO-15: Introduction or spread of invasive aquatic animal or plant species	Significant	Less than significant	**Mitigation Measure BIO-MM-15:** Prevent the Spread or Introduction of Aquatic Invasive Species
Impact BIO-16: Loss of valley oak woodland	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-16a:** Protect Valley Oak Trees during Construction **Mitigation Measure BIO-MM-16b:** Compensate for Loss of Valley Oak Woodland
Impact BIO-17: Loss of riparian habitat	Significant	Less than significant	**Mitigation Measure BIO-MM-1a** (described above) **Mitigation Measure BIO-MM-1b** (described above) **Mitigation Measure BIO-MM-13** (described above) **Mitigation Measure BIO-MM-17a:** Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat **Mitigation Measure BIO-MM-17b:** Avoid the Introduction and Spread of Invasive Plants during Construction
Impact BIO-18: Loss of waters of the United States and waters of	Significant	Less than significant	**Mitigation Measure HYD-MM-1** (described above)

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
the state			**Mitigation Measure BIO-MM-18a:** Minimize and Compensate for Loss of Perennial Drainage **Mitigation Measure BIO-MM-18b:** Minimize and Compensate for Loss of Seasonal Wetland **Mitigation Measure BIO-MM-18c:** Minimize and Compensate for Loss of Ditch
Impact BIO-19: Substantial interference with the movement of any native resident or migratory fish species	Significant	Less than significant	**Mitigation Measure BIO-MM-10a** (described above) **Mitigation Measure BIO-MM-10b** (described above)
Impact BIO-20: Conflict with local policies or ordinances protecting biological resources	Significant	Less than significant	**Mitigation Measure BIO-MM-16a** (described above) **Mitigation Measure BIO-MM-16b** (described above) **Mitigation Measure BIO-MM-17a** (described above)
3.7 Greenhouse Gas Emissions			
Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment	Significant	Less than significant	**Mitigation Measure GHG-MM-1:** Implement Best Management Practices to Mitigate Tree Loss and Reduce Construction Generated Greenhouse Gas Emissions
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases	Significant	Less than significant	**Mitigation Measure GHG-MM-1** (described above)
3.8 Noise			
Impact NOI-1: Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies	Significant	Less than significant	**Mitigation Measure NOI-MM-1:** Implement Best Noise Control Practices During Construction
3.10 Cultural Resources			
Impact CUL-1: Change in the significance of an archaeological resource	Significant	Less than significant	**Mitigation Measure CUL-MM-1:** Implement measures to protect previously unidentified cultural resources
Impact CUL-2: Potential to disturb human remains from ground-disturbing construction activities	Significant	Less than significant	**Mitigation Measure CUL-MM-2:** Implement measures if construction activities inadvertently discover or disturb human remains

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
3.11 Tribal Cultural Resources			
Impact TCR-1: Potential to cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources	Significant	Less than significant	**Mitigation Measure TCR-MM-1:** Implement measures to protect previously unidentified tribal cultural resources
Impact TCR-2: Potential to cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency to be significant	Significant	Less than significant	**Mitigation Measure TCR-MM-1** (described above)

Public Review Period: The proposed project's Initial Study and proposed Mitigated Negative Declaration (IS/MND) is available for review and comment from August 30, 2022 to September 28, 2022. No later than **September 28, 2022,** any person may:

1. Review the IS/MND; and
2. Submit written comments regarding the information, analysis, and mitigation measures in the IS/MND by mail or email.

The IS/MND may be viewed at the following locations:

- SRWSLD: 975 Wilson Bend Road, Grimes, CA 95950
- Grimes Library: 240 Main Street, Grimes, CA 95950
- Online at www.rd108.org.

Lead Agency Contact: Questions, comments, or requests for digital or physical copies may be directed to **Ms. Meegan Nagy** by email at mnagy@rd108.org; or in writing care of Sacramento River West Side Levee District, PO Box 50, Grimes, CA 95950; or by telephone at **(530) 437-2221**.

Name: Meegan Nagy

Title: Deputy Manager

Signed: Meegan Nagy

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Contents

List of Appendices

List of Tables

List of Figures

Follows Page

Acronyms and Abbreviations

°C	degree Celsius
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
2012 CVFPP	2012 Central Valley Flood Protection Plan
2017 CVFPP Update	2017 Central Valley Flood Protection Plan update
2018 Ozone Plan	2018 Triennial Air Quality Attainment Plan
2018 RTP	2018 Colusa County Regional Transportation Plan Update
AB	Assembly Bill
ADT	average daily traffic
amplitude	the pressure level or energy content
ANSI	American National Standards Institute
APN	Assessor Parcel Number
BACT	Best Available Control Technology
Basin Plan	Water Quality Control Plan
BMPs	best management practices
BSSCP	bentonite slurry spill contingency plan
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal. Code Regs.	California Code of Regulations
CalEnviroScreen	California Communities Environmental Health Screening Tool
Caltrans	California Department of Transportation
CARB	California Air Resources Board
Carl Moyer Program	Carl Moyer Memorial Air Quality Standards Attainment Program
CCAA	California Clean Air Act
CCAPCD	Colusa County Air Pollution Control District
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	methane
CHSC	California Health and Safety Code
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CVFPB	California Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CWA	Clean Water Act
dB	decibels

dBA	A-weighted decibel
dbh	diameter at breast height
Delta	Sacramento–San Joaquin River Delta
DPM	diesel particulate matter
DPR	Department of Parks and Recreation
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EFH	Essential Fish Habitat
EIR	environmental impact report
EO	executive orders
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
FEMA	Federal Emergency Management Agency
FHSZ	fire hazard severity zones
FIRMs	Flood Insurance Rate Maps
FMMP	Farmland Mapping and Monitoring Program
FRAQMD	Feather River Air Quality Management District
frequency	the rate of oscillation of sound waves
FTA	Federal Transit Administration
GHGs	Greenhouse gases
GWP	global warming potential
HAPs	hazardous air pollutants
HFCs	hydrofluorocarbons
HHDT	heavy-heavy duty truck
IPCC	Intergovernmental Panel on Climate Change
ISA	International Society of Arboriculture
ISA	International Society of Arboriculture
kV	kilovolt
LDA	light-duty automobile
L_{dn}	Day-night level
LDT	light-duty truck
L_{eq}	Equivalent Sound Level
L_{max} and L_{min}	Maximum and Minimum Sound Levels
LOS	level of service
LRAs	Local Responsibility Areas
Ma	million years ago
MHDT	medium-heavy duty truck
mpg	miles per gallon
mph	mile-per-hour
MY	model year
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NDC	U.S. Nationally Determined Contribution
NFIP	National Flood Insurance Program

NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NRHP	National Register of Historic Places
NSR	New Source Review
NSVPA	Northern Sacramento Valley Planning Area
NSVPA Plan	Northern Sacramento Valley Planning Area Air Quality Attainment Plan
NTU	nephelometric turbidity units
NULE	Non-Urban Levee Evaluation
O&M	operations and maintenance
OEHHA	California Office of Environmental Health Hazard Assessment
Pb	lead
PCAQMD	Placer County Air Pollution Control District
PCBs	polychlorinated biphenyls
PCR	Public Resources Code
PFCs	perfluorocarbons
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM10	particulates 10 microns in diameter or less
PM2.5	particulates 2.5 microns in diameter or less
ppm	parts per million
PPMP	pollution prevention and monitoring program
PPV	peak particle velocity
PRC	Public Resources Code
proposed project	Grimes Small Communities Flood Risk Reduction Project
QSD	Qualified SWPPP Developer
RDs	reclamation districts
Regional Water Board	Regional Water Quality Control Board
RMS	root mean square
ROGs	reactive organic gases
RPS	Renewables Portfolio Standard
RSP	rock slope protection
SAFE	Safer Affordable Fuel-Efficient
SB	soil-bentonite
SB	Senate Bill
SCCB	slag-cement-cement-bentonite
Scoping Plan	California’s 2017 Climate Change Scoping Plan
SEL	sound exposure level
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SLCPs	short-lived climate pollutants
SO_2	sulfur dioxide
SPCCP	spill prevention, control, and counter-measure plan

SPFC	State Plan of Flood Control
SPL	sound pressure level
SR	State Route
SRA	shaded riverine aquatic
SRAs	State Responsibility Areas
SRFCP	Sacramento River Flood Control Project
SRFCP	Sacramento Flood Control Project
SRWSLD	Sacramento River West Side Levee District
SSC or CSC	Species of special concern
State Water Board	State Water Resources Control Board
SVAB	Sacramento Valley Air Basin
SWPPP	Surface Water Pollution Prevention Plan
TACs	toxic air contaminants
TCRs	tribal cultural resources
TMDL	total maximum daily load
UAIC	United Auburn Indian Community
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VMT	Vehicle Miles Traveled
VMT	vehicle-miles-traveled
YDWN	Yoche Dehe Wintun Nation

Chapter 1
Introduction

1.1 Project Purpose

The Sacramento River West Side Levee District (SRWSLD), with funding from the California Department of Water Resources (DWR), is proposing the Grimes Small Communities Flood Risk Reduction Project (proposed project) also known as the Grimes Floodplain Restoration and Levee Resiliency Project which would consist of constructing a 1.8-mile-long slurry cutoff wall in the existing Sacramento River West Bank Levee System (SRWBLS), encroachment remediation, waterside hardening, establishment of an operations and maintenance (O&M) area, and restoration of approximately 11 acres of floodplain for salmonids. DWR investigations have determined that the section of SRWBLS north and south of, and directly adjacent to, the town of Grimes in Colusa County is vulnerable to seepage. (see Figure 1-1 for illustrations of through- and under-seepage). Currently, Grimes is not mapped within a Federal Emergency Management Agency (FEMA) special flood hazard area; however, FEMA has initiated a remapping process for Colusa County. Initial results indicate that without remediation of the Sacramento River levees, FEMA will model the area assuming no levees are present. The goal of the proposed project is to increase flood resiliency to a 100-year level of flood protection to the town of Grimes in a manner consistent with the 2012 Central Valley Flood Protection Plan (2012 CVFPP) and its 2017 update (2017 CVFPP Update), including investments in multi-benefit flood projects, and to ensure Grimes is not placed within a FEMA special flood hazard area.

1.2 Document Purpose and Use

This initial study was prepared in accordance with Article 5, Section 15060 et seq. of the California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations [CCR], Title 14, Division 6, Chapter 3). This initial study describes the existing environmental resources in the project area, evaluates the environmental impacts of the proposed project on these resources, and identifies mitigation measures to avoid or reduce any potentially significant impacts to a less-than-significant level.

The CEQA lead agency, SRWSLD, will consider the findings of this initial study in determining whether preparation of an environmental impact report (EIR) is necessary prior to implementation of the proposed project. The initial study will also be used by multiple responsible, trustee, and cooperating agencies, including DWR, the California Department of Fish and Wildlife (CDFW), the Central Valley Regional Water Quality Control Board (Regional Water Board), the Central Valley Flood Protection Board (CVFPB), and the State Lands Commission, as well as the Pacific Gas and Electric Company (PG&E) in taking action under CEQA and other regulatory schemes to authorize implementation of the proposed project.

1.3 Project Area and Setting

The town of Grimes is an unincorporated community located along the west bank of the Sacramento River in Colusa County (Figure 1-2). Grimes sits at an approximate elevation of 46 feet (North American Vertical Datum 1988) and has a population of 296 people as of the 2020 census (U.S. Census Bureau 2022). State Route 45 and Grimes-Arbuckle Road are the main roads that run through the town. The proposed project area of protection includes the community of Grimes and critical infrastructure such as Grand Island Elementary School, municipal wells that supply the community with potable water, domestic septic systems, and a grain mill operated by Western Milling.

1.4 Project Background

The SRWBLS, in the vicinity of Grimes, was constructed in the mid- to late-1800s by local interests using unknown construction methods. The levee was subsequently set back, enlarged, strengthened, and/or raised by the U.S. Army Corps of Engineers (USACE) to meet Sacramento River Flood Protection Project standards in the 1940s.

Reported past performance of the levee includes, seepage and boils near the town of Grimes. During high water events in 2007 and 2008, seepage and boils were reported up to 15 feet from the levee toe in the yards of Grimes residents, but reports did not indicate movement of significant amounts of material. No instances of slope instability have been reported, and no freeboard deficiencies have been identified.

According to DWR studies, the presence of sand layers through the levee and shallow sand layers immediately beneath the levee are causing through- and under-seepage issues, respectively. Additionally, a thin clay blanket may exist above the shallow sand layers under the levee, which could induce stresses. This indicates that during a 100-year flood, water has the potential to make its way through the pervious layers of the levee causing sloughing and elevated average exit gradients that may result in boils or undermining of the levee foundation. Levee breaches which could result from these deficiencies have the potential to inundate the town.

As described above, Grimes is not currently mapped within a FEMA special flood hazard area; however, FEMA has initiated a remapping process for Colusa County, and initial results indicate that without remediation of the Sacramento River levees, much of Colusa County, including Grimes, may be placed within a FEMA special flood hazard area. In December 2019, a feasibility study was prepared by Colusa County (with funding provided by DWR through the Small Community Flood Risk Reduction Program) to identify a feasible alternative to increase flood protection to a 100-year level of flood protection (Colusa County 2019).

A variety of flood risk management measures were considered for the feasibility study, including both structural and non-structural actions, and these alternatives were evaluated for their ability to achieve a 100-year level of flood protection and for their alignment with the State of California's goals listed in the 2012 CVFPP and the 2017 CVFPP update. More specifically, the alternatives were evaluated for their ability to improve flood risk management, institutional and public support, and operations and maintenance (O&M) activities. The alternatives were also evaluated for their ability to promote ecosystem functions and multi-benefit projects and for their resulting capital costs and impacts on O&M costs. The proposed project represents the alternative deemed most feasible in the

Levee seepage is when water moves away from the river channel, either below or through the levee and surrounding land surface (see diagram below). Two main factors contribute to seepage:

- high water pressure within the river (such as during periods when the river is near flood stage), and
- pervious earth material within and underlying the levee.

The combination of high water pressure and pervious material can be evident in sand boils and water seepage on the land-side of the levee. Under severe conditions, the clay blanket on the land side may be ruptured and the increased flow of the under-seeping water undermines the levee, causing the levee to breach or collapse.

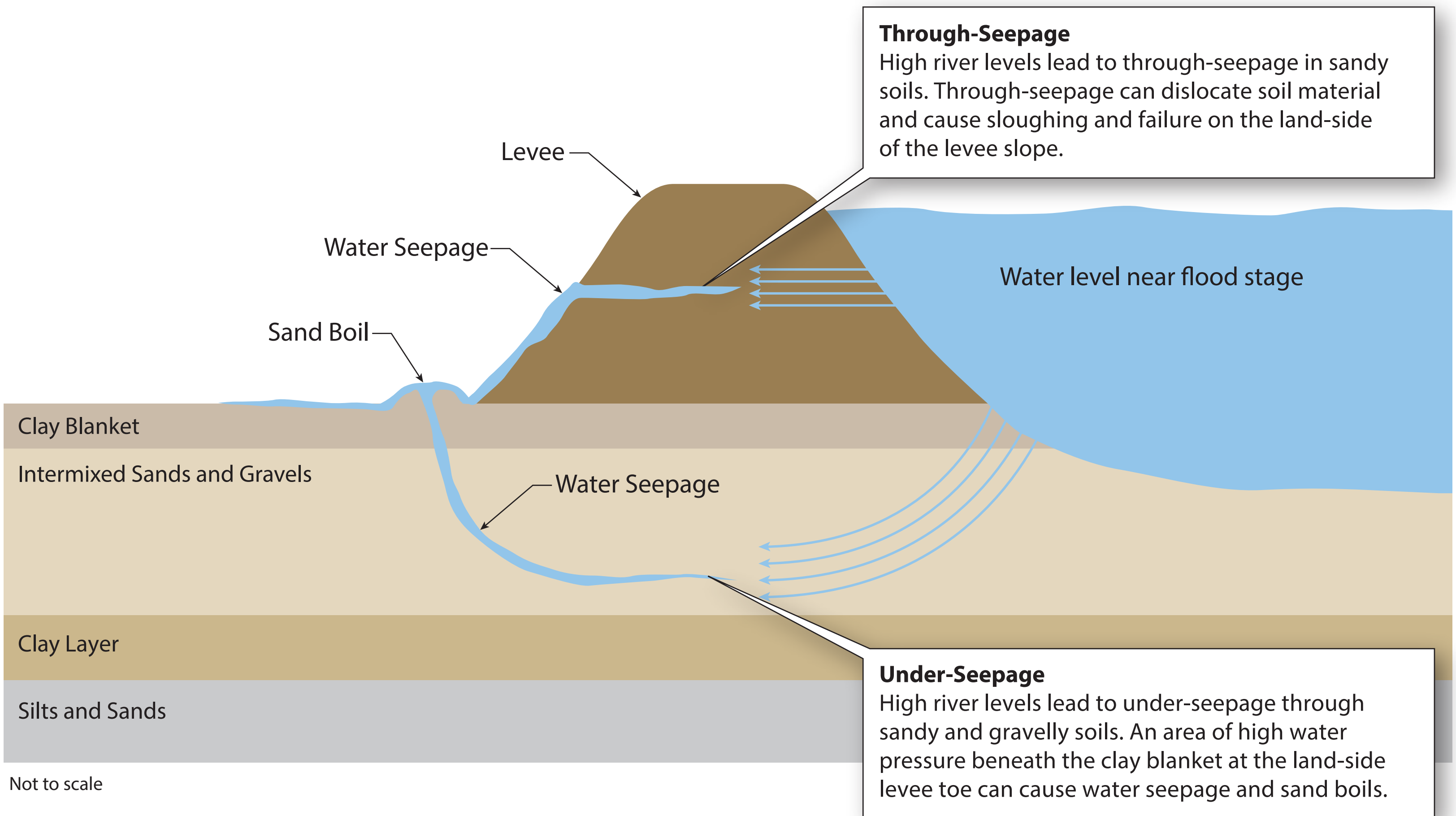

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Figure 1-1
Levee Seepage

2019 feasibility study and is the alternative that would create the least disturbance to existing infrastructure, operation, and land while providing 100-year flood protection to the community and reducing residual risk.

1.5 Regulatory Compliance

In implementing the proposed project, SRWSLD would seek all necessary permissions, authorizations, concurrences, and permits to comply with the following regulatory schemes, as relevant.

- National Environmental Policy Act
- California Code of Regulations
- Clean Water Act
- California Fish and Game Code
- National Historic Preservation Act
- Federal Endangered Species Act
- California Endangered Species Act
- Porter-Cologne Water Quality Control Act
- Federal Clean Air Act
- California Clean Air Act
- 33 United States Code Section 408
- Public Utilities Code Section 1001
- California Public Utilities Commission General Order 131-D
- Colusa County Planning Commission review for any required acquisition of new rights-of-way for transmission line rerouting

1.6 Document Organization

This document is organized as follows.

- Chapter 1, *Introduction*, describes the project purpose, project area, background, and regulatory compliance.
- Chapter 2, *Project Description*, describes the proposed project, including project features, construction information, operation and maintenance activities, and environmental commitments.
- Chapter 3, *Environmental Setting and Impacts*, describes the environmental resources present in the project area, and analyzes the proposed project's potential to affect such resources.

- Chapter 4, *Cumulative Impacts*, discusses the potential for the proposed project's incremental effect to be cumulatively considerable when combined with other projects causing related impacts.
- Chapter 5, *References*, provides a list of all printed references and personal communications used to prepare the initial study.
- Chapter 6, *List of Preparers*, presents a list of all personnel who assisted in the preparation of this document.
- Appendix A, *Environmental Checklist*, contains the Environmental Checklist Form, CEQA Guidelines Appendix G.

Chapter 2
Project Description

2.1 Introduction

This chapter describes the proposed project, which would consist of a slurry cutoff wall within the levee on the right bank of the Sacramento River, habitat restoration, waterside hardening, establishment of an operations and maintenance (O&M) area, and encroachment remediation. The proposed project would achieve multiple objectives including improved flood protection to a 100-year level of flood protection for the town of Grimes, and habitat improvements for salmonids.

2.2 Description of Proposed Project

This section discusses project features, construction methods and activities, construction equipment and personnel, proposed construction schedule, and operation and maintenance activities for the proposed project. The project area and stationing is depicted in Figure 2-1 and encompasses the limits of ground disturbance ("Area of Potential Effect" in the figure), which includes the construction footprints for the levee improvements and floodplain restoration, borrow areas, site access, and staging areas.

2.2.1 Project Features

2.2.1.1 Slurry Cutoff Wall

The proposed project includes the construction of a 3-foot-wide, approximately 30-foot-deep, and approximately 1.8-mile-long slurry cutoff wall within the existing levee. The majority of the slurry cutoff wall would be soil-bentonite (SB), while a small portion of the slurry cutoff wall would be slag-cement-cement-bentonite (SCCB).

2.2.1.2 Habitat Restoration and Floodplain Borrow

A multi-benefit project objective includes restoring riparian habitat in an area adjacent to the levee by lowering the floodplain and enhancing habitat. The riparian restoration habitat area is shown on Figure 2-1. The restored area would provide a more frequently wetted riverine habitat area for rearing salmonids, better support riparian vegetation, and expand shaded riverine aquatic habitat along the low-flow shoreline. The excavated material from the restoration work, if suitable, would be used to reconstruct the levee following installation of the slurry walls.

2.2.1.3 Encroachment Remediation

Levee standards for vegetation and encroachments may require removal or modification of encroachments, such as structures, certain vegetation, levee penetrations (e.g., pipes, conduits, cables), power poles, pump stations, and similar features from the levee prism and the operations and maintenance area at the landside toe. Encroachment remediation may include the demolition, relocation, or reconstruction of such features as appropriate on a case-by-case basis.

2.2.1.4 Rock Slope Protection

The proposed project includes waterside hardening of a site located between project stations 22+00 and 26+00, along the right bank of the Sacramento River upstream of Grimes. The approximately 400-foot-long section is in a location with an increased risk of erosion due to the direction of the river. The site was identified in a California Department of Water Resources (DWR) Non-Urban Levee Evaluation (NULE) report. The hardening would be completed by placement of rock slope protection (RSP), including clearing, earthwork required for access, and for slope preparation to accommodate RSP placement.

2.2.1.5 Offsite Borrow

The construction methods for this project slurry cutoff wall will require the existing levee to be degraded to half its height to provide a working construction platform. The suitability of the excavated levee material for the levee reconstruction will be evaluated during project development and confirmed during levee degrade. Offsite borrow material may need to be imported if the excavated levee material or habitat restoration area material is deemed unacceptable for use/reuse. SRWSLD has identified one potential offsite borrow source in addition to the habitat restoration area, as shown on Figure 2-1. If additional suitable fill material is required beyond what can be supplied by habitat restoration activities, the 19.5-acre potential offsite borrow area has been identified approximately one-half mile to the west of the floodplain restoration area.

2.2.2 Construction Methods and Activities

2.2.2.1 Project Footprint and Land Acquisition

Land rights for an O&M area at the landside levee toe will be obtained as part of the project. The O&M area to be acquired will extend up to 20 feet in width beyond the landside toe.

2.2.2.2 Site Access, Mobilization, and Staging

The project site may be accessed via existing levee ramps and temporary earthen ramps. The temporary ramps would be constructed for equipment access between the levee and the staging area(s)/access points and removed when construction is complete.

Three staging areas would be used in the project area. These staging areas are located (1) at the southern limit of the town of Grimes between State Route (SR) 45 and the levee, (2) at the northern limit of the town of Grimes at the end of 2nd Street, and (3) at the proposed habitat restoration area at the north end of the project, and they would occupy approximately 4 acres outside of the work footprint. Staging areas would house construction equipment and materials, the SB slurry mixing ponds, SCCB slurry batch plant, equipment parking, fueling and maintenance, project offices, employee parking, and other uses needed for project construction. At the start of construction, the construction site and any necessary construction staging or slurry mixing areas will be cleared and grubbed.

SB cutoff wall construction requires temporary establishment of an onsite slurry mixing pond and work area that would occupy approximately one-half acre. The onsite mixing pond will be located at a maximum of 1 mile from the furthest work location. The pond will most likely be located at the staging area identified just north of Grimes, and at the end of 2nd Street. The site would likely

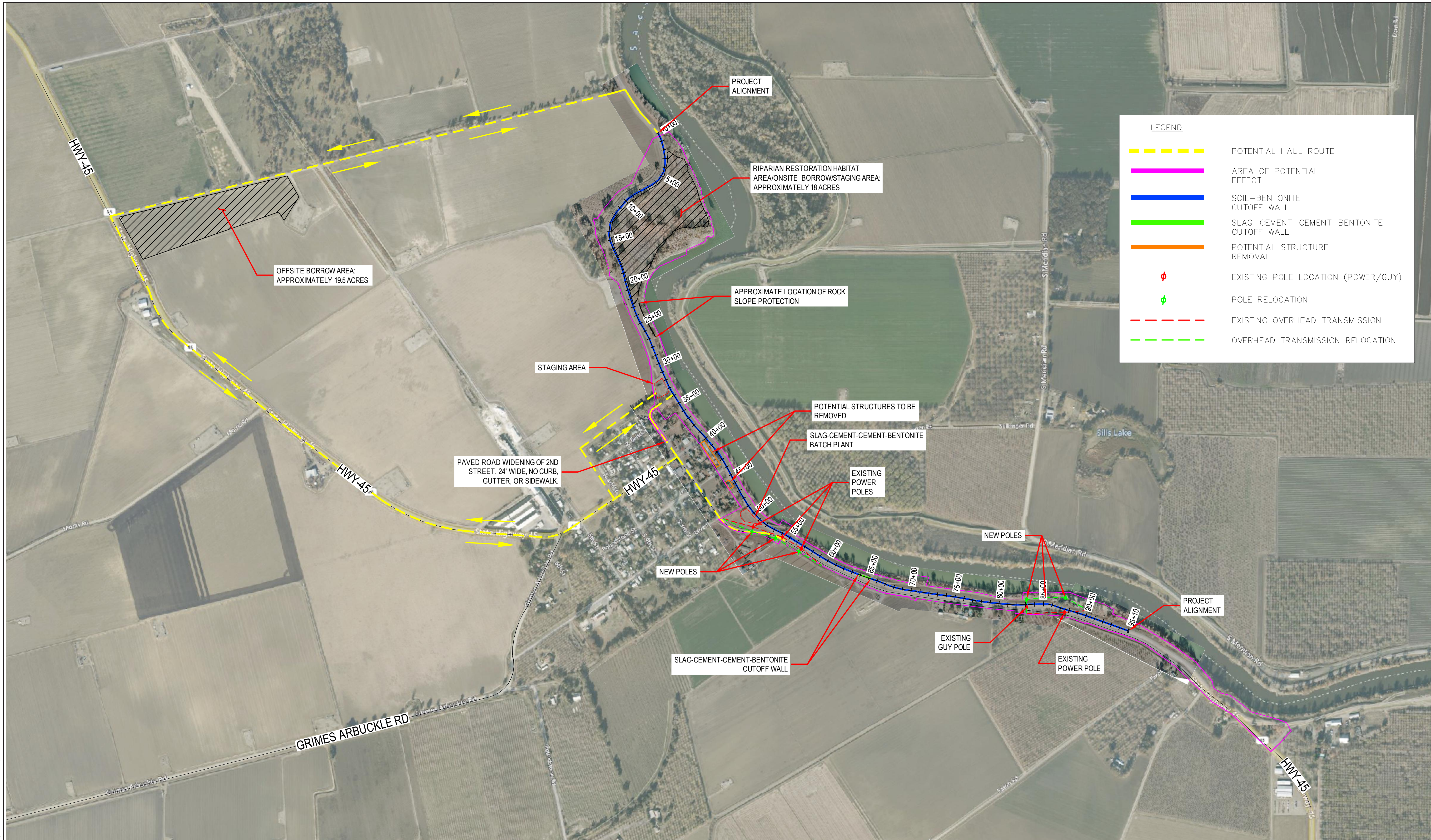

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Figure 2-1
Project Area

contain bulk bag supplies of bentonite, a cyclone mixer, pumps, a slurry storage tank, and generators that meet air quality requirements. The pond is not expected to be relocated as construction progresses.

SCCB cutoff wall construction requires a staging area to accommodate cement and bentonite silos, a mixing plant, and room for delivery of materials. The SCCB staging area is typically located as close as possible to the SCCB work area and must have access to a water source. It is expected that the SCCB staging area and mixing plant would be located at the staging area located just south of Grimes.

Staging, access, and other temporary construction areas would be located, to the extent practicable, away from wetlands, woody vegetated areas, wildlife species habitat, known cultural resources, or other sensitive areas.

2.2.2.3 Seepage Cutoff Walls

A seepage cutoff wall consists of a relatively impermeable material typically placed through the center of the levee. The cutoff wall is keyed, in most cases, into a relatively impervious stratum below permeable layers in the levee. A cutoff wall will address through- and under-seepage deficiencies in levees (See Figure 2-2 for a sketch depicting a cutoff wall). The project cutoff wall would be constructed by the following methods.

Method 1: Soil-Bentonite Cutoff Wall—All Locations Except PG&E High-Pressure Gas Line

SB cutoff wall construction typically begins with building a working platform by degrading the top portion of the levee by conventional earthwork methods. The working platform is constructed by widening the overall footprint of the levee prism with the degrade material. The elevation of the working platform typically marks the top design elevation of the SB cutoff wall. For the Grimes levee, the work is expected to require the removal of the top half of the levee prism.

SB cutoff walls are excavated with a long-reach excavator in a continuous trench along the levee alignment. As the trench is excavated, a bentonite slurry is piped into the trench to prevent sloughing. This bentonite slurry is mixed at the staging site and stored temporarily in a slurry storage tank and/or a pond until it is pumped into the trench. The bentonite slurry delivery pipe is typically a 4- or 6-inch-diameter, high-density polyethylene pipe.

The material excavated from the trench is placed onto the working platform adjacent to the trench. As the trench excavation reaches the design depth of the wall, the trench is backfilled with a SB blend of borrow material, excavated material, bentonite, and water meeting the project design specifications. This low-permeability backfill material is typically mixed alongside the trench and placed into the trench by an excavator or dozer. As the SB backfill material is placed into the trench, the bentonite slurry that was piped into the trench is displaced.

Once the SB backfill material has been placed and allowed to settle, the top half of the levee would be reconstructed utilizing excavated or imported material. The excavated material not meeting project requirements used to construct the temporary working platform would be off-hauled and disposed of or used elsewhere on site. An all-weather patrol road made of aggregate base rock would be constructed on the levee crown to enable regular levee patrols.

Method 2: Slag-Cement-Cement-Bentonite Cutoff Wall—Pacific Gas and Electric High-Pressure Gas Line

Pacific Gas and Electric (PG&E) operates a steel, 20-inch-diameter high-pressure gas pipeline that passes through the levee and crosses the Sacramento River at STA 57+60 of the project alignment. Based on the Flood Control Project Maintenance Levee Inspections Levee Log Report (California Department of Water Resources Division of Flood Management 2021), the pipe is buried 3 feet below the levee crown. The encroachment permit allowing the gas line to be present requires that PG&E pay for any modifications of the pipeline because of the project (CVFPB Permit 3800, Condition Five). If the decision is made to keep the high-pressure gas line in service throughout construction, a SCCB cutoff wall will be constructed through this segment of the project instead of a SB cutoff wall.

SCCB cutoff walls are constructed in a similar manner as SB cutoff walls. The major difference is that the slurry pumped into the trench during excavation is not a bentonite water slurry, but a slag-cement-bentonite slurry. The slurry is self-hardening and fully replaces excavated material in the trench. The work is completed in panels, with the adjacent panel hardened sufficiently to be self-supporting before excavating the adjacent panel. After completion of the SCCB walls, the excavated material is hauled off-site and disposed of. Another difference is that levee degrade is often not required, as a large working platform is not necessary for SCCB construction.

SB cutoff walls would be constructed, as described under *Method 1* above, to the extent possible on either side of STA 57+60 while leaving the levee at full height at the gas line. After the levee is reconstructed on top of the SB cutoff walls, a SCCB wall would be constructed to overlap the SB walls on each side of the gas line and close the gap in the SB wall. The estimated length of the SCCB wall would be 150 feet, including overlaps, (from approximately STA 56+85 to STA 58+35).

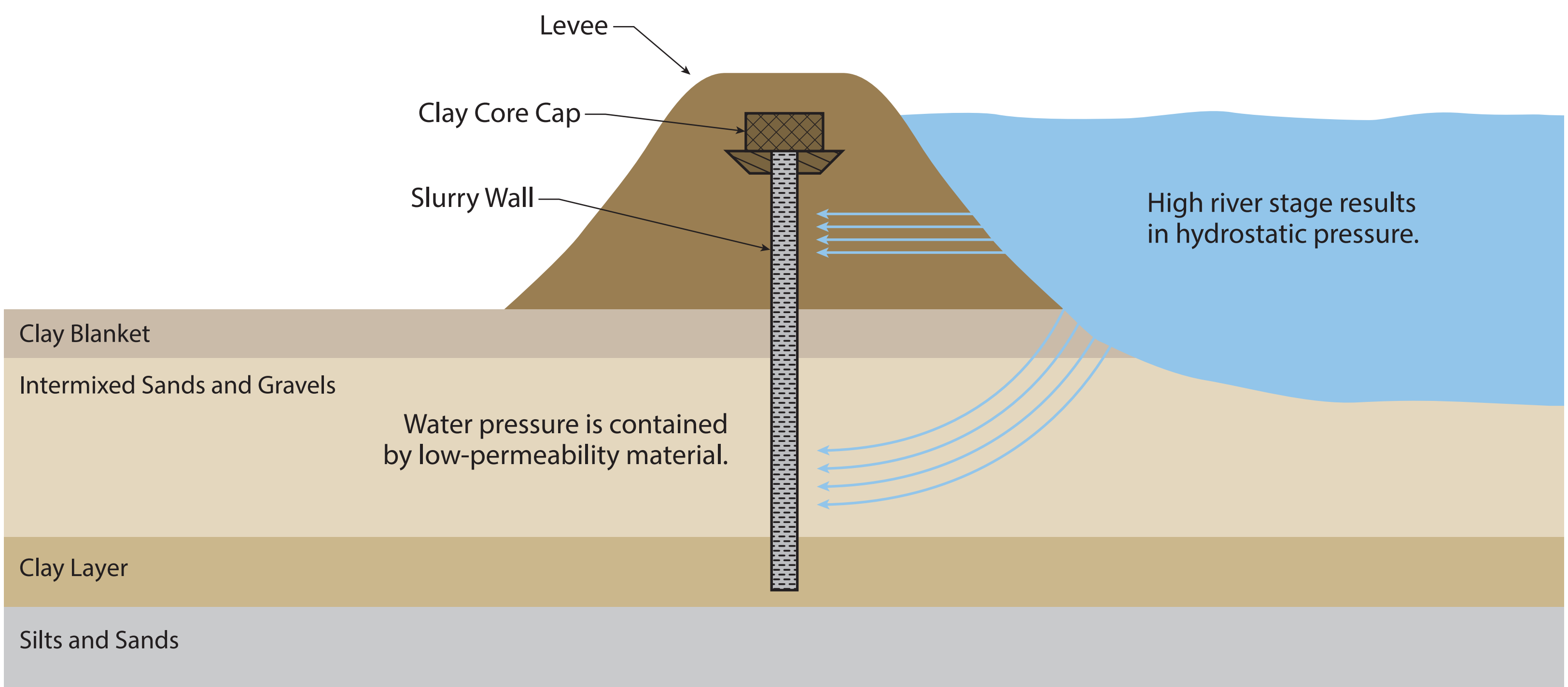
2.2.2.4 Relocations, Demolition, and Removals

As described above in Section 2.2.1, encroachments found within the area of potential effect may require removal and replacement, abandonment, relocation, or retrofit if they present a threat to the stability of the levee, do not comply with levee encroachment criteria, or are not permitted or would be disrupted or otherwise affected by construction activities. Encroachments within the permanent easement or on Sacramento San Joaquin Drainage District (SSJDD) property (typically from 20 feet of the landside toe and into the floodway) would be required to be permitted as encroachments and must meet current standards. This would require utility relocations (PG&E and Frontier Communications), reconstruction or removal of pipe systems for irrigation and storm drainage, working around a PG&E high-pressure gas line, demolition of structures, tree removal, and other similar actions.

Encroachment removal techniques would be implemented based on the needs of the specific encroaching feature, which are described below. Generally, smaller encroachments would be removed, relocated, or retrofitted by manual labor of small crews (approximately 2 to 10 laborers) using hand tools. Larger encroachments would require machinery such as excavators and bulldozers. Encroachments that substantially penetrate the levee (like footings, pipes, retaining walls, or large woody vegetation) would require levee reconstruction, discussed in Section 2.2.2.5. Dump trucks would be used for offsite hauling and disposal of removed material at a permitted commercial source. Relocations would require similar equipment.

Concept

Through-seepage and underseepage are controlled by a low-permeability slurry cutoff wall constructed within the levee cross section and through the clay blanket, permeable layer, and into the underlying clay layer.



Not to scale

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Figure 2-2
Slurry Cutoff Wall

Structures

Houses, outbuildings, and all utilities associated with the structures would be relocated or demolished and disposed of offsite. Structures would be assessed in accordance with California Department of Toxic Substances Control requirements and any material generated from the demolition would be disposed of accordingly.

Utility Poles and Guys

Utility poles and guys would be relocated outside of the fee/easement area of the levee (up to 20 feet from the landside toe to 15 feet from the waterside toe). This work would be completed by the utility owner (or the customer for service poles). Holes would be backfilled with appropriate materials.

Overhead wires would be evaluated to determine if they meet the guidelines for overhead clearance at the levee crown. Those facilities not meeting guidelines would be raised or relocated by the utility owner (or the customer for service lines).

The following activities have been identified for utility pole relocations.

- Relocation of two segments along a 12 kilovolt (kV) overhead transmission line (approximately 1,250-foot and 430-foot-long segments).
- Relocation of four wooden power poles, and necessary guy wires.
- Installation of two additional wooden power poles.
- Implementation of environmental commitments associated with hazardous materials and land use.

The project involves relocating four wooden poles, and installation of one additional pole located along a 12kV overhead transmission line operated by PG&E to meet minimum offset distance from the landside levee toe. These poles are currently located on the north side of SR 45, along the landside levee toe. The poles will be relocated on the south side SR 45, just across from their current locations. Relocation work would entail relocation of the poles, and no change to the transmission line.

All work would be prepared in accordance with the California Public Utility Commissions' General Order 95 Rules (CPUC General Order 95) for Overhead Electric Line Construction and all applicable California Building Codes. PG&E will cut and remove the four existing poles they operate at the ground surface for later removal by SRWSLD's contractor during other project work. PG&E will drill holes and direct-bury the replacement poles.

Where possible, existing levee roads would be used for access during pole relocation construction activities and staging would be restricted to existing disturbed areas within the previously approved project footprint.

A Treated Wood Management Program would be implemented in accordance with California Health and Safety Code section 25143.15 and PG&E utility procedure ENV-4000P-07. The program includes the implementation of best management practices (BMPs) and health and safety procedures for cutting, removing, storing, handling, and transporting treated wood and treated wood waste. The program also includes special handling procedures in the event that copper naphthenate paper is encountered at the base of the poles (i.e., stumps). All employees performing pole removal will be properly trained on hazards and handling procedures and provided with the appropriate level of personal protective equipment necessary for work performed. During pole cutting, visqueen plastic would be placed underneath the wood to capture cutting debris and a water mist would be used to minimize dust. Removed wood poles, cutting debris, and stumps would be collected in project-specific containers and transferred to a PG&E service center designated as a PG&E treated wood waste consolidation site. Poles would then be scheduled for transport to an appropriate licensed Class 1 or composite-lined portion of a solid waste landfill.

Retaining Walls

Retaining walls would be evaluated to determine if they meet guidelines. Those not meeting guidelines would be removed by excavating around the wall and its footing with construction equipment, demolishing the wall, off hauling demolished material, and reconstructing the levee prism, including extending the levee slope into the area once occupied by the retaining wall.

Irrigation and Drainage Pipes

Each individual operating pipe would be evaluated to determine if it meets guidelines. Those facilities not meeting guidelines would be raised or relocated by the owner or the construction contractor depending on the language in the permit allowing for the pipeline.

Pressurized Irrigation or Drainage Pipes

Each pipe would be reconstructed outside of the levee prism, which may require a higher pipe profile. Each pipe would have a positive shutoff valve and an air release valve. If the pipe is in a cutoff wall section, it would need to be removed to allow the cutoff wall construction to proceed and may require a temporary bypass.

Upgrading pipe and changing the profile may require upgrades to the pump structure, intake piping and power supply. Upgrading the pump structure and intake piping may require in-water work for removal of existing facilities and construction of replacement facilities, as well as clearing of vegetation on the waterside of the levee.

During construction, the contractor may be required to implement a temporary bypass pumping system utilizing temporary pumps and diesel generators. The temporary system would utilize the existing intake and pipelines to the extent possible but may include temporary piping and a temporary crossing of SR 45. This system would be relocated during cutoff wall and levee regrading operations as needed to allow the levee work to proceed. During this process, the existing pump station may need to be removed and reconstructed. Reconstruction would include a new pump platform, pumps, and switch gear. Pile driving may be required as a part of the reconstruction. Pile driving would be either vibratory, impact, or a combination of the two, would occur above the water surface elevation, and would be limited to daylight hours. The existing intake piping would be reused. Once the levee is near finish grade, a new pipe would be constructed over the theoretical levee prism, across SR 45 and to the current outfall location. Once the permanent system is online, the temporary bypass would be removed.

The placement of temporary piping and the replacement of the existing piping under SR 45 would require temporary traffic control (flagging) with delays (up to 20 minutes). Traffic control would be in daytime hours, and the road would be reopened to traffic with temporary steel traffic plates in place at the end of each shift.

Vegetation

Vegetation would be removed from within the direct construction footprint and the minimum areas necessary for staging and access and within 20 feet of the landside levee toe to ensure access for routine maintenance and inspection activities. Any special-status vegetation removed as part of direct construction activities would not be replaced at that location but would require either onsite mitigation at the habitat restoration area or offsite, in-kind mitigation.

Stumps

Stumps above the working platform would be removed in their entirety during the excavation of the levee crown. Stumps below the working platform elevation would be removed and the resulting hole backfilled with suitable material using a compaction wheel mounted on an excavator or similar equipment.

Access Ramps and Access Control

Existing Access Ramps and Access Control would be partially or completely removed during construction and replaced at the end of the work.

For the Grimes Boat Launch Facility, access would be maintained during construction with delays (up to 1 hour). During most of the work, the access road would include a gravel or steel plate surface. During certain periods, such as levee degrade and regrade, the access would be dirt. A flagger would be placed at this location to control public and project traffic.

2.2.2.5 Levee Reconstruction

Levee reconstruction would be necessary where the levee has been degraded to construct the SB cutoff wall and where a substantial encroachment has been removed from within the levee prism. Levee backfill material could be excavated by an excavator, scraper, or bulldozer from the previously degraded material stored adjacent to the levee (if degraded material is deemed suitable for reuse), or from a nearby borrow site. For offsite borrow, front-end loaders or excavators would load haul trucks with the borrow material and the haul trucks would transport the material to the levee reconstruction site. Motor graders or bulldozers would spread the material evenly according to design specifications, and a sheepsfoot roller would compact the material. Water trucks would distribute water over the material to ensure proper moisture for compaction. The reconstructed levee would be built to the existing levee crown elevation.

2.2.2.6 Material Importation, Reuse, and Borrow

Materials imported to the project site would include bentonite, incidental construction support materials, aggregate surfacing, RSP, hydroseed, and embankment fill soil. To meet borrow demands, embankment fill material excavated as part of construction would be evaluated for reuse. Embankment fill material deemed suitable would be used as part of levee reconstruction.

Borrow Volume

For the anticipated one-half levee degrade with full replacement, it is expected that approximately 200,000 cubic yards of material will be hauled to the project site, and a similar amount will be off-hauled and placed in a disposal site.

Potential Borrow Sites

There are two potential borrow areas being considered for the project.

Onsite borrow would utilize material excavated from the habitat restoration area. This material would be excavated and hauled in trucks. Material excavated from the levee prism that is considered unsuitable for levee reconstruction would be off-hauled to the offsite borrow/disposal site.

Offsite borrow would be generated from a nearby borrow/disposal site and hauled to the project site either along SR 45 and local streets or along existing dirt farm roads. Excess project material would be returned to the same site along the same routes.

No excess earthen material would be taken to landfills.

Phase 1 Environmental Site Assessments will be conducted for areas that would be excavated. Additionally, the existing material would be observed during excavation for indications of potential contamination. Contaminated material, in the unlikely event that it is discovered, would be properly analyzed and remediated or taken to the appropriate disposal facility.

Rock Slope Protection

Material for RSP would be imported from commercial quarry sites utilizing trucks. It is expected that approximately 1,100 tons of rock slope protection material would be hauled to the project site.

Aggregate Surfacing

Material for aggregate surfacing would be imported from commercial quarry sites by truck. It is expected that approximately 4,000 tons of aggregate rock material would be hauled to the project site.

Bentonite Clay

Bentonite clay for slurry walls would be trucked from a distributor located in Roseville, California. It is expected that approximately 640 tons of Bentonite clay would be hauled to the project site.

Slag Cement

Slag cement for SCCB walls would be trucked from a distributor located in Roseville, California. It is expected that approximately 100 tons of slag cement material would be hauled to the project site.

2.2.2.7 Haul Routes

Onsite borrow, if utilized, would use the levee area, including crown, working platform, and landside toe for hauling operations.

Hauling material from the offsite borrow area would use SR 45, as well as surface streets within Grimes (2nd Street, Main Street, Poundstone Street, and Leven Street), or existing dirt farm access roads.

2.2.2.8 Rock Slope Protection

RSP would be placed from the waterside levee bench and temporary access ramps constructed down the bank within the work area. RSP material would be hauled by truck and placed utilizing excavators. The work would proceed from the farthest point waterward from the levee and build upwards and towards the levee. Work to place RSP material will be scheduled during periods of low water conditions in the river as much as possible to minimize work in water. If needed, any in-water work would include water quality monitoring.

2.2.2.9 Demobilization

All equipment and site controls would be removed once construction is complete, and disturbed areas would be reseeded with a sterile wheat seed mix or a SRWSLD-approved seed mix to promote vegetation growth appropriate for the current O&M approach.

2.2.2.10 Road Work and Detours

Traffic control would be implemented along SR 45. There is no convenient detour for work on SR 45. Traffic control measures would include one-way traffic control (flaggers) and short-term full closures (up to 30 minutes) during low volume time periods.

E. Leven Street, Poundstone Street, and Main Street may be used for construction ingress and egress.

Second Street would be a main access route to the project. Second Street would be widened to increase paved street width to one lane in each direction between Main Street and the levee. The improvement would include widening approximately 600 feet of an existing paved road, to 24 feet wide. There is no detour available for this street. Work would include one-way traffic control (flaggers) and short-term full closures (up to 30 minutes).

2.3 Construction Equipment and Personnel

Each project feature would vary in crew size and equipment needed, but there would be an average of approximately 15 individuals expected to be on site daily during the construction of the proposed project. Typical equipment used at the project site would include excavators, bulldozers, rollers, skid steers, forklifts, compactors, backhoes, cranes, motor graders, generators, haul/dump trucks, and water trucks.

2.4 Construction Schedule

Project construction is anticipated to be completed within one construction season. Most utility relocations would occur prior to the levee construction activities, but may overlap to some extent. Utility relocations within the levee prism with occur concurrently with the levee construction. Any necessary tree-trimming, tree removal, and shrub removal will be timed to limit disturbance of nesting birds. Major levee construction activities would be limited to a construction window between April 15 and November 1. Site cleanup, hydroseeding, and demobilization would occur after construction and is anticipated to be complete by November 30 of the construction year. Construction would primarily be limited to Monday-Saturday from 7:00 a.m. to 7:00 p.m. Nighttime work between 7:00 p.m. and 4:30 a.m. may be needed in very limited circumstances, up to six nights total, to allow for replacement of utility crossings under the roadway between approximately stations 54+00 and 80+00 to minimize traffic impacts.

2.5 Operation and Maintenance Activities

Post construction, SRWSLD will continue typical levee maintenance activities such as vegetation control, rodent control, and maintenance of access for levee patrols. SRWSLD will continue to observe for seepage and general performance of the levees during high-water events.. Any remaining or replaced pipe encroachments would be maintained in accordance with encroachment permit requirements by the permit holder. Any borrow sites/disposal sites utilized for the project would be returned to private agricultural production and would be operated and maintained accordingly. The floodplain restoration area would be maintained for a period of 3 to 5 years until vegetation is established, and afterwards it would function as a natural system with minimal maintenance requirements.

Chapter 3
Existing Conditions and Environmental Effects

3.1 Introduction

This chapter provides an overview of the existing physical environment and regulatory requirements for each of the resources that may be affected by the proposed project. For each resource, there is a discussion of the existing conditions, followed by an evaluation of the environmental effects on the resource. The chapter is organized by resource topic and corresponds to the Environmental Checklist Form of Appendix G of the State CEQA Guidelines. A complete environmental checklist for each potentially affected resource is provided in Appendix A.

Implementation of the mitigation measures specified in the impact analysis would either avoid adverse impacts completely or reduce the impacts to a less-than-significant level. SRWSLD would adopt a mitigation monitoring and reporting plan at the time it adopts the mitigated negative declaration. The purpose of the mitigation monitoring and reporting plan is to ensure that the mitigation measures adopted as part of the project approval would be implemented when the project is implemented.

The following terminology is used to describe the level of significance of impacts.

- A finding of *no impact* is appropriate if the analysis concludes that the project would not affect the particular environmental resource topic in any adverse way.
- An impact is considered *less than significant* if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of mitigation measures that have been agreed to by the applicant.
- An impact is considered *significant and unavoidable* if the analysis concludes that it could have a substantial adverse effect on the environment and mitigation to a less-than-significant level of impact is not possible.

3.2 Resources Not Likely to Be Affected

3.2.1 Mineral Resources

The project area is not in or near a mineral extraction site; therefore, the proposed project would neither result in the loss of availability of mineral resources nor otherwise prevent the extraction of important mineral resources. The proposed project would have no impact on mineral resources, and they are not considered further in this initial study.

3.2.2 Growth Inducement

The proposed project would achieve multiple objectives including improved flood protection for the town of Grimes and habitat improvements for salmonids. While Grimes is not currently mapped by the Federal Emergency Management Agency (FEMA) as a flood hazard area, the proposed project would improve levee resiliency to prevent future designation as a FEMA 100-year floodplain, which could create potential barriers to growth. However, because growth in Grimes is not currently limited by flood risk, the proposed project would not directly induce growth or result in long-term development.

3.3 Hydrology and Water Quality

3.3.1 Introduction

This section analyzes the proposed project's potential impacts related to hydrology and water quality. It describes existing conditions in the project area and summarizes the overall regulatory framework for hydrology and water quality, and it analyzes the potential for the proposed project to affect these resources.

3.3.2 Existing Conditions

The proposed project is within the Sacramento River Hydrologic Region. The Sacramento River Hydrologic Region encompasses an area of approximately 17.4 million acres (27,200 square miles) and contains all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa Counties (California Department of Water Resources 2003). Most of northern California is located in the Sacramento River Hydrologic Region, which encompasses several watersheds of various sizes.

According to the U.S. Geological Survey (USGS), the project area is within the Sacramento-Stone Corral watershed (USGS Hydrologic Unit Code #18020104) (U.S. Geological Survey 1978).

3.3.2.1 Surface Water Hydrology

The Sacramento River is the principal river of northern California and is also the largest river in California. Beginning in the Klamath Mountains, the river flows south for approximately 445 miles before reaching the Sacramento–San Joaquin River Delta (Delta) and San Francisco Bay. Several major tributaries, including the upper Sacramento, Pit, Feather, Yuba, and American Rivers, contribute to flow in the Sacramento River. Flow also is contributed to the Sacramento River by a series of smaller tributaries, including Cottonwood, Battle, Butte, Mill, Deer, and Thomes Creeks.

The level of flow in the upper Sacramento River below Keswick Dam is controlled by local runoff, releases from Shasta Lake and Keswick Reservoir, transfers from the Trinity River, and groundwater accretions. The releases and transfers are determined by a suite of laws, regulations, contracts, and agreements to address demands of water users, requirements for water quality, and needs of fish populations throughout the river and the Delta. Operations are regulated by the State Water Resources Control Board (State Water Board) Water Rights Decision 1641 (D-1641; March 15, 2000), which requires flow releases to meet Delta standards, and State Water Board Water Rights Order 90-5 (May 2, 1990), which requires cold water releases to meet temperature targets at compliance points in the upper Sacramento River.

Downstream of Keswick Reservoir, the Sacramento River is influenced by tributary streams; diversions for agricultural, municipal, and industrial purposes; agricultural and municipal inputs; and the flood management system. Despite the regulated nature of the system, flow conditions in the river have a somewhat predictable pattern defined by season.

3.3.2.2 Groundwater Hydrology

The California Department of Water Resources (DWR) delineates groundwater basins throughout California under the state's Groundwater Bulletin 118. The proposed project is located in the Sacramento Valley Groundwater Basin, Colusa Subbasin (Basin No. 5-021.52). The Colusa Subbasin has a total surface area of 918,380 acres (1,434 square miles). It is bounded on the east by the Sacramento River, on the west by the Coast Ranges and foothills, on the north by Stony Creek, and on the south by Cache Creek.

Groundwater level data show an average seasonal fluctuation of approximately 5 feet for normal and dry years, and there does not appear to be any increasing or decreasing trend in groundwater levels in the Colusa Subbasin. Based on available information, DWR calculated groundwater storage capacity in the subbasin at 13,025,887 acre-feet to a depth of 200 feet (California Department of Water Resources 2003).

3.3.2.3 Surface Water Quality

The Central Valley Regional Water Quality Control Board (CVRWQCB) Basin Plan (Central Valley Regional Water Quality Control Board 2018) describes beneficial uses for the Sacramento River (Table 3.3-1). Clean Water Act (CWA) Section 303(d) establishes the total maximum daily load (TMDL) process to assist in guiding the application of state water quality standards. Section 303(d) requires states to identify streams in which water quality is impaired (i.e., affected by the presence of pollutants or contaminants) and to establish the TMDL—the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects. Table 3.3-2 shows 303(d) listed impairments for the Sacramento River in the vicinity of the project area based on the 2017 California Integrated Report (State Water Resources Control Board 2017).

Table 3.3-1. Designated Beneficial Uses for Surface Water Bodies within the Project Vicinity

Water Body	Designated Beneficial Uses
Sacramento River (from the Colusa Basin Drain to the I Street Bridge in Sacramento)	Municipal and domestic supply; irrigation; water contact recreation; non-contact water recreation; warm and cold freshwater habitat; warm and cold fish migration; warm and cold fish spawning; wildlife habitat; navigation.

Source: Central Valley Regional Water Quality Control Board 2018.
[a] Potential beneficial use.

Table 3.3-2. 303(d) Listed Impaired Waters with Potential to be Affected by the Proposed Project

Water Body	Pollutant Stressors	Potential Sources	TMDL Completion Date
Sacramento River (Red Bluff to Knights Landing)	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2027
	Dieldrin	Unknown	Est. 2027
	Mercury	Unknown	Est. 2027
	PCBs (Polychlorinated biphenyls)	Unknown	Est. 2027
	Unknown Toxicity	Unknown	Est. 2027

Source: State Water Resources Control Board 2017.
Est. = Estimated.
TMDL = total maximum daily load.

The water quality of the Sacramento River is good to excellent, with relatively cool water temperatures, low biochemical oxygen demand, medium to high dissolved oxygen, and low mineral and nutrient content. In general, the surface water quality of the Sacramento River is representative of agricultural return flows, urban runoff, and natural sedimentation from scouring. Primary water quality concerns include potential aquatic life toxicity and domestic water supply use impacts associated with pesticides, mercury and methylmercury accumulation in the food chain, erosion and sediment transport/deposition, and temperature impacts on coldwater species (Sacramento River Watershed Program 2006:7).

3.3.2.4 Groundwater Quality

The groundwater in the Sacramento River Hydrologic Region, which includes the Colusa Subbasin, is generally considered to be of good quality. The most commonly detected chemicals above a regulatory limit between 2009 and 2018 were manganese and iron, which had concentrations in some wells above the drinking water secondary maximum level for consumer acceptance (California Department of Water Resources 2021).

The CVRWQCB Basin Plan designates all groundwaters as suitable or potentially suitable for the beneficial uses of municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO) (Central Valley Regional Water Quality Control Board 2018).

3.3.2.5 Flooding and Flood Management

Existing flood management facilities along the Sacramento River affect its flow and operation. These facilities include dams and reservoirs, levees, and weirs. Shasta Lake collects flow in the upper Sacramento River, but many controlled and uncontrolled tributaries enter the Sacramento River downstream from this reservoir. In addition to dams and reservoirs, there are six weir structures and three flood relief structures that divert portions of flood flows to three overflow basins/bypasses: Butte Basin, Sutter Bypass, and Yolo Bypass. These weirs act as flood relief structures, allowing high flows from the Sacramento River to empty into the overflow basins and bypasses. The weirs were designed to function in a particular order (upstream to downstream), as follows: Moulton Weir, Colusa Weir, Tisdale Weir, Fremont Weir, Sacramento Weir, and Cache Creek Weir (California Department of Water Resources 2010:1).

Multiple facilities along the Sacramento River are part of the Sacramento River Flood Control Project (SRFCP), which was authorized by Congress in 1917. The SRFCP was the major project for flood control on the Sacramento River and its tributaries. It was sponsored by the Reclamation Board of the State of California (today reauthorized as the Central Valley Flood Protection Board [CVFPB]) and was the first federal flood control project constructed outside the Mississippi River Valley (U.S. Army Corps of Engineers 2009). The SRFCP includes levees, overflow weirs, pumping plants, and bypass channels that protect communities and agricultural lands in the Sacramento Valley and the Delta. The SRFCP extends from the Sacramento River's mouth near Collinsville in the Delta to near Chico Landing in the northern Sacramento Valley. Approximately 980 miles of levees were constructed as part of the SRFCP, providing flood protection to thousands of acres of highly productive agricultural lands, and multiple cities in the Central Valley, including Sacramento and Marysville. A large area of this regulated system includes both state- and federally authorized projects as the CVFPB has provided assurances of state cooperation to the federal government. This portion of the flood protection system is known as the State Plan of Flood Control (SPFC) (California

Department of Water Resources 2017a). The current flood risk statuses of the Sacramento River and other river systems under the jurisdiction of the SPFC, as well as the statuses of levees and flood control structures in these areas, are fully described in DWR's 2017 Flood System Status Report (California Department of Water Resources 2017b). The levee in the project area is a component of the SRFCP.

3.3.3 Regulatory Setting

3.3.3.1 Federal

The following federal regulations related to hydrology and water quality may apply to implementation of the proposed project.

Clean Water Act Sections 404, 402, 401, and 303(d)

Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the project area contains wetlands or other waters of the United States that qualify for CWA protection.

Section 402

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by the U.S. Environmental Protection Agency (EPA). In California, the State Water Board is authorized by EPA to oversee the NPDES program through the Regional Water Boards. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. A Stormwater Pollution Prevention Plan (SWPPP) and pollution prevention and monitoring program may be required for construction of the proposed project to comply with the Construction General Permit and General Dewatering Permit, respectively, under Section 402.

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]) also must comply with CWA Section 401. In California, the authority to grant water quality certification has been delegated to the State Water Board, and applications for water quality certification under CWA Section 401 typically are processed by the Regional Water Quality Control Boards with local jurisdiction. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States.

Section 303(d) and Total Maximum Daily Loads

In California, the State Water Board develops the list of water quality limited segments; the EPA approves each state's list. Waters on the list do not meet water quality standards, even after point sources of pollution have installed required pollution control technology. Section 303(d) also establishes the TMDL process to improve water quality in listed waterways.

Rivers and Harbors Appropriation Act of 1899

The Rivers and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures across any navigable water, or that place obstructions to navigation outside established federal lines and excavate from or deposit material in such waters. Such activities require permits from USACE.

Section 14

Section 14 (33 U.S. Code [USC] 408) requires approval from the USACE Chief of Engineers, or designee, for alterations to certain public works, including federal project levees, so long as the alteration would not be injurious to the public interest and does not impair the usefulness of the work. Section 408 alterations would include actions that could change the hydraulic capacity of the floodway or change the authorized geometry of the federal project. As described in Chapter 1, *Introduction,* Sacramento River West Side Levee District (SRWSLD) is seeking approval under 33 USC Section 408, supported by an Environmental Assessment that will be prepared for this project under the National Environmental Policy Act.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were intended to reduce the need for large, publicly funded flood risk management structures and disaster relief by restricting development on floodplains. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to subsidize flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues Flood Insurance Rate Maps for communities participating in the NFIP. These maps delineate flood hazard zones in the community. These maps are designed for flood insurance purposes only and do not necessarily show all areas subject to flooding. The maps designate lands likely to be inundated during a 100-year storm event and elevations of the base flood. They also depict areas between the limits affected by 100-year and 500-year events and areas of minimal flooding. These maps often are used to establish building pad elevations to protect new development from flooding effects.

Requirements for Federal Emergency Management Agency Certification

For guidance on floodplain management and floodplain hazard identification, communities turn to FEMA guidelines, as defined in 44 Code of Federal Regulations (CFR) 59 through 77. In order for a levee to be recognized by FEMA under the NFIP, the community must provide evidence demonstrating that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood (1 percent or 100-year flood) exists. These specific requirements are outlined in 44 CFR 65.10, Mapping of Areas Protected by Levee Systems.

U.S. Army Corps of Engineers Levee Design Criteria

The levees included in the proposed project area are federally authorized and fall within the jurisdiction of USACE. The levee evaluation for the proposed project area conforms to the engineering criteria established by USACE for the assessment and remediation of levees.

Executive Order 11988 Floodplain Management

Executive Order 11988 addresses floodplain issues related to public safety, conservation, and economics. The order generally requires that federal agencies constructing, permitting, or funding actions meet the following requirements.

- Avoid incompatible floodplain development.
- Be consistent with the standards and criteria of the NFIP.
- Restore and preserve natural and beneficial floodplain values.

3.3.3.2 State

The following state regulations related to hydrology and water quality may apply to implementation of the proposed project.

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act established the State Water Board and nine Regional Water Boards as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act (and the CWA), the state is required to adopt a water quality control policy and waste discharge requirements to be implemented by the State Water Board and nine Regional Water Boards. The State Water Board also establishes Water Quality Control Plans (Basin Plans) and statewide plans. The Regional Water Boards carry out State Water Board policies and procedures throughout the state. Basin Plans designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses.

Central Valley Regional Water Quality Control Board

The Central Valley Regional Water Quality Control Board is responsible for implementing its Basin Plan (2018) for the Sacramento River and its tributaries. The Basin Plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Basin Plan for several key water quality constituents, including dissolved oxygen, water temperature, trace metals, turbidity, suspended material, pesticides, salinity, radioactivity, and other related constituents.

California Fish and Game Code Section 1602 Streambed Alteration Agreement

Under Chapter 6 of the California Fish and Game Code (CFGC), the California Department of Fish and Wildlife (CDFW) is responsible for the protection and conservation of the state's fish and wildlife resources. Section 1602 et seq. of the code defines the responsibilities of CDFW and requires that public and private applicants obtain an agreement to "divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the CDFW in which there is at any time an existing fish or wildlife resource or from which those resources derive benefit, or will use material from the streambeds designated by the department." A streambed alteration agreement is required under Section 1602 of the CFGC for all activities that involve temporary or permanent activities within state jurisdictional waters.

Central Valley Flood Protection Plan

According to California Government Code Sections 65302.9 and 65860.1, every jurisdiction located within the Sacramento–San Joaquin Valley is required to update its general plan and zoning ordinance in a manner consistent with the Central Valley Flood Protection Plan (CVFPP) within 24 months after the CVFPP's adoption, which occurred on June 29, 2012. In addition, the locations of the state and local flood management facilities, locations of flood hazard zones, and the properties located in these areas must be mapped and consistent with the CVFPP.

Central Valley Flood Protection Board

The CVFPB (formerly the Reclamation Board) of the State of California is the State regulatory agency responsible for ensuring that appropriate standards are met for the construction, maintenance, and protection of the flood control system that protects life, property, and wildlife habitat in California's vast and diverse Central Valley from the devastating effects of flooding. Rules promulgated in Title 23 of the California Code of Regulations (CCR) (Title 23, Division 1, Article 8 [Sections 111–137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season, which is generally November 1 through April 15 for the Sacramento River.

Title 23, CCR Sections 6 and 7 (Title 23, Division 1, Chapter 1, Article 3) stipulate permitting authority to the CVFPB. Section 6(a) outlines the need to obtain a permit from the CVFPB: "Every proposal or plan of work, including the placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduit, fence, projection, fill, embankment, building….that involves cutting into the levee wholly or in part within any area for which there is an adopted plan of flood control, must be approved by the board prior to the commencement of work." Section 7(a) requires that "Prior to submitting an encroachment permit application to the board, the application must be endorsed by the agency responsible for maintenance of levees within the area of the proposed work…."

The following CVFPB guidance has been followed during the levee evaluation:

> The California Reclamation Board has primary jurisdiction approval of levee design and construction. The Reclamation Board standards are found in Title 23, Division 1, Article 8 (Sections 111 through 137) of the CCR, and constitute the primary state standard. Section 120 of the CCR directs that levee design and construction be in accordance with the USACE's Engineer Manual EM 1110-2-1913, Design and Construction of Levees. This document is the primary federal standard applicable to this project, as supplemented by additional prescriptive standards contained in Section 120 of the CCR. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

3.3.3.3 Local

Colusa County General Plan

The Safety Element of the *Colusa County General Plan* (Colusa County 2012) identifies the following goals, objectives, and policies related to flooding hazards and flood protection:

Goal SA-1: Ensure the safety of County residents, businesses, and visitors from hazardous conditions, including natural catastrophes and human-caused emergencies

- Policy SA 1-22: Maintain designated floodways as open space and limit uses to low intensity uses such as agriculture, passive recreation, preservation of vegetation and wildlife habitat, and scenery; provided such uses do not impede floodwaters or pose a threat to public safety.
- Policy SA 1-26: Provide ongoing maintenance of bridges, culverts, railroad trestle structures, and other flood control and storm water conveyance infrastructure to provide for adequate storm water flows.
- Policy SA 1-30: Ensure that construction activities will not result in adverse impacts to existing flood control and drainage structures.
- Policy SA 1-34: Require new structures to be located outside of the 100-year floodplain to the greatest extent feasible. Exceptions may be made for agricultural structures that would not significantly impede flood waters or result in significant water quality impacts during a storm event.
- Policy SA 1-39: Support coordinated efforts to maintain levees along the Sacramento River and adjacent to canals and waterways throughout the County.

The *Colusa County General Plan* Conservation Element (Colusa County 2012) addresses the conservation, development, and utilization of natural resources, including water. The Public Services and Facilities Element of the *Colusa County General Plan* addresses a range of public and utilities services, including water and wastewater (sewer), that are integral to maintaining a high quality of life for Colusa County residents (Colusa County 2012). The following goals, objectives, policies, and action from the *Colusa County General Plan* may apply to the proposed project.

Conservation Element

Goal CON-1: Conserve and protect Colusa County's ecosystem

- Objective CON-1D: Protect surface water quality in the County's lakes, streams, creeks and rivers.
- Policy CON 1-22: Maintain lakes, rivers, streams, creeks, and waterways in a natural state whenever possible. These water features may be actively managed and/or improved or modified in order to function as natural flood protection and storm water management features during storms and flooding events.
- Policy CON 1-23: Protect and enhance streams, channels, seasonal and permanent marshland, wetlands, sloughs, riparian habitat and vernal pools through sound land use planning, community design, and site planning.
- Policy CON 1-28: Support non-regulatory programs for protection of streams and riparian habitat, including education, technical assistance, tax incentives, and voluntary efforts to protect riparian resources.

Colusa County Code

The purpose of Chapter 33, *Flood Damage Prevention,* of the Colusa County Code (Colusa County 2020) is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions. Chapter 33 describes various methods and provisions for reducing flood losses. Chapter 33 also states that a development permit shall be obtained before any construction or other development begins within any area of special flood hazard established in Section 33-3.2.

3.3.4 Environmental Effects

Potential impacts of the proposed project related to hydrology and water quality are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section X, *Hydrology and Water Quality*, asks whether the project would result in any of the following conditions.

a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Impact HYD-1: Degradation of surface water quality

While the proposed project would not have an effect on groundwater quality, it could potentially affect surface water quality. The proposed project would require the construction of a slurry cutoff wall, levee reconstruction, encroachment removal, borrow excavation, placement of rock slope protection, and restoration of the floodplain area. These construction activities would include earth disturbance that could cause erosion and sedimentation in the Sacramento River. Although a substantial portion of the construction would occur on the landside of the existing levee, some activities would occur on the waterside of the levee and, to a very limited extent, in the Sacramento River.

Additionally, the proposed project would involve the storage and use of toxic and other harmful substances, which could result in discharge of these substances to the Sacramento River. Construction activities would involve the use of heavy equipment, cranes, compactors, and other construction equipment that use petroleum products such as fuels, lubricants, hydraulic fluids, and coolants, all of which can be toxic to fish and other aquatic organisms. The use of this equipment could contribute a direct source of contamination if equipment and construction practices were not properly followed. An accidental spill or inadvertent discharge from such equipment could affect the water quality of the river or water body.

Finally, the use of bentonite materials (e.g., the construction of slurry walls) could potentially result in the accidental release of bentonite (which is used in excavation and tunneling activities), which would degrade surface water quality. These impacts are potentially significant.

A SWPPP, which would be implemented as a requirement of the NPDES Construction General Permit, is targeted at reducing or eliminating erosion and sedimentation effects. The SWPPP would include erosion control measures to ensure that the land disturbance activities do not cause erosion that would increase sediment in the Sacramento River. Site-specific erosion control measures would be developed as part of a SWPPP, which typically contains, but is not limited to, the following BMPs.

- **Timing of construction**. The construction contractor will conduct all construction activities during the typical construction season to avoid ground disturbance during the rainy season.
- **Staging of construction equipment and materials**. To the extent possible, equipment and materials will be staged in areas that have already been disturbed.
- **Minimizing of soil and vegetation disturbance**. The construction contractor will minimize ground disturbance and the disturbance/destruction of existing vegetation. This will be

accomplished in part through the establishment of designated equipment staging areas, ingress and egress corridors, and equipment exclusion zones prior to the commencement of any grading operations.

- **Stabilizing of grading spoils**. Grading spoils generated during construction will be temporarily stockpiled in staging areas. Silt fences, fiber rolls, or similar devices will be installed around the base of the temporary stockpiles to intercept runoff and sediment during storm events. If necessary, temporary stockpiles may be covered with an appropriate geotextile to increase protection from wind and water erosion.
- **Installation of sediment barriers**. The construction contractor may install silt fences, fiber rolls, or similar devices to prevent sediment-laden runoff from leaving the construction area.
- **Stormwater drain inlet protection**. The construction contractor may install silt fences, drop inlet sediment traps, sandbag barriers, and similar devices.
- **Permanent site stabilization**. The construction contractor will install structural and vegetative methods to permanently stabilize all graded or otherwise disturbed areas once construction is complete. Structural methods may include the installation of biodegradable fiber rolls and erosion control blankets. Vegetative methods may involve the application of organic mulch and tackifier and/or the application of an erosion control seed mix. Implementation of a SWPPP will substantially minimize the potential for project-related erosion and associated adverse effects on water quality.

In addition to the SWPPP, Mitigation Measures HYD-MM-1, -2, -3, and -4 would be implemented to minimize potential effects associated with potential spills, disturbance of soils, turbidity, and bentonite spills, respectively. Implementation of these mitigation measures would reduce this impact to less than significant.

Mitigation Measure HYD-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan

SRWSLD or its contractor will develop and implement a spill prevention, control, and countermeasure plan (SPCCP) to minimize the potential for and effects from spills of hazardous, toxic, and petroleum substances during construction and operation activities, as well as minimize the effects of unearthing previously undocumented hazardous materials. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with state and federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that will be taken in the event of a spill (e.g., an oil spill from engine refueling will be cleaned up immediately with oil absorbents) or the exposure of an undocumented hazard. The SPCCP will outline descriptions of containment facilities and practices such as double-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures, and spill response kits. It also will describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

SRWSLD will review and approve the SPCCP before onset of construction activities and routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. SRWSLD will notify its contractors immediately if there is a non-compliance issue and will require compliance.

If a spill is reportable, the contractor's superintendent will notify SRWSLD, and SRWSLD will ensure that the SPCCP is followed. A written description of reportable releases must be submitted to the CVRWQCB and the Department of Toxic Substances Control. This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.

Mitigation Measure HYD-MM-2: Implement Construction Best Management Practices

SRWSLD will require the construction contractor to implement appropriate BMPs that will be utilized to avoid or minimize impacts on water quality. Such BMPs will include, but not be limited to, the following.

- **Staging of construction equipment and materials**. To the extent possible, equipment and materials will be staged in areas that have already been disturbed.
- **Minimizing of soil and vegetation disturbance**. The construction contractor will minimize ground disturbance and the disturbance/destruction of existing vegetation. This will be accomplished, in part, through establishing designated equipment staging areas, ingress and egress corridors, equipment exclusion zones prior to the commencement of any grading operations, and protection of existing trees.
- **Installation of silt fences**. The construction contractor will install silt fences to prevent sediment-laden water from leaving the construction area.

Mitigation Measure HYD-MM-3: Turbidity Monitoring

SRWSLD or its contractor will monitor turbidity in the Sacramento River during in-water construction to determine whether turbidity is being affected by construction and ensure that construction does not affect turbidity levels, which ultimately increase the sediment loads.

The *Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Fifth Edition)* (Central Valley Regional Water Quality Control Board 2018) contains turbidity objectives. Specifically, the plan states that where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2 NTUs; where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU; where natural turbidity is between 5 and 50 NTUs, turbidity levels may not be elevated by 20 percent above ambient conditions; where ambient conditions are between 50 and 100 NTUs, conditions may not be increased by more than 10 NTUs; and where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

When water is flowing through the project site, monitoring will continue approximately 1,000 feet downstream of construction activities to determine whether turbidity is being affected by construction. Grab samples will be collected at a downstream location that is representative of the flow near the construction site. If there is a visible sediment plume being created from construction, the sample would represent this plume. Monitoring will occur hourly during the placement of riprap, and once a week on a random basis during the remaining construction period.

If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities will slow to a point that would alleviate the problem. SRWSLD will notify the Regional Water Board of the issue immediately and provide an explanation of the cause.

Mitigation Measure HYD-MM-4: Implement a Bentonite Slurry Spill Contingency Plan

Before excavation begins, SRWSLD will ensure that the contractor will prepare and implement a bentonite slurry spill contingency plan (BSSCP) for any excavation activities that use pressurized fluids (other than water). If the contactor prepares the plan, it will be subject to approval by USACE, the National Marine Fisheries Service (NMFS), and SRWSLD before excavation can begin. The BSSCP will include measures intended to minimize the potential for a frac-out (short for *fracture-out event*) associated with excavation and tunneling activities; provide for the timely detection of frac-outs; and ensure an organized, timely, and *minimum-effect* response in the event of a frac-out and release of excavation fluid (i.e., bentonite). The BSSCP will require, at a minimum, the following measures.

- If a frac-out is identified, all work will stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out will be determined, and the frac-out will be monitored for 4 hours to determine whether the fluid congeals (bentonite usually hardens, effectively sealing the frac-out location).
- NMFS, CDFW, and the Regional Water Board will be notified immediately of any spills and will be consulted regarding cleanup procedures. A Brady barrel will be onsite and used if a frac-out occurs. Containment materials, such as straw bales, also will be onsite prior to and during all operations and a vacuum truck will be on retainer and available to be operational onsite within notice of 2 hours. The site supervisor will take any necessary follow-up response actions in coordination with agency representatives. The site supervisor will coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.
- If the frac-out has reached the surface, any material contaminated with bentonite will be removed by hand to a depth of 1 foot, contained, and properly disposed of, as required by law. The drilling contractor will be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.
- If the bentonite fluid congeals, no other actions, such as disturbance of the streambed, will be taken that would potentially suspend sediments in the water column.
- The site supervisor has overall responsibility for implementing this BSSCP. The site supervisor will be notified immediately when a frac-out is detected. The site supervisor will be responsible for ensuring that the biological monitor is aware of the frac-out and for coordinating personnel, response, cleanup, regulatory agency notification, and coordination to ensure proper cleanup, disposal of recovered material, and timely reporting of the incident. The site supervisor will ensure that all waste materials are properly containerized, labeled, and removed from the site to an approved Class II disposal facility by personnel experienced in the removal, transport, and disposal of drilling mud.
- The site supervisor will be familiar with the contents of the BSSCP and the conditions of approval under which the activity is permitted to take place. The site supervisor will have the authority to stop work and commit the resources (personnel and equipment) necessary

to implement the BSSCP. The site supervisor will ensure that a copy of the BSSCP is available (onsite) and accessible to all construction personnel. The site supervisor will ensure that all workers are properly trained and familiar with the necessary procedures for response to a frac-out, prior to commencement of excavation operations.

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The proposed project will not use groundwater as a part of construction or operation, so will not affect groundwater supplies from a usage perspective. Effects on groundwater recharge are considered here in relation to installation of the slurry cutoff wall and the potential for the cutoff wall to block lateral water transfer from the river to the aquifer. Less water available to the aquifer could potentially affect recharge. The proposed project's feasibility study, the Town of Grimes Flood Risk Reduction Feasibility Study (Colusa County and California Department of Water Resources 2019), summarized geotechnical conditions, including data from previous subsurface explorations. The subsurface conditions and connectivity between the river channel and the aquifer are varied and range in depth up to hundreds of feet. The proposed project entails a relatively shallow cutoff wall (less than 40 feet in depth) that would be installed through the levee and would provide a positive cutoff to prevent piping in the pervious sand layer underlying the levee embankment. The distance of the proposed slurry wall below the surrounding grade is even less than the approximately 40 feet. As previously described, DWR calculated groundwater storage capacity in the subbasin at 13,025,887 acre-feet to a depth of 200 feet (California Department of Water Resources 2003). The limited linear extent and shallow depth of the slurry cutoff wall in relation to the size of the adjacent aquifer indicates that it will have negligible effects on the recharge of the aquifer. As a result, the proposed project will not interfere substantially with groundwater recharge or impede sustainable groundwater management of the basin. The effect on groundwater is considered less than significant. No mitigation is required.

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 that would:

1. Result in substantial erosion or siltation on or off site?

Impact HYD-2: Site Erosion

Ground-disturbing activities that would occur during project construction would result in minor alterations to the right bank of the Sacramento River. The levee degrade would be reconstructed in a single season and compacted to meet engineering standards. The placement of rock slope protection is specifically intended to control potential erosion along the riverbank. The borrow area and floodplain restoration has the potential to result in erosion and siltation during and after construction. The borrow area would be designed with gentle slopes that would diffuse the erosive power of sheet flows running off the floodplain area and further reduce the potential for erosion. This impact is potentially significant. Implementation of the SWPPP and Mitigation Measures HYD-MM-1, -2, and -3 would minimize erosion or siltation on and off site. Therefore, this impact is less than significant with mitigation.

2. Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site?

The proposed project would not substantially increase the rate or amount of surface runoff. The modification of the levee, including installation of the slurry cutoff wall, would in no way affect surface runoff. The levee structure would be effectively the same as under existing conditions with regard to surface runoff. Similarly, the borrow areas would not increase surface runoff. The waterside borrow area and associated riparian habitat improvements on the lowered floodplain surface would actually have an incremental effect of slowing runoff. While this effect would be slight, it would be beneficial. Under all of these circumstances, runoff would not result in flooding onsite or offsite beyond what the floodway is designed to accommodate. There would be no impact.

3. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The proposed project would not alter the capacity of existing or planned stormwater drainage systems. In addition, the proposed project would not provide substantial additional sources of polluted runoff, and all disturbed areas would be treated and/or revegetated to prevent soil erosion. Therefore, there would be no impact.

4. Impede or redirect flood flows?

The proposed project would increase the reliability of the existing levee through installation of the slurry cutoff wall and rock slope protection. Neither of these project elements would impede or redirect flood flows. The waterside borrow location would intentionally lower the elevation of the floodplain, allowing it to be inundated more often. The floodplain is within the regulated floodway and between the flood control levees and all flood flows would remain within the floodway (i.e., the Sacramento River).

The goal of the final restoration design would be to increase river–floodplain connectivity and restore ecologically functional floodplain habitat consistent with the flood-risk reduction goals of the proposed project. Hydrodynamic, geomorphic, and ecological considerations will be addressed during the final planning and design process. Future studies will determine the expected flooding regime (inundation extent, frequency, duration), hydraulic conditions (depths and velocities), and ecological benefits (habitat quantity and quality) of the final design.

Based on preliminary investigations, the restored floodplain surface would be completely or partially inundated during a 2-year-recurrence interval river discharge. Portions of the floodplain would be lowered to increase floodplain inundation area and duration and create planting surfaces that would support native riparian and wetland vegetation communities. Floodplain elevations and grading patterns would be designed to result in complete drainage and dewatering of the lowered floodplain area as seasonal flows recede. These characteristics are expected to result in a substantial direct beneficial effect to native fishes and overall productivity of the river-floodplain system in this portion of the Sacramento River. As a result, changes in flow would be minimal and localized and are considered less than significant. No mitigation is required.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The proposed project would slightly alter the contours of the riverbanks at the project site but would not involve alterations that would increase susceptibility of surrounding communities to inundation by seiches, tsunamis, or mudflows, and would not risk release of pollutants as a result of subsequent inundation. The proposed project is intended to reduce flood hazards resulting from high flows in the Sacramento River. Therefore, there would be no impact.

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

As previously described, the proposed project would comply with the applicable regional water quality control plan during construction. Operation of the proposed project would not differ from current conditions and would not influence implementation of the water quality control plan. Similarly, the previously described negligible effect on groundwater recharge would not result in any conflict or obstruct implementation of a sustainable groundwater management plan. Therefore, there would be no impact.

3.4 Geology and Soils

3.4.1 Introduction

This section analyzes the proposed project's potential impacts related to geology and soils. It describes existing conditions in the project area and summarizes the overall regulatory framework for geology and soils, and it analyzes the potential for the proposed project to affect these resources.

3.4.2 Existing Conditions

The project area is in the central portion of the Sacramento Valley within California's Great Valley geomorphic province (California Geological Survey 2016). Grimes is located within the north-central portion of this approximately 50-mile-wide and 400-mile-long province. The Great Valley province is an archetypal forearc basin bounded by the Sierra Nevada magmatic arc to the east and the Coast Ranges of the Franciscan subduction complex to the west. The Klamath Mountains and Cascade Range delineate the northern boundary of the province. The basin is a broad, elongated, northwest-trending structural trough that formed as a result of the subduction of the Farallon plate beneath the North American plate during the Nevadan Orogeny (155 to 145 million years ago [Ma]) (Schweickert et al. 1984).

The formation of the forearc basin created a moderately deep, marine depositional environment that was subsequently infilled with sediments, forming the Great Valley Sequence (150 to 65 Ma) (Staton and Spangler 2014). Fine-grained sediments settled out of the water in the ancient seaway, forming the shale units of the sequence (Staton and Spangler 2014). Erosion following the uplift of the ancestral Sierra Nevada range produced volcanic-derived sediments that were transported into the marine basin and deposited as sandstone and conglomerate units of the sequence (Staton and Spangler 2014). Within the project area, the Great Valley Sequence is up to 8,000 feet thick, overlying Coast Range Ophiolite and oceanic basement (Staton and Spangler 2014).

Transgression and regression of the seaway during the Eocene epoch (56 to 40 Ma) led to the deposition of marine sedimentary valley fill (Graymer et al. 2002). These valley fill deposits are composed of interbedded shale and sandstone units with carbonaceous interbeds containing lignite and coal (Graymer et al. 2002). Within the area, several thousand feet of valley fill overlie the Great Valley Sequence (Staton and Spangler 2014).

The local geology was mapped by Helley and Harwood (1985) and Saucedo and Wagner (1992). They mapped the project area as alluvial deposits (Qa, Holocene) with surrounding basin deposits (Qb, Holocene). Qa deposits are composed of unweathered gravel, sand, and silt deposited by present-day fluvial systems. Qb deposits consist of fine-grained soils (silt and clay), deposited contemporaneously with Qa, but generally deposited further away from the river than the coarser alluvium. Thickness of these deposits varies from 3 to 6 feet to more than 190 feet. Stream channel deposits (Qsc, Holocene) are mapped along the Sacramento River to outline the right and left bank boundaries of the active channel. These deposits are unweathered, light tan and gray, and can have a thickness of up to 82 feet.

Deformation associated with Cretaceous (145 to 66 Ma) accretion of the Franciscan Complex produced northeast-southwest striking tectonic structures within the project area (Graymer et al.

2002). These structures include faults, such as the Willows Fault Zone located east of the project area, and related large-scale folds, such as the Zamora Syncline also located east of the project area. Younger, north-northwest striking structures in the region are associated with the transpressional plate margin (Graymer et al. 2002).

The project area is in a region of California characterized by relatively low seismic activity (California Geological Survey 2016). The project area is not located in an Alquist-Priolo Earthquake Fault Zone (Bryant and Hart 2007; California Geological Survey 2015), and no active faults have been identified in the project area (California Geological Survey 2010); therefore, the risk of surface fault rupture is considered low. The nearest fault is the Dunnigan Hills Fault (not considered an active fault, but a late Quaternary fault that has experienced displacement during the past 700,000 years) located approximately 12 miles southwest of the project area (California Geological Survey 2010). The nearest active fault (i.e., showing evidence of surface displacement during Holocene epoch [the past 11,700 years]) is an unnamed fault (most likely associated with the Dunnigan Hills Fault), approximately 5 miles west of the Dunnigan Hills Fault (California Geological Survey 2010). The nearest major active fault to the project area is the Hunting Creek Fault, located in the far northwestern portion of Yolo County (California Geological Survey 2010).

The soils in the project area have been mapped by the U.S. Natural Resources Conservation Service (California Soil Resource Laboratory 2016). The soil survey mapping identified four map units in the project area: Scribner silt loam, Colusa loam, Vina loam, and Vina loam with silt loam substratum. Scribner silt loam is poorly drained, while Colusa loam is somewhat poorly drained. Both types of Vina loam are well drained. The parent material for all four types is alluvium, and the potential erosion hazard is slight. The Scribner silt loam, Vina loam, and Vina loam with silt loam substratum are all considered to have low shrink-swell potential. The Colusa loam is considered to have moderate shrink-swell potential.

3.4.3 Regulatory Setting

3.4.3.1 Federal

Clean Water Act

The Clean Water Act (CWA) is also discussed in Section 3.3*, Hydrology and Water Quality*. However, because CWA Section 402 is directly relevant to soil erosion, additional information is provided here.

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. In California, the California State Water Resources Control Board (State Water Board) has been designated by the U.S. Environmental Protection Agency to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated the specific responsibilities for the development and enforcement actions to the Regional Water Quality Control Boards. The study area is located within Region 5, the jurisdictional area of the Central Valley Regional Water Quality Control Board.

Under Section 402, dischargers whose projects would disturb at least 1 acre of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the NPDES Construction General Permit (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ).

Construction activity subject to this permit includes clearing, grading, and other ground disturbances, such as soil stockpiling and excavation.

Obtaining coverage under the Construction General Permit requires the preparation, submittal, and implementation of a site-specific Surface Water Pollution Prevention Plan (SWPPP) by a Qualified SWPPP Developer (QSD). The SWPPP and other Permit Registration Documents must be submitted to the State Water Board. The SWPPP must identify an effective combination of soil erosion and sediment control measures, as well as non-stormwater best management practices (BMPs). The Construction General Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases, sampling of water quality parameters.

Section 402 applies to the proposed project because the area of soil disturbance will be 1 acre or more.

3.4.3.2 State

Alquist-Priolo Earthquake Fault Zoning Act of 1972

The Alquist-Priolo Earthquake Fault Zoning Act, passed in 1972, required the establishment of earthquake fault zones (known as Special Studies Zones prior to January 1, 1994) along known active faults in California. Its main purposes are to identify known active faults in California and to prevent the construction of buildings used for human occupancy on the surface trace of active faults. For the purpose of this act, a fault is considered active if it displays evidence of surface displacement during the Holocene (approximately during the last 11,000 years). The proposed project would not involve construction of buildings used for human occupancy, but the analysis considers locations of faults.

3.4.3.3 Local

Colusa County General Plan

The Safety Element of the *Colusa County General Plan* (Colusa County 2012:12-3 and 12-4) contains an objective to identify and mitigate a range of natural and human-caused hazards that may pose a risk to life and property in the county, including seismic and geologic hazards. The policies are primarily directed to ensuring that proper geotechnical engineering studies are conducted for proposed projects and that projects are designed to avoid or reduce the potential for damage to structures and facilities caused by geologic and seismic hazards (Policies and Actions SA 1-7, SA 1-9, SA 1-13, SA 1-14 through 1-19, SA 1-21, SA 1-F, SA 1-H, SA 1-J, and SA 1-K).

3.4.4 Environmental Effects

Potential impacts of the proposed project related to geology and soils are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section VII, *Geology and Soils*, asks whether the project would result in any of the following conditions.

a. ***Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:***

1. ***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.

The proposed project would not expose people to the rupture of an earthquake fault, as there are no known faults in proximity to the project footprint. There would be no impact.

2. Strong seismic ground shaking?

The proposed project would not expose people to seismic ground shaking, as there are no known faults in proximity to the project footprint and the area has a low potential for seismic ground shaking. Additionally, potential impacts associated with ground shaking would be minimized because the Sacramento River West Side Levee District would be required to construct the slurry cutoff wall to conform to engineering criteria established by the U.S. Army Corps of Engineers (USACE) for the remediation of flood risk-reduction structures. The other project features, including borrow areas, rock slope protection, and utility replacements would also have to meet applicable engineering standards. There would be no impact.

3. Seismic-related ground failure, including liquefaction?

The proposed project would not expose people to seismic-related ground failure, as no structures intended for human occupancy would be built as part of the proposed project. Additionally, there is a low potential for seismic ground shaking and, therefore, liquefaction. There would be no impact.

4. Landslides?

The potential for landslides to occur is low in the Sacramento Valley, including in the project area, where the slopes are shallow. There would be no impact.

b. Result in substantial soil erosion or the loss of topsoil?

Grading and removal of vegetative cover associated with construction activities could temporarily increase erosion. However, construction would occur during the dry season, and disturbed areas would be reseeded prior to the following wet season. Furthermore, a SWPPP would be developed by a Qualified SWPPP Developer and implemented before and during construction. The SWPPP would include details of how the erosion and sediment control practices (i.e., BMPs) would be implemented. This impact is less than significant, and no mitigation is required.

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 an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

The geologic units within the project area have little topographical variation other than the levee slope, which could be considered unstable due to seepage concerns. However, construction of the slurry cutoff wall and placement of the rock slope protection would stabilize the project area by reducing the potential for through- and under-seepage. While some of the soils in the project area have moderate shrink-swell potential, these soils are in the area of borrow and the slurry cutoff wall would be designed and constructed to conform to USACE engineering criteria. As a result, the proposed project would not create a substantial risk to life or property. There would be no impact.

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?

The constructed project features, including the slurry cutoff wall, will be constructed on soils with a low linear extensibility, or shrink-swell potential. Some soils from a borrow area have a moderate linear extensibility. These soils are not considered expansive, and they will be used in a manner that conforms to USACE engineering criteria. As a result, the proposed project would not create a substantial risk to life or property. There would be no impact.

e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?

The project does not include any septic tanks or alternative wastewater disposal systems and would not dispose of wastewater in areas where soils are incapable of receiving wastewater. There would be no impact.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

There are no known paleontological resources or unique geologic features in the project area. There would be no impact.

3.5 Biological Resources

3.5.1 Introduction

This section analyzes the proposed project's potential impacts related to biological resources. It describes existing conditions in the project area and summarizes the overall regulatory framework for biological resources, and it analyzes the potential for the proposed project to affect these resources.

3.5.2 Existing Conditions

3.5.2.1 Study Area

The approximately 236-acre study area is located along approximately 1.5 miles of the west levee of the Sacramento River adjacent to the community of Grimes in Colusa County. The study area for the biological resources analysis encompasses the proposed project construction area; proposed temporary construction access, staging, and storage areas; and a surrounding buffer of up to 200 feet (Figure 3.5-1). This area is within the Grimes and Tisdale Weir U.S. Geological Survey (USGS) 7.5-minute quadrangles and is relatively flat, with elevations ranging from approximately 30 to 50 feet above mean sea level.

Land use in the levee part of the study area is primarily open space on the Sacramento River west bank levee, abutting agricultural lands and developed areas in the town of Grimes and along State Route (SR) 45. The proposed borrow site is entirely agricultural land that is currently fallow.

3.5.2.2 Land Cover Types

The 11 land cover types mapped in the study area are cottonwood riparian forest, willow riparian scrub, valley oak woodland, ruderal annual grassland, agriculture (actively cultivated and fallow), seasonal wetland, ditch, perennial stream, landscaped, orchard, and unvegetated/developed. Each of these land cover types is discussed below and shown in Figure 3.5-1. A list of the plant species observed during the three site visits is included in Appendix B, *List of Plant Species Observed in the Study Area.*

Of the land cover types in the study area, cottonwood riparian forest, willow riparian scrub, and valley oak woodland would be considered sensitive natural communities. Seasonal wetland and perennial stream are waters of the United States and/or waters of the state. Sensitive natural communities and waters of the United States and waters of the state are regulated by state and/or federal agencies and protected under policies in the *Colusa County General Plan* (see Section 3.5.3, *Regulatory Setting,* below).

Cottonwood Riparian Forest

Cottonwood riparian forest occurs on the waterside of the levee along the Sacramento River and within the floodplain at the north end of the study area. Dominant tree species in the riparian forest include Fremont cottonwood (*Populus fremontii*), box elder (*Acer negundo*), valley oak (*Quercus lobata*), and California sycamore (*Platanus racemosa*). California wild grape (*Vitis californica*) grows into the forest canopy, and understory shrub species include Himalayan blackberry (*Rubus armeniacus*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), poison oak (*Toxicodendron diversilobum*), and narrowleaf willow (*Salix exigua*). Black locust (*Robinia pseudoacacia*), an invasive species, also occurs in the riparian forest. Annual grasses and native and nonnative forbs, such as mugwort (*Artemisia douglasiana*), cleavers (*Galium aparine*), dock (*Rumex conglomeratus*, *R. crispus*), and vetch (*Vicia americana*, *V. sativa*, *V. villosa*) also grow in the riparian forest.

Invertebrates, amphibians, and aquatic reptiles live in aquatic and adjacent upland habitats. Raptors, herons, egrets, and other birds nest in the upper canopy. A variety of songbirds use the shrub canopy, and cavity-nesting birds, such as Nuttall's woodpecker (*Picoides nuttallii*) and oak titmouse (*Baeolophus inornatus*), occupy dying trees and snags (Zeiner et al. 1990a:388, 472). Several mammals including raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*) are common in riparian forest habitats (Zeiner et al. 1990b:2, 298, 316). The cottonwood riparian forest at the edge of the Sacramento River functions as shaded riverine aquatic (SRA) cover for fish species. Overhanging vegetation is a form of SRA cover that creates shade necessary to reduce water temperatures and provides fallen leaves and insects that are a food source for fish. SRA cover also provides fish with protection from predators in the form of undercut banks and submerged branches, roots, and logs.

Willow Riparian Scrub

Willow riparian scrub occurs along the steep banks of the Sacramento River in the north part of the study area. The riparian scrub is a dense stand of narrowleaf willow.

Willow riparian scrub provides cover, a place to escape, and nesting substrate for a variety of animals. Songbirds perch and nest in the woody vegetation and other birds may use the emergent vegetation for cover and nesting (Zeiner et al. 1990a:176, 638). Willow riparian scrub also functions as SRA cover, as described above for cottonwood riparian forest.

Valley Oak Woodland

Valley oak woodland occurs on the landside of the levee in several locations—at the north end of the study area adjacent to an agricultural ditch, on the north side of 2nd Street, and at the south end of the study area between the levee and SR 45. Valley oak is the only tree in this woodland. Understory species are primarily annual grasses.

Oak woodlands are important habitats because of their high value to wildlife in the form of nesting sites, cover, and food (California Department of Fish and Wildlife 2022a). Birds associated with oak woodlands include acorn woodpecker (*Melanerpes formicivorus*), California scrub jay (*Aphelocoma californica*), yellow-billed magpie (*Pica nuttalli*), and many warblers and flycatchers (Zeiner et al. 1990a:376, 452, 460). Cavities in oak trees are important nesting sites for acorn woodpecker, oak titmouse, Bewick's wren (*Thryomanes bewickii*), and western bluebird (*Sialia mexicana*) (California Partners in Flight 2002:24). Oak woodlands provide nesting sites and/or foraging habitat for raptors, such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), and great-horned owl (*Bubo virginianus*) (Zeiner et al. 1990a:132, 136, 326; California Partners in Flight 2002:24). Acorns are an important food source for species such as California quail (*Callipepla californica*), wild turkey (*Meleagris gallopavo*), western gray squirrel (*Sciurus griseus*), and mule deer (*Odocoileus hemionus*)(California Department of Fish and Wildlife 2022a).

Ruderal Annual Grassland

The ruderal annual grassland areas occur on the levee slopes, within the floodplain, and in disturbed areas of the study area. These areas are dominated by nonnative annual grasses and herbs with some natives present. Areas of ruderal annual grassland occur on the levee slope and on undeveloped areas between the levee and roads. Dominant species include upland annual grasses, such as wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), and foxtail barley (*Hordeum murinum*); grasses that are facultative wetland species, such as perennial ryegrass (*Festuca perennis*); and native and nonnative forbs, such as common fiddleneck (*Amsinckia intermedia*), big heron bill (*Erodium botrys*), field bindweed (*Convolvulus arvensis*), smooth cats ear (*Hypochaeris glabra*), hoary mustard (*Hirschfeldia incana*), and alkali mallow (*Malvella leprosa*).

Reptiles that occur in annual grassland habitats include western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and Northern Pacific rattlesnake (*Crotalus oreganus oreganus*). Grasslands provide foraging habitat for wide-ranging species such as red-tailed hawk, turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*). Mammals typically found in this habitat include California vole (*Microtus californicus*), California ground squirrel (*Otospermophilus beecheyi*), and coyote (*Canis latrans*) (California Department of Fish and Wildlife 2022a). In addition, many species that nest or roost in open woodlands, including western bluebird, western kingbird (*Tyrannus verticalis*), and some species of bats, may forage in associated grasslands (Zeiner et al. 1990a:428, 510; 1990b).

Agriculture and Fallow Agriculture

The agriculture land cover type includes a field used for row crops at the north end of the study area and a fallow field on the east side of SR 45 in the proposed borrow area. At the time of the site visit, the row crop field was in preparation for planting and the fallow field supported nonnative annual grasses and native and nonnative forbs, including Italian rye grass (*Lolium multiflorum*), soft chess, meadow barley (*Hordeum brachyantherum*), burclover (*Medicago polymorpha*), mustard, and common tarweed. One seasonal wetland, described below, occurs within the fallow field. Wildlife species and habitat use for fallow agriculture are similar to those described for ruderal annual grassland. Wildlife species that may be associated with row crops include mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), Brewer's blackbird (*Euphagus cyanocephalus*), raptors, egrets, and rodents.

Seasonal Wetland

One seasonal wetland occurs in the study area within the fallow agricultural field within the offsite borrow area. The wetland supports common tarweed, common toad rush (*Juncus bufonius*), and Italian rye grass, similar to other parts of the field, but additionally exhibited indicators of hydric soils and wetland hydrology. Due to the lack of pooling water and the regular disturbance regime of this seasonal wetland, wildlife species and habitat use for the seasonal wetland are similar to those described for ruderal annual grassland.

Ditch

Ditches in the study area are earth-lined, primarily unvegetated, constructed channels used for irrigation or drainage of agricultural fields and roadside drainages along SR 45. There are three irrigation ditches within the delineation area. The northern irrigation ditch consists of a soft, earthen bank with no vegetation. This ditch held water during the site visit on April 1, 2022. The irrigation ditch to the south is located west of SR 45 along an orchard and is a similar feature, constructed of an earthen bank with sparse annual grasses along the edge of SR 45. The irrigation ditch at the west end of the offsite borrow area also has an earthen bank and held water during the April site visit. Part of this feature supported cattail (*Typha* sp.), and it meets the vegetation density requirement (greater than 30 percent cover) to be considered a wetland. However, because the vegetation is regularly cleared as part of farming operations, the feature is not considered a wetland. There are additional irrigation ditches outside of the delineation area but within the study area (Figure 3.5-1). These ditches are constructed of earthen banks with sparse, short, ruderal grasses.

Wildlife use of ditches is dependent on several factors including the extent of vegetation in and along the ditch, the period of time that water remains in the ditch, and the velocity of flow. Ditches with vegetation in the channel and along the banks and an adequate inundation period can provide food, water, cover, and dispersal corridors for various wildlife species such as Sierran treefrog (*Pseudacris sierra*), California newt (*Taricha torosa*), great egret (*Ardea alba*), raccoon, and striped skunk. The banks of ditches could be used by California ground squirrel and western fence lizard.

Perennial Stream

The Sacramento River is the perennial stream in the study area. Perennial streams with adjacent riparian or emergent wetland vegetation provide food, water, and migration and dispersal corridors, as well as escape, nesting, and thermal cover for a variety of wildlife and fish species. The open water areas of large rivers and creeks provide resting and escape cover for many species of waterfowl and other waterbirds. Insectivorous birds, such as swallows, swifts, and flycatchers, catch insects over open water areas. The river shore and shallow water areas provide foraging opportunities for waterfowl, herons, and shorebirds. (California Department of Fish and Wildlife 2022a). Other wildlife species that may use the riverine habitat or associated riparian habitat include western pond turtle (*Actinemys marmorata*) (Zeiner et al. 1988:100), river otter (*Lontra canadensis*), raccoon, and striped skunk (Zeiner et al. 1990b:298, 316, 318).

Landscaped

In the study area, residential backyards in Grimes and the Grimes Boat Landing and RV Park support landscaped land cover. This land cover type includes primarily nonnative and horticultural species, such as incense cedar (*Calocedrus decurrens*), cypress (*Cupressus* sp.), and mulberry (*Morus alba*), with fewer native species, such as Fremont cottonwood and valley oak. Trees within landscaped areas provide a location where animals can escape, nest, and obtain thermal cover. Common and special-status birds may perch or nest in stands of nonnative woodland. Common mammals, such as raccoon, Virginia opossum, and striped skunk, may take cover in nonnative woodlands. Foliage-roosting bat species may roost in the foliage of nonnative woodland trees.

Orchard

Two areas of orchard occur in the study area: an almond orchard on the south side of SR 45 and a patch of walnut orchard at the southern tip of the study area. The orchards support minimal understory of nonnative annual grasses and forbs.

Orchards are typically planted on deep fertile soils that supported diverse and productive natural habitats in the past. Orchards can provide shade or water, if irrigated, for wildlife. Deer may browse on orchard trees. Orchards may provide cover and nesting sites for various species of birds, including mourning dove and California quail. California ground squirrels may feed on nuts in

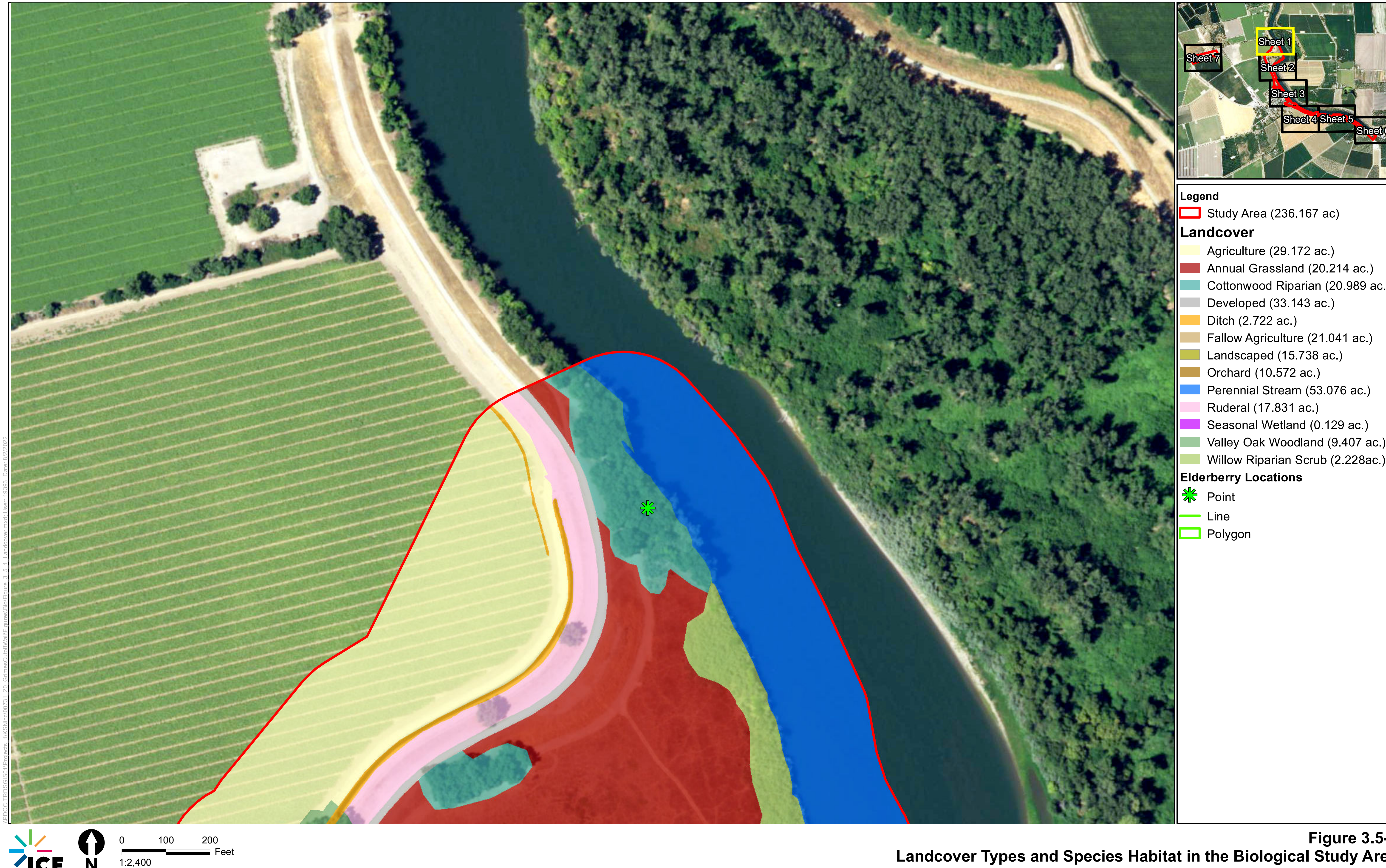

Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 1

ICF

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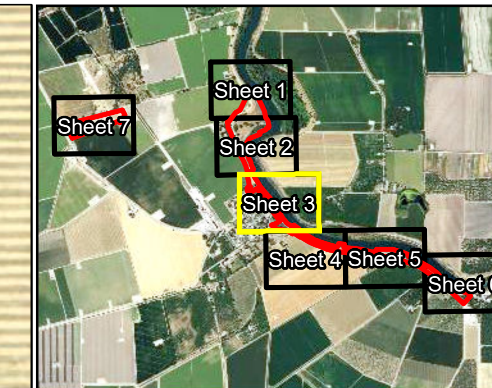
1:2,400

Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 2



Legend

Study Area (236.167 ac)

Landcover

- Agriculture (29.172 ac.)
- Annual Grassland (20.214 ac.)
- Cottonwood Riparian (20.989 ac.)
- Developed (33.143 ac.)
- Ditch (2.722 ac.)
- Fallow Agriculture (21.041 ac.)
- Landscaped (15.738 ac.)
- Orchard (10.572 ac.)
- Perennial Stream (53.076 ac.)
- Ruderal (17.831 ac.)
- Seasonal Wetland (0.129 ac.)
- Valley Oak Woodland (9.407 ac.)
- Willow Riparian Scrub (2.228ac.)

Elderberry Locations

- Point
- Line
- Polygon

ICF

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1:2,400

Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 3

ICF

N

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Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 4

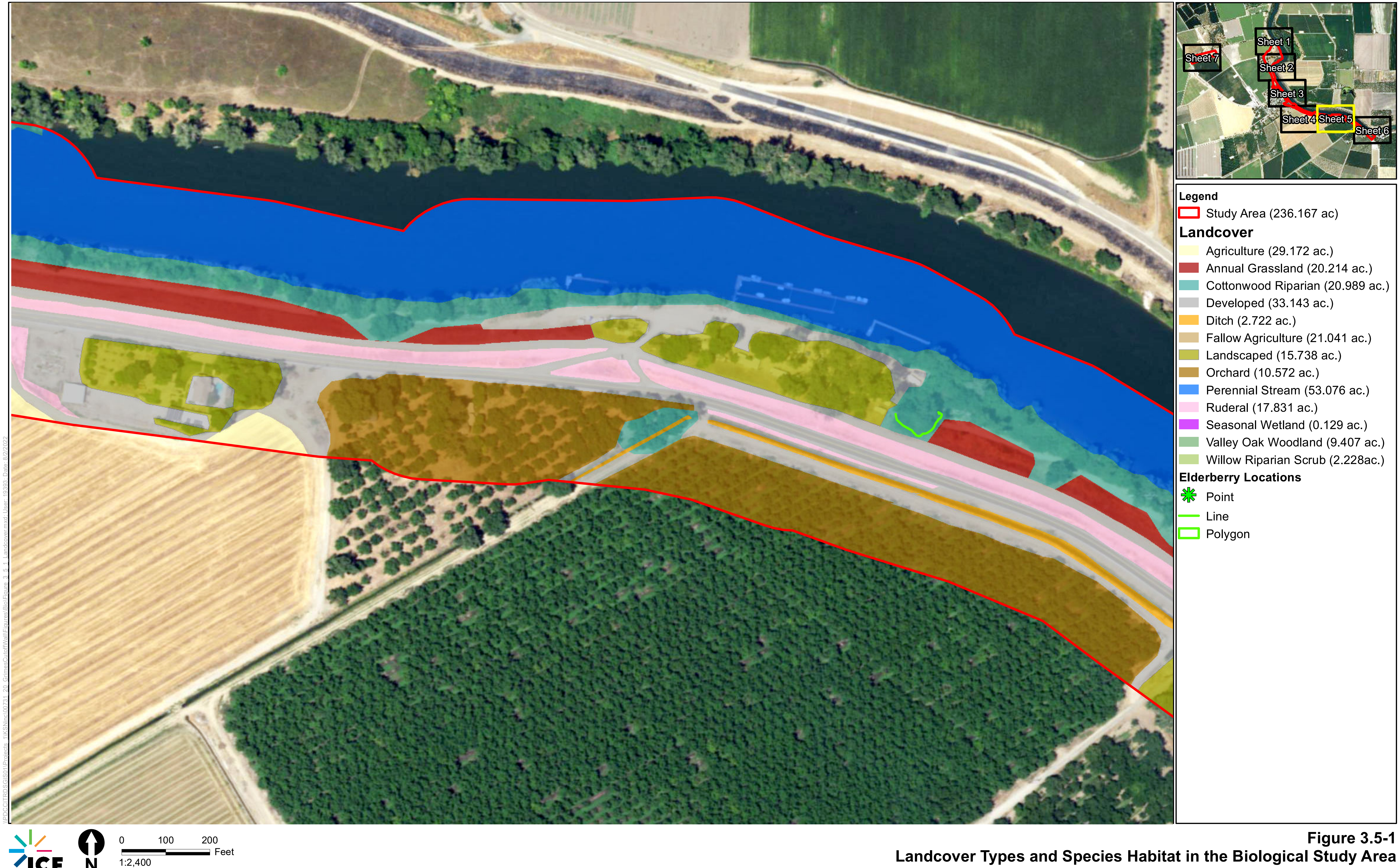

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Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 5

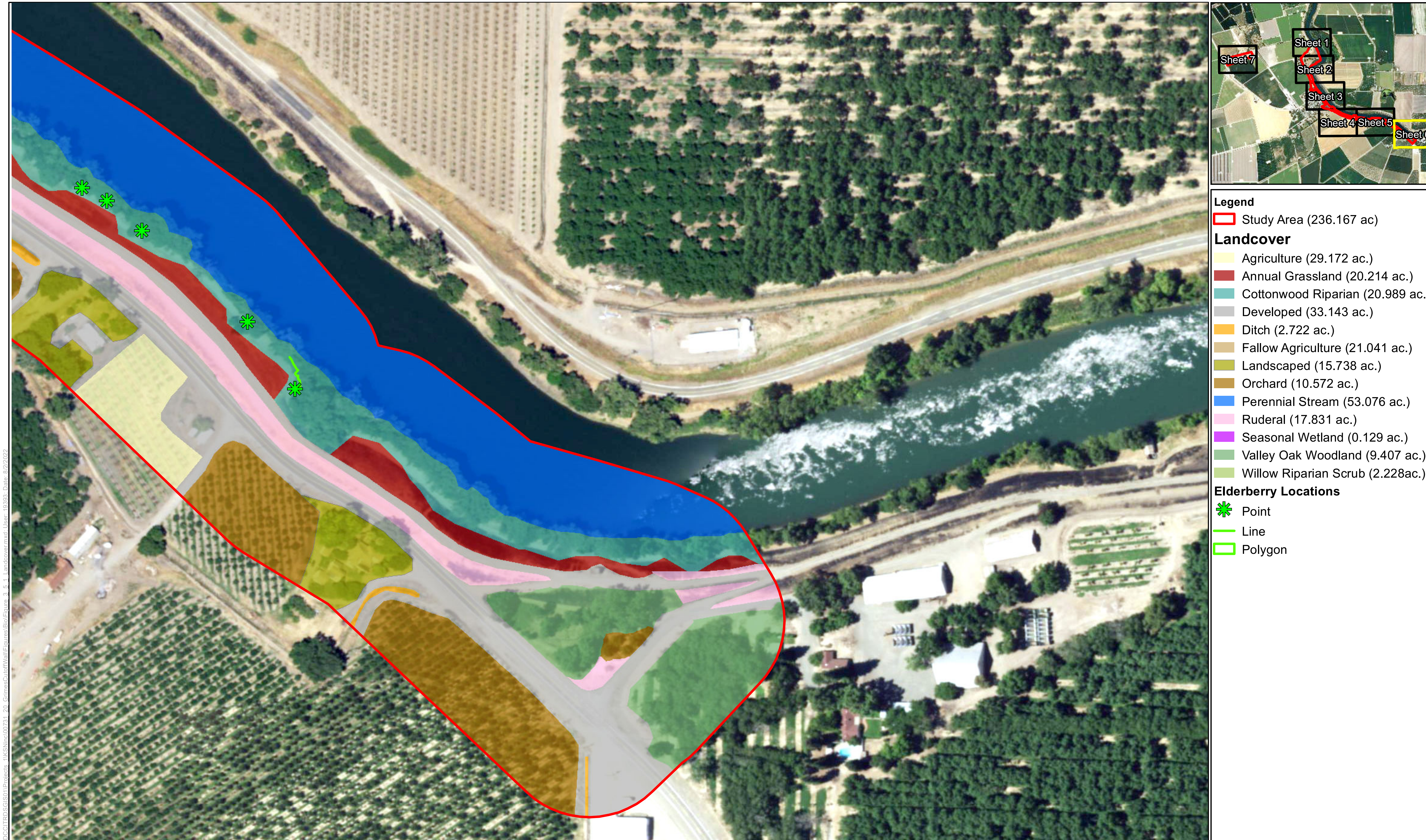

Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 6

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Figure 3.5-1
Landcover Types and Species Habitat in the Biological Study Area
Sheet 7

orchards. Birds that commonly feed on almonds and walnuts are northern flicker (*Colaptes auratus*), California scrub jay, American crow, oak titmouse, Brewer's blackbird, and house finch (*Haemorhous mexicanus*). Birds that frequently feed on orchard fruit include yellow-billed magpie, western bluebird, American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), cedar waxwing (*Bombycilla cedrorum*), and Bullock's oriole (*Icterus bullockii*). (California Department of Fish and Wildlife 2022a).

Unvegetated/Developed

The unvegetated/developed portions of the study area consist of the gravel roads on top of the levee, farm roads surrounding the agricultural fields, riprap installed for erosion control along the Sacramento River, and cleared areas used for staging farm equipment. Killdeer (*Charadrius vociferus*) may nest in graveled areas or dirt roads and staging areas (Zeiner et al. 1990a:192, 344).

3.5.2.3 Special-Status Species

Special-status species are species that are legally protected under the California Endangered Species Act (CESA), federal Endangered Species Act (ESA), or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. For the purposes of this analysis, special-status species are species, subspecies, or varieties that fall into one or more of these categories.

- Listed as threatened or endangered under ESA.
- Proposed or candidates for listing under ESA.
- Listed as threatened or endangered under CESA
- Plants listed as rare under the California Native Plant Protection Act (CNPPA).
- Candidates for listing under CESA.
- Taxa (i.e., taxonomic categories or groups) that meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the State CEQA Guidelines (e.g., species that appear on the California Department of Fish and Wildlife (CDFW) Special Animals List).
- California species of special concern.
- California fully protected species.
- Plants ranked as "rare, threatened, or endangered in California" (California Rare Plant Rank [CRPR] 1B and 2).
- Plants that may warrant consideration on the basis of local significance or recent biological information (CEQA Guidelines § 15380[d]), which may include some CRPR 3 and 4 species (plants about which more information is needed to determine their status and plants of limited distribution, respectively).
- Plants considered to be locally significant species, that is, species that are not rare from a statewide perspective but are rare or unique in a local context, such as within a county or region (CEQA Guidelines § 15125 [c]) or are so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G).

Special-Status Plants

Special-status plant species with potential to occur in the study area were identified based on the presence of suitable habitat and microhabitat. Species presumed absent from the study area are those without suitable habitat or microhabitat.

Nineteen special-status plant species were identified as occurring within an approximately 10-mile radius of the study area (California Department of Fish and Wildlife 2022b; California Native Plant Society 2022; Appendix C, *Species List*). The status, distribution, habitat requirements, and identification period of the 19 species are shown in Table 3.5-1. Most species occur in microhabitats or on soil types that are not present in the study area, including vernal pools, alkali grasslands, freshwater marsh, coniferous forest, foothill woodlands, and chaparral habitats, and clay, volcanic, and serpentinite soils. One species, red-stemmed cryptantha (*Cryptantha rostellata)*, has marginal habitat present in ruderal areas, but soils are disturbed and unlikely to be suitable and the habitat is too disturbed by road and levee construction or cultivation.

Spring blooming-period surveys were conducted in the study area in 2021 and 2022, and no special-status plants were observed. Although summer blooming-period surveys have not been conducted, there is no suitable habitat in the study area for any of the summer-blooming special-status plant species with potential to occur in the project vicinity. Therefore, there are no special-status plants in the study area.

Table 3.5-1. Special-Status Plants with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Names	Status—Federal/State/CRPR[a]	Distribution and Habitat Requirements	Blooming Period	Potential for Occurrence
Ferris' milk-vetch *Astragalus tener* var. *ferrisiae*	–/–/1B.1	Sacramento Valley; vernal pools or wet saline flats; below 2,300 feet	February–May	No vernal pool or saline flat habitat in study area
Heartscale *Atriplex cordulata* var. *cordulata*	–/–/1B.2	Central Valley from Colusa County to Kern County; alkali grassland, alkali meadow, alkali scrub; below 1,835 feet	May–October	No alkali grassland habitat in study area
Brittlescale *Atriplex depressa*	–/–/1B.2	Western and eastern Central Valley and adjacent foothills on west side of Central Valley; alkali grassland, alkali meadow, alkali vernal pools, and alkali scrub; below 1,050 feet	April–August	No alkali grassland habitat in study area
Vernal pool smallscale *Atriplex persistens*	–/–/1B.2	Central Valley, from Glenn County to Tulare County; dry beds of vernal pools, on alkaline soils; from 30 to 375 feet	June–October	No vernal pool habitat in study area

Common and Scientific Names	Status—Federal/State/CRPR[a]	Distribution and Habitat Requirements	Blooming Period	Potential for Occurrence
Parry's rough tarplant *Centromadia parryi* ssp. *rudis*	–/–/4.2	Inner North Coast Ranges, Sacramento Valley, northern San Joaquin Valley; alkali meadow and grasslands; from 0 to 330 feet	June–October	No alkali grassland habitat in study area
Palmate-bracted bird's-beak *Chloropyron palmatum*	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa County to Fresno County; alkali grasslands, chenopod scrub; from 15 to 510 feet	May–October	No alkali grassland habitat in study area
Red-stemmed cryptantha *Cryptantha rostellata*	–/–/4.2	Butte, Colusa, Napa, and Sutter Counties, Oregon, Washington; cismontane woodland, valley grassland, often on gravelly and volcanic soils, in openings and on roadsides; from 130 to 2,625 feet	April–June	Marginal habitat present in ruderal areas along roadsides in study area—not observed during June 2021 or April 2022 surveys
San Joaquin spearscale *Extriplex joaquinana*	–/–/1B.2	Eastern San Francisco Bay Area, west edge of Central Valley from Glenn County to Fresno County; alkali meadow, alkali grassland, saltbush scrub; from 3 to 2,740 feet	April–September	No alkali grassland habitat in study area
Stinkbells *Fritillaria agrestis*	–/–/4.2	Alameda, Contra Costa, Fresno, Kern, Mendocino, Monterey, Merced, Monterey, Mariposa, Placer, Sacramento, Santa Barbara, San Benito, San Luis Obispo, San Mateo, Stanislaus, and Tuolumne Counties; chaparral, cismontane woodland, pinyon-juniper woodland, valley and foothill grassland, on clay, sometimes serpentinite substrate; from 30 to 5,100 feet	March–June	No suitable clay or serpentinite soils or woodland habitat in study area

Common and Scientific Names	Status—Federal/ State/ CRPR[a]	Distribution and Habitat Requirements	Blooming Period	Potential for Occurrence
Mendocino tarplant *Hemizonia congesta* ssp. *calyculata*	–/–/4.3	Lake and Mendocino Counties; cismontane woodland, valley and foothill grassland, sometimes on serpentinite; from 740 to 4,590 feet	July–November	No suitable serpentinite soils in study area—study area is below elevational range of species
Hogwallow evax *Hesperevax caulescens*	–/–/4.2	Inner North Coast Ranges, Cascade Range foothills, Sierra Nevada foothills, Great Valley, Outer South Coast Ranges; vernal pools and flats, on clay soils; below 1,660 feet	March–June	No vernal pool habitat in study area
Woolly rose-mallow *Hibiscus lasiocarpos* var. *occidentalis*	–/–/1B.2	Cascade Range foothills, Sacramento Valley, Sacramento–San Joaquin Delta, from Butte County to San Joaquin County; freshwater marsh along rivers and sloughs; below 395 feet	August–September	No freshwater marsh habitat in study area
Ferris' goldfields *Lasthenia ferrisiae*	–/–/4.2	Sacramento Valley, San Joaquin Valley; vernal pools or wet saline flats; below 2,300 feet	February–May	No vernal pool habitat in study area
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	–/–/1B.1	Tehachapi Mountains, southern Outer South Coast Ranges, South Coast, northern Channel Islands, Peninsular Ranges, western Mojave Desert; grassland, vernal pools; alkaline soils; below 4,590 feet	February–June	No alkaline soils or vernal pool habitat in study area
Del Norte pea *Lathyrus delnorticus*	–/–/4.3	Del Norte and Siskiyou Counties, Oregon; lower montane coniferous forest, North Coast coniferous forest, often on serpentinite; from 100 to 4,760 feet	June–July	No coniferous forest or serpentinite habitat in study area
Colusa layia *Layia septentrionalis*	–/–/1B.2	Inner North Coast Ranges; sandy or serpentine soils, in grasslands and openings in chaparral and foothill	April–May	No suitable soils or chaparral or woodland

Common and Scientific Names	Status—Federal/State/CRPR[a]	Distribution and Habitat Requirements	Blooming Period	Potential for Occurrence
		woodlands; from 50 to 3,610 feet		habitat in study area
Baker's navarretia *Navarretia leucocephala* ssp. *bakeri*	–/–/1B.1	Inner Coast Ranges, southwestern Sacramento Valley from Mendocino County to Solano County; vernal pools and swales on clay or alkaline soils; from 15 to 5,710 feet	May–July	No vernal pool or swale habitat in study area
California alkali grass *Puccinellia simplex*	–/–/1B.2	Scattered locations in the San Francisco Bay Area, Central Valley, Tehachapi Mountains, western Mojave Desert; seasonally wet alkali wetlands, sinks, flats, vernal pools, and lake margins; below 3,000 feet	March–May	No alkali habitats in study area
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	–/–/2B.1	Scattered locations in the Central Valley and along the Southern Coast, Texas; on alkaline soils in floodplains, meadows and seeps, marshes and swamps, riparian forest, vernal pools; from 15 to 1,425 feet	May–September	No alkaline soils in study area

Sources: California Department of Fish and Wildlife 2022b; California Native Plant Society 2022.
CRPR = California Rare Plant Rank.
[a] Status Explanations:
Federal:
– = not listed under the federal Endangered Species Act.
E = listed as endangered under the federal Endangered Species Act.
State:
– = not listed under the California Endangered Species Act.
E = listed as endangered under the California Endangered Species Act.
California Rare Plant Rank:
1B = rare, threatened, or endangered in California and elsewhere.
2B = rare, threatened, or endangered in California but more common elsewhere
.1 = seriously endangered in California.
.2 = fairly endangered in California.
.3 = not very endangered in California.
.4 = plants of limited distribution that are on a watch list.

Special-Status Wildlife

Based on searches of the California Natural Diversity Database (CNDDB) and the IPaC species list (California Department of Fish and Wildlife 2022b; U.S. Fish and Wildlife Service 2022; Appendix C, *Species List*), a total of 28 special-status wildlife species were evaluated for their potential to occur in the study area (Appendix D, *Special-Status Wildlife with Potential to Occur in the Vicinity of the Study Area and Species Accounts*). Based on a review of species distribution, habitat requirements, and land cover types in the study area (Figure 3.5-1), seven of the 28 species are not expected to occur in the study area because the area lacks suitable habitat for the species or is outside the species' known range. These seven species are not addressed further. Five additional species were added as having at least moderate potential to occur in the study area, based on species habitat requirements and professional judgment (western pond turtle, northern harrier [*Circus cyaneus*], white-tailed kite [*Elanus leucurus*], loggerhead shrike [*Lanius Ludovicianus*], and yellow warbler [*Setophaga petechia*]). These additional five species would be considered rare under CEQA, based on being biologically rare, very restricted in distribution, or declining throughout their range, as determined by the scientific community (such as the Western Bat Working Group), and/or identified on the CDFW Special Animals List (California Department of Fish and Wildlife 2022c). Appendix D contains the species' regulatory status, distribution, habitat requirements, and a rationale for their potential to occur in the study area (Table D-1.1) and species accounts for terrestrial wildlife species with a moderate to high potential to occur in the study area.

In addition to special-status species, non-special-status migratory birds and raptors could nest in or adjacent to the project footprint, and their occupied nests and eggs are protected by California Fish and Game Code (CFGC) Sections 3503 and 3503.5 and the federal Migratory Bird Treaty Act (MBTA).

Fish and Aquatic Species of Management Concern

Fish and aquatic species in the study area were selected for analysis based on their importance and/or vulnerability and their potential to be affected by construction activities (installation of the slurry cutoff wall and revetment and grading of the floodplain area) associated with the proposed project. These fish species, referred to herein as species of management concern, include species listed by state or federal agencies as endangered or threatened or designated by CDFW as fish species of special concern in California (Moyle et al. 2015). *Species of special concern* is a protective legal designation assigned by CDFW to fish and wildlife species that face varying levels of threats and that could potentially become extinct by the end of this century. *Species of management concern* also include species of tribal, commercial, or recreational importance. Table 3.5-2 lists the species of management concern potentially associated with the proposed project and includes the general geographic areas where these species occur. Species descriptions are provided in Appendix E, *Aquatic Species Life Histories*.

Sacramento River

The mainstem Sacramento River provides migration, spawning, and rearing habitat for native and introduced (nonnative) fish and other aquatic species. In the study area, the Sacramento River is bordered by levees with a relatively narrow band of riparian vegetation along the levee slope, providing varying amounts of instream and overhead cover from adjacent riparian vegetation and instream woody material. Habitat along the river is relatively homogeneous, and artificial structures are largely absent, with the exception of several pump intakes used for water supply and several small boat docks associated with the Grimes Boat Landing. The flow regime of the Sacramento River is managed for water supply and flood management.

Generally, dredging, dams, levee construction, urban encroachment, and other human activities in and along the Sacramento River have modified aquatic habitat, altered sediment dynamics, simplified streambank and riparian habitat, reduced floodplain connectivity, and modified hydrology (National Marine Fisheries Service 2009).

Table 3.5-2. Aquatic Species of Management Concern in the Sacramento River

Species and ESU/DPS	Federal Status	State Status	Tribal, Commercial, or Recreational Importance
Winter-run Chinook Salmon Sacramento River ESU	Endangered	Endangered	Yes
Spring-run Chinook Salmon Central Valley ESU	Threatened	Threatened	Yes
Fall-run/Late Fall–run Chinook Salmon Central Valley ESU	Species of Concern	Species of Special Concern	Yes
Steelhead California Central Valley DPS	Threatened	None	Yes
Green Sturgeon Southern DPS	Threatened	Species of Special Concern	Yes
White Sturgeon	None	Species of Special Concern	Yes
Pacific Lamprey	Species of Concern	Species of Special Concern	Yes
River Lamprey	None	Species of Special Concern	Yes
Sacramento Hitch	None	Species of Special Concern	No
Sacramento Splittail	None	Species of Special Concern	No
Hardhead	None	Species of Special Concern	No
Central California Roach	None	Species of Special Concern	No
Striped Bass	None	None	Yes
American Shad	None	None	Yes
Black Bass (Largemouth, Smallmouth, Spotted)	None	None	Yes

DPS = distinct population segment; ESU = evolutionarily significant unit.

3.5.2.4 Waters of the United States and Waters of the State

The Sacramento River is a water of the United States. Irrigation and roadside ditches in the study area are considered waters of the state and may be considered waters of the United States as part of a preliminary jurisdictional determination. One seasonal wetland was identified in the study area. All these features would also be considered waters of the state. A preliminary delineation of the study area was conducted on March 31 and April 1, 2022, and submittal to the U.S. Army Corps of Engineers (USACE) in support of a preliminary jurisdictional determination is pending. The mapped areas of these features are subject to verification by USACE and the Central Valley Regional Water Quality Control Board (CVRWQCB).

3.5.3 Regulatory Setting

3.5.3.1 Federal

The following federal regulations related to biological resources apply to implementation of the proposed project.

Federal Endangered Species Act

ESA protects fish and wildlife species and their habitats that have been identified by the National Marine Fisheries Service (NMFS) or U.S. Fish and Wildlife Service (USFWS) as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments (DPSs) that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or DPSs that are likely to become endangered in the near future.

ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 7 and 9 of ESA are relevant to this proposed project and summarized below.

Section 7: Endangered Species Act Authorization Process for Federal Actions

Section 7 of ESA provides a means for authorizing take of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action (for this project, the agency is USACE) must consult with NMFS or USFWS, as appropriate, to ensure that the proposed project would not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. The study area supports potential habitat for federally listed valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), giant garter snake (*Thamnophis gigas*), Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytsha*), Central Valley spring-run Chinook salmon, Central Valley steelhead (*Oncorhynchus mykiss*), and southern DPS green sturgeon (*Acipenser medirostris*) that could be adversely affected by the proposed project. Therefore, the proposed project has the potential to result in take of a federally listed species, and consultation would be initiated with NMFS and USFWS.

Section 9: Endangered Species Act Prohibitions

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations.[1] *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction.

[1] In some cases, exceptions may be made for threatened species under ESA Section 4(d); in such cases, USFWS or NMFS issues a "4(d) rule" describing protections for the threatened species and specifying the circumstances under which take is allowed.

Critical Habitat

Critical habitat, as defined in ESA Section 3, is the specific area within the geographic area occupied by a species, at the time it is listed in accordance with ESA, on which are found those biological features essential to the conservation of the species and may require special management considerations or protection. It also includes specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. No critical habitat for valley elderberry longhorn beetle occurs within the study area and no critical habitat has been designated for giant garter snake. The study area is within the critical habitat designated for Central Valley steelhead, Central Valley spring-run Chinook salmon, winter-run Chinook salmon, and southern DPS green sturgeon.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires all federal agencies to consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect *essential fish habitat,* which is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

Migratory Bird Treaty Act

The MBTA (16 United States Code [USC] § 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union (now Russia). It protects migratory birds, their occupied nests, and their eggs (16 USC § 703; 50 Code of Federal Regulations [CFR] Part 21; 50 CFR Part 10). The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter of any migratory bird or their eggs, parts, and nests, except as authorized under a valid permit (50 CFR § 21.11). Executive Order (EO)13186 (January 10, 2001) directs each federal agency taking actions that have or may have a negative effect on migratory bird populations to work with USFWS to develop a memorandum of understanding that will promote the conservation of migratory bird populations. The proposed project has the potential to result in take of migratory birds (through disturbance or removal of occupied nests). Mitigation measures would be implemented to avoid take of migratory birds and ensure compliance with the MBTA.

Clean Water Act

The 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.

The CWA empowers the U.S. Environmental Protection Agency (EPA) to set national water-quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. *Point-source pollution* is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. *Nonpoint-source pollution* originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following sections provide additional details on pertinent sections of the CWA.

Section 404 of the Clean Water Act

USACE and EPA regulate the discharge of dredged and fill material into waters of the United States under Section 404 of the CWA. USACE's jurisdiction over nontidal waters of the United States extends to the ordinary high water mark (OHWM), provided the jurisdiction is not extended by the presence of wetlands (33 CFR § 328.3). The OHWM is defined in the federal regulations as follows.

> [T]hat line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. (33 CFR § 328.3[e].)

USACE typically will exert jurisdiction over that portion of the study area that contains waters of the United States and adjacent wetlands. This jurisdiction equals approximately the bank-to-bank portion of a stream along its entire length up to the OHWM and adjacent wetland areas that would be directly or indirectly adversely affected by the proposed project. The OHWM of the Sacramento River and, pending verification by USACE, ditches and seasonal wetland are under USACE jurisdiction. Placement of erosion control within the OHWM, excavation of the small seasonal wetland area identified in the offsite borrow area, and fill placed in ditches would require a CWA Section 404 permit.

Section 401 of the Clean Water Act

Under CWA Section 401, applicants for a federal license or permit to conduct activities that might 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. A CWA Section 401 water quality certification from the CVRWQCB would be required for construction in the Sacramento River, ditches, and seasonal wetland.

Executive Order 11990, Protection of Wetlands

EO 11990, signed May 24, 1977, directs all federal agencies to refrain from assisting in or giving financial support to projects that encroach on publicly or privately owned wetlands. It further requires that federal agencies support a policy to minimize the destruction, loss, or degradation of wetlands. Such a project that encroaches on wetlands may not be undertaken unless the agency has determined that (1) there are no practicable alternatives to such construction, (2) the project includes all practicable measures to minimize harm to wetlands that would be affected by the project, and (3) the impact will be minor. The project would comply with EO 11990 by coordinating with USACE to implement the least damaging project alternative.

No Net Loss of Wetlands Policy

The national policy of "no-net loss of wetlands" was established in 1989 to replace each newly affected wetland with a replacement wetland of the same size and with similar wetland functions and values. The proposed project would comply with the policy by avoiding wetlands in the study area and implementing compensatory mitigation for any wetland loss in coordination with USACE and the CVRWQCB.

Executive Order 13112, Invasive Species

EO 13112, signed February 3, 1999, directs all federal agencies to prevent and control the introduction of invasive species in a cost-effective and environmentally sound manner. The EO established the National Invasive Species Council, which is composed of federal agencies and departments, and a supporting Invasive Species Advisory Committee, composed of state, local, and private entities. In 2016, the National Invasive Species Council released an updated national invasive species management plan (National Invasive Species Council 2016) that recommends objectives and measures to implement the EO and prevent the introduction and spread of invasive species. The EO requires consideration of invasive species in National Environmental Policy Act analyses, including their identification and distribution, their potential impacts, and measures to prevent or eradicate them.

Because the proposed project would potentially introduce and/or spread invasive species as part of construction activities, the Sacramento River West Side Levee District (SRWSLD) would comply with EO 13112 by implementing measures to prevent introduction and spread of invasive species during construction.

3.5.3.2 State

The following state regulations related to biological resources apply to implementation of the proposed project.

California Endangered Species Act

CESA (CFGC §§ 2050–2116) states that all native species or subspecies of a fish, amphibian, reptile, mammal, or plant and their habitats that are threatened with extinction and those experiencing a significant decline that, if not halted, would lead to a threatened or endangered designation will be protected or preserved.

Under Section 2081 of the CFGC, a permit from CDFW is required for projects that could result in the take of a species that is state listed as threatened or endangered. Under CESA, *take* is defined as an activity that would directly or indirectly kill an individual of a species. The definition does not include *harm* or *harass*, as the definition of take under ESA does. As a result, the threshold for take under CESA is higher than that under ESA. For example, habitat modification is not necessarily considered take under CESA.

Section 2090 of the CFGC requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. CDFW administers the act and authorizes take through CFGC Section 2081 incidental take agreements (except for species designated as fully protected) and Section 2080.1 consistency determinations. If it is determined that the proposed project will result in take of a state-listed species, an incidental take permit or consistency determination will be obtained through consultation with CDFW. The study area supports state-listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and potential nesting habitat for the state-listed Swainson's hawk (*Buteo swainsoni*).

California Fully Protected Species

CFGC Sections 3511, 3513, 4700, and 5050 pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock, or if a natural community conservation plan has been adopted. The study area supports potential nesting habitat for the fully protected white-tailed kite that could be affected by implementation of the proposed project.

Sections 3503, 3503.5, and 3513 of the California Fish and Game Code

CFGC Sections 3503, 3503.5, and 3513 protect all native birds, birds of prey, and all nongame birds, including eggs and nests, that are not already listed as fully protected and that occur naturally within the state. Eggs and nests of all birds are protected under Section 3503, while Section 3503.5 protects all birds of prey as well as their eggs and nests. Migratory non-game birds are protected under Section 3513. Except for take related to scientific research, take as described above is prohibited. Many bird species potentially could nest in the project area or vicinity. These birds and their nests and eggs would be protected under these sections of the CFGC. The study area supports known bird nests and potential nesting habitat that could be affected by implementation of the proposed project.

California Native Plant Protection Act

CESA defers to the CNPPA to ensure that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. Plants listed as rare under the CNPPA are not protected under CESA but rather under CEQA. One state-listed endangered species, palmate-bracted bird's-beak, occurs in the project region, but is not in the study area, so the proposed project would not require any measures for compliance with the CNPPA.

Sections 1600–1603 of the California Fish and Game Code

CFGC Sections 1600–1603 state that it is unlawful for any person or agency to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources, or to use any material from the streambeds, without first notifying CDFW. A Lake and Streambed Alteration Agreement must be obtained if effects are expected to occur. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks, and that supports wildlife, fish, or other aquatic life. This definition includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife extending to the tops of banks and often including the outer edge of riparian vegetation canopy cover. The Sacramento River and associated riparian habitat within the study area are within CDFW jurisdiction, and construction activities in the Sacramento River and riparian habitat would require a Section 1602 lake and streambed alteration agreement.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, the State of California, through the Regional Water Quality Control Boards, regulates discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404. *Waters of the state* include all surface water or groundwater within the state. Revised definitions for state wetlands and procedures for permitting impacts on these wetlands were recently adopted by the State Water

Resources Control Board (State Water Board) (State Water Resources Control Board 2019). The Sacramento River, ditches, and seasonal wetland are waters of the state that would be affected by implementation of the proposed project. Because these features are also waters of the United States, regulation by the CVRWQCB would occur under CWA Section 401, as described above.

3.5.3.3 Local

The following local policies related to biological resources apply to implementation of the proposed project.

Colusa County General Plan

The Conservation Element of the *Colusa County General Plan* addresses the conservation, development, and utilization of natural resources, including wildlife. The following Conservation Objectives and Policies address the conservation and protection of sensitive natural communities, special-status plants, special-status plant habitats, and wetland and stream resources. These policies were considered when assessing the biological resources that may be affected by the proposed project (Colusa County 2012).

Objective CON-1A: Protect, Enhance, and Manage the County's Ecosystems and Habitats

- Policy CON 1-7: Conserve and enhance those biological communities that contribute to the County's rich biodiversity including, but not limited to, blue oak woodlands, annual grasslands, mixed chaparral, pine woodlands, wetlands, riparian areas, aquatic habitat, and agricultural lands.
- Policy CON 1-8: Conserve existing native vegetation where possible and integrate existing native vegetation into new development if appropriate.
- Policy CON 1-9: Avoid oak tree removal within oak woodland habitat to the greatest extent feasible through appropriate project design and building siting. If full avoidance is not possible, prioritize planting replacement trees on-site over off-site locations.
- Policy CON 1-11: Protect wetlands and riparian habitat areas from encroachment by development to the greatest extent feasible.

Objective CON-1B: Protect Endangered, Threatened, and Special-Status Plant and Animal Species, Their Habitats, and Other Sensitive Habitats

- Policy CON 1-13: Sensitive habitats include oak woodlands, wetlands, vernal pools, riparian areas, wildlife and fish migration corridors, native plant nursery sites, waters of the U.S., and other habitats designated by state and federal agencies and laws.
- Policy CON 1-14: Require any proposed project that may affect special-status species, their habitat, or other sensitive habitat to submit a biological resources evaluation as part of the development review process. Evaluations shall be carried out under the direction of the Colusa County Department of Planning and Building and consistent with applicable state and federal guidelines. Additional focused surveys shall be conducted during the appropriate season (e.g., nesting season, flowering season, etc.), if necessary.
- Policy CON 1-15: Require that impacts to wetlands and riparian habitat protected by State or Federal regulations be avoided to the greatest extent feasible. If avoidance is not possible, fully mitigate impacts consistent with applicable local, State and Federal requirements.

- Policy CON 1-17: All discretionary public and private projects that identify special-status species or sensitive habitats in a biological resources evaluation shall avoid impacts to special-status species and their habitat to the maximum extent feasible. Where impacts cannot be avoided, projects shall include the implementation of site-specific or project-specific effective mitigation strategies developed by a qualified professional in consultation with state or federal resource agencies with jurisdiction (if applicable) including, but not limited to, the following strategies:
  a. Preservation of habitat and connectivity of adequate size, quality, and configuration to support the special-status species. Connectivity shall be determined based on the specifics of the species' needs.
  b. Project design measures, such as clustering of structures or locating project features to avoid known locations of special-status species and/or sensitive habitats.
  c. Provision of supplemental planting and maintenance of grasses, shrubs, and trees of similar quality and quantity to provide adequate vegetation cover to enhance water quality, minimize sedimentation and soil transport, and provide adequate shelter and food for wildlife.
  d. Protection for habitat and the known locations of special-status species through adequate buffering or other means.
  e. Provision of replacement habitat of like quantity and quality on- or off-site for special-status species.
  f. Enhancement of existing special-status species habitat values through restoration and replanting of native plant species.
  g. Provision of temporary or permanent buffers of adequate size (based on the specifics of the special-status species) to avoid nest abandonment by nesting migratory birds and raptors associated with construction and site development activities.
  h. Incorporation of the provisions or demonstration of compliance with applicable recovery plans for federally listed species.
  i. Monitoring of construction activities by a qualified biologist to avoid impacts to on-site special status species.
- Policy CON 1-18: Where sensitive biological habitats have been identified on or immediately adjacent to a project site, the following measures shall be implemented:
  a. Pre-construction surveys for species listed under the State or Federal Endangered Species Acts, or species identified as special-status by the resource agencies, shall be conducted by a qualified biologist;
  b. Construction barrier fencing shall be installed around sensitive resources and areas identified for avoidance or protection; and
  c. Employees shall be trained by a qualified biologist to identify and avoid protected species and habitat.

Objective CON-1D: Protect Surface Water Quality in the County's Lakes, Streams, Creeks, and Rivers

- Policy CON 1-22: Maintain lakes, rivers, streams, creeks, and waterways in a natural state whenever possible. These water features may be actively managed and/or improved or modified in order to function as natural flood protection and storm water management features during storms and flooding events.

- Policy CON 1-24: If a proposed project may result in impacts to wetlands or other waters of the U.S., require the project proponent to consult with the appropriate regulatory agency and implement all applicable permit requirements as a condition of project approval.

3.5.4 Methods for Analysis

3.5.4.1 Prefield Investigation

Prior to conducting the site visits for the proposed project, ICF International biologists reviewed information pertaining to vegetation and wetland resources in the project area or vicinity from the following sources.

- A CNDDB records search of the USGS 7.5-minute Grimes, Tisdale Weir, Kirkville, Dunnigan, Wildwood School, Arbuckle, Colusa, Meridian, and Sutter Buttes quadrangles (California Department of Fish and Wildlife 2022b) (Appendix C, *Species List*).
- A search of the California Native Plant Society online Inventory of Rare and Endangered Plants of California for the 7.5-minute Grimes, Tisdale Weir, Kirkville, Dunnigan, Wildwood School, Arbuckle, Colusa, Meridian, and Sutter Buttes quadrangles (California Native Plant Society 2022) (Appendix C).
- USFWS list of endangered, threatened, and proposed species for the study area obtained from the USFWS website (U.S. Fish and Wildlife Service 2022) (Appendix C).

3.5.4.2 Field Surveys

ICF botanists and wetland ecologists conducted botanical and aquatic resources surveys in the northern part of the study area on June 22, 2021, and throughout the entire study area on March 31 and April 1, 2022. An ICF wildlife biologist conducted a habitat assessment for special-status wildlife species, including potential habitat for valley elderberry longhorn beetle, giant garter snake, and nesting birds on March 24, 2021, and March 31, 2022.

3.5.4.3 Impact Mechanisms

Impact mechanisms that are common to construction include the following.

- Ground disturbance—Most common examples include grading, excavation, trenching, drilling, and placement of fill, and vibrations associated with those ground-disturbing activities.
- Vegetation removal—Examples include grubbing, trimming, and mowing.
- Hazardous materials—Examples include spills of fuels, oils, cement, and herbicide application.
- Vehicle movement—Examples include construction personnel vehicles, haul trucks, and grading equipment movement on local roads, construction access roads, and off-road vehicle movement in portions of work areas.
- Noise—An examples is equipment operation.
- Visual disturbance—Includes temporary lighting used for construction, and disturbances caused by the presence of construction vehicles and personnel.

- Dust—Results from ground disturbance and vegetation removal.

Impact mechanisms resulting from floodplain restoration include the following.

- Inundation of suitable or occupied habitat for special-status species.

3.5.4.4 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, or regulations, or by CDFW or USFWS.
- Have a substantial adverse effect on state- or federally protected wetlands (including, but not limited to, marshes, vernal pools, or coastal wetlands) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of a native resident or migratory 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 wildlife resources.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

3.5.5 Environmental Effects

Potential impacts of the proposed project related to biological resources are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section IV, *Biological Resources*, asks whether the project would result in any of the following conditions.

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?

Special-Status Plants

No special-status plants were observed during the June 2021 and March and April 2022 surveys. The biological study area does not support suitable microhabitat for 18 of the 19 special-status species identified as having potential to occur in the biological study area, and the remaining species, red-stemmed cryptantha, has only marginal habitat present in ruderal areas and was not observed in the study area during the 2021 or 2022 surveys. The proposed project would not have an impact on special-status plants.

Special-Status Wildlife

Impact BIO-1: Potential mortality or disturbance of valley elderberry longhorn beetle

Elderberry is the host plant for valley elderberry longhorn beetle. Based on the assumption that all shrubs may be inhabited by the beetle, any mortality or damage to elderberry shrubs could result in the injury, mortality, or disruption of normal behaviors of valley elderberry longhorn beetle larvae, pupae, and adults. Ground disturbance within 20 feet of an elderberry shrub's dripline could damage its roots and result in stress or reduced vigor of the shrub (U.S. Fish and Wildlife Service 2017:11).

Construction vehicles or equipment traveling or staged for construction activities could result in the injury, mortality, or disruption of normal behaviors of adult beetles during the beetle flight season (March to July). The movement of equipment and vehicles could disrupt the movement of adult beetles by physically blocking their path or deterring them from using a certain pathway through noise, vibrations, and visible disturbance. Construction-related dust and the accidental discharge of work-related fluids could affect the vigor of elderberry shrubs within 165 feet of project activities. Elderberry shrubs could also die from inundation of the floodplain restoration area. Maintenance activities involving herbicide and pesticide use could cause mortality of elderberry shrubs or illness or mortality of valley elderberry longhorn beetle, respectively. Elderberry shrubs could also be inadvertently removed or trimmed during maintenance activities.

These impacts would be potentially significant because implementation of the proposed project could reduce the local population of this federally listed species through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, and BIO-MM-1f would reduce the level of impact to less than significant because biological resources awareness training would make workers aware of the species habitat requirements and required conservation measures, access routes would be limited to established roadways and construction area boundaries would be demarcated, surveys would be conducted to determine presence, elderberry shrubs to be protected would be fenced, compensation would be provided for permanent loss of habitat, and a measure would be implemented to avoid and minimize potential effects of herbicide and pesticide use on valley elderberry longhorn beetle and its habitat. These mitigation measures would also be implemented during project-related maintenance activities as applicable to protect elderberry shrubs from accidental trimming or other harmful effects that could occur.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

No fewer than 30 days prior to construction activities, SRWSLD will submit a request to CDFW and USFWS for approval of the biologists to conduct the biological awareness training, pre-activity surveys, and biological monitoring. Prior to implementation of the proposed action, a CDFW- and USFWS-approved biologist will conduct a mandatory biological resources awareness training for all project personnel. The training will cover special-status species and their habitats that could be encountered in the action area. The training will cover the natural history, appearance (using representative photographs), and legal status of species; regulatory protections; penalties for noncompliance; benefits of compliance and the avoidance and minimization measures to be implemented. Participants will be required to sign a form that states they have received and understand the training. SRWSLD will maintain the record of training and make it available to CDFW and USFWS upon request. The project foreman will verify that any new personnel brought onto the project receive the mandatory training before starting work.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

General restrictions and guidelines that will be followed by personnel during construction of the project are listed below. The project foreman will be responsible for ensuring that crew members adhere to these guidelines and restrictions.

- SRWSLD will clearly delineate the construction limits through the use of survey tape, pin flags, orange barrier fencing, or other means, and prohibit any construction-related traffic outside these boundaries.
- Personnel driving vehicles will observe the posted speed limit on hard-surfaced roads and a 15-mile-per-hour speed limit on unpaved roads during travel in the study area.
- 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. Vegetation clearing and scraping or digging of soil will be limited to the minimal area necessary to facilitate construction activities.
- All project personnel will have stop work authority if a potential listed species is observed within an active work area.
- All food-related trash items, such as wrappers, cans, bottles, and food scraps, will be disposed of in closed containers and removed from the work area daily during the work period. Personnel will not feed or otherwise attract fish or wildlife to the work site.
- No pets or firearms will be allowed in the construction area.
- All project-related equipment will be maintained to prevent leaks of fuels, lubricants, or other fluids. Daily equipment inspections will include inspections for leaks. To prevent possible resource damage from hazardous materials such as motor oil or gasoline, personnel will not service or refuel vehicles, equipment, or motorized tools within 200 feet of any aquatic habitat.
- Temporary signs, staking, or flagging will be used to identify sensitive biological resources within the action area, and project personnel will be advised to avoid disturbance of these areas. These areas will be identified during pre-activity surveys. Signs, staking, and flagging will be inspected by the CDFW- and USFWS-approved biologist.
- Vehicles left onsite overnight will be thoroughly inspected each day for wildlife (both underneath the vehicle and in open cabs) before they are moved.
- To avoid entrapment of wildlife, all excavated steep-walled holes or trenches more than 1 foot deep will either be properly covered or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday.
- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas.
- Any worker who inadvertently injures or kills a special-status species or finds one dead, injured, or entrapped will immediately report the incident to the biological monitor and

construction foreman. The biological monitor will immediately notify SRWSLD, which will provide verbal notification to the USFWS Sacramento Endangered Species Office and/or the local CDFW warden or biologist within 1 working day. SRWSLD will follow up with written notification to USFWS or CDFW within 5 working days. The biological monitor will follow up with SRWSLD to ensure that the wildlife agencies were notified.

- For all work conducted within 200 feet of wetlands and waters, the following measures will be implemented.

  Sediment control measures:

  - Prevent transport of sediment from work areas.
  - Reduce offsite sediment tracking.
  - If applicable, use tightly woven fiber netting (mesh size less than 0.25 inch) or similar material at the project site for erosion control and other purposes, including to reduce the likelihood of wildlife becoming trapped or entangled in erosion-control material. Coconut coir matting is acceptable, but no plastic monofilament matting will be used for erosion control.

  Management measures for construction materials:

  - Store chemicals in watertight containers.
  - Minimize exposure of materials to stormwater.
  - Place best management practices (BMPs), such as sandbags or other containment features, around the areas used for fueling or other uses of hazardous materials to ensure that these materials do not accidentally spill into the river.

In addition to the measures above, SRWSLD will retain a qualified biologist to monitor construction activities adjacent to sensitive biological resources (e.g., elderberry shrubs, riparian trees, active nests, occupied bat roosts). The biologist will assist the construction crew, as needed, to comply with all proposed project implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that SRWSLD or its contractor maintain the construction barrier fencing adjacent to sensitive biological resources.

Mitigation Measure BIO-MM-1c: Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat

SRWSLD will retain qualified biologists or botanists (i.e., with elderberry or valley elderberry longhorn beetle experience) to conduct surveys to identify and map locations of elderberry shrubs in work areas and within 165 feet of the work areas. For shrubs located in non-riparian areas, elderberry stems will be examined for the presence of valley elderberry longhorn beetle exit holes. This information will be used to determine the amount of compensation required for the loss of elderberry shrubs in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (Desmocerus californicus dimorphus) (U.S. Fish and Wildlife Service 2017). The biologist will mark elderberry shrubs in or within 165 feet of work areas with flagging for future removal or protection.

Mitigation Measure BIO-MM-1d: Fence Elderberry Shrubs to be Protected

Elderberry shrubs in or within 165 feet of work areas that will not be removed will be protected during construction. If not already marked, a qualified biologist will flag the elderberry shrubs that will be protected during construction. SRWSLD's contractor will install orange construction barrier fencing or stakes and flagging at the edge of the buffer areas established for each shrub, and signs indicating the potential for beetle presence and excluding any project activity within the buffer areas will be posted prior to the start of work. The buffer area distances will be proposed by the biologist and approved by USFWS. No construction activities will be permitted in the buffer area other than those activities necessary to erect the fencing or stakes and flagging without written permission from USFWS.

If orange construction barrier fencing is used, it will be placed such that there is at least a 1-foot gap between the ground and the bottom of the orange construction fencing to minimize the potential for snakes and other ground-dwelling animals to become caught in the fencing. Buffer areas around elderberry shrubs will be inspected periodically by a qualified biologist until project construction is complete or until the fences or staking and flagging are removed, as approved by the biological monitor and the resident engineer. SRWSLD's contractor will be responsible for maintaining the buffer area fences around elderberry shrubs throughout construction and removing the fencing or staking and flagging when construction is complete. The biologist's fencing inspection reports will be provided to SRWSLD.

Mitigation Measure BIO-MM-1e: Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and Its Habitat

Before construction begins, SRWSLD will retain a qualified contractor to transplant elderberry shrubs that cannot be avoided to a USFWS-approved mitigation or conservation bank or other approved area in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (Desmocerus californicus dimorphus) (U.S. Fish and Wildlife Service 2017). Elderberry shrubs that cannot be avoided will be transplanted during the plant's dormant phase (November through the first 2 weeks of February). A qualified biological monitor will remain onsite while the shrubs are being transplanted. Additionally, SRWSLD will compensate for permanent impacts on occupied riparian habitat by creating or preserving habitat at a 3 to 1 ratio (acres of created or preserved habitat to acres of permanent impact) or by an equivalent or greater amount as determined in consultation with USFWS. SRWSLD will compensate for permanent impacts on occupied non-riparian habitat by creating or preserving habitat at a ratio of 1 to 1 for all acres that are permanently affected, or by transplanting affected elderberry shrubs containing valley elderberry longhorn beetle exit holes and providing compensation at a 1 to 1 ratio for the area of the affected shrubs.

USFWS-approved conservation banks have long-term adaptive management plans with performance standards. If credits are not purchased at a USFWS-approved conservation bank, SRWSLD will implement standards for long-term management and protection of conservation areas. SRWSLD will work closely with USFWS during the planning and development of preservation areas. Once established, preservation areas will be surveyed by a USFWS-approved biologist a minimum of two times per year between February 14 and June 30. The biologist will search for valley elderberry longhorn beetle exit holes, evaluate the adequacy of site protection (e.g., fencing, signage) and weed control, assess potential threats to the beetle, take photographs of the site, and evaluate the performance standards below.

1. A minimum of 60 percent of the initial elderberry and native associate plantings must survive over the first 5 years after the site is established. As much as feasible, elderberry shrubs should be well distributed throughout the site; however, in some instances underlying geologic or hydrologic issues might preclude elderberry establishment over some portion of the site. If significant die-back occurs within the first 3 years, replanting may be used to achieve the 60 percent performance standard. However, replanting efforts should be concentrated in areas containing surviving elderberry plants. In some instances, overplanting may be used to offset the selection of a less suitable site.
2. After 5 years, the site must show signs of recruitment. A successful site should have evidence of new growth on existing plantings, as well as natural recruitment of elderberry. New growth is characterized as stems 1.2 inches in diameter. If no signs of recruitment are observed, SRWSLD will discuss possible remedies with USFWS.

Following USFWS's interim standards for the long-term management and protection of mitigation sites, working closely with USFWS during planning and development of the preservation area, monitoring the preservation area to ensure performance standards are achieved, and replanting elderberries when the performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the losses resulting from the proposed project.

Mitigation Measure BIO-MM-1f: Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use

To minimize impacts on valley elderberry longhorn beetle, monarch butterfly (*Danaus plexippus*), and Crotch bumble bee (*Bombus crotchii*) from herbicide drift, herbicide application will be limited to the minimum area necessary and will be conducted using handheld equipment. Herbicides and pesticides will be applied only by applicators with current licenses or certifications from the California Department of Pesticide Regulation. The applicator will follow the herbicide label directions. Spray nozzles will be kept within 24 inches of target vegetation during spraying. The most current information on herbicide toxicity on wildlife will be used to inform future decisions about herbicide and pesticide use during operations.

Impact BIO-2: Potential mortality or disturbance of monarch butterfly and Crotch bumble bee

There is no suitable monarch butterfly breeding habitat in the study area, but monarch butterflies may use trees and nectar plants during migration. Construction of the slurry cutoff wall could result in the permanent and temporary losses of suitable roosting (trees) habitat and the temporary loss of suitable foraging (nectar plants present in ruderal annual grassland) habitats for monarch butterflies. However, substantial concentrations of monarch butterfly nectar plants were not observed during site visits in March 2021 and March 2022. The new floodplain habitat area would be designed to provide sufficient topography to support mature trees; however, potentially suitable roosting trees and nectar plants used during migration could be affected by increased inundation of the habitat within the floodplain. Clearing and grubbing, excavation, and other construction activities could result in mortality of migrating adults from being crushed or buried by equipment. If foraging or flying through the area, adult monarch butterflies could be struck by vehicles and construction equipment traveling along access roads during construction. Construction could also disrupt roosting or foraging activities.

Potentially suitable Crotch bumble bee habitat would be lost from the construction of the slurry cutoff wall, the use of the borrow area, and the grading of the floodplain restoration area. Potential nesting habitat and food plants may also be affected by increased inundation of the ruderal annual grassland within the restored floodplain. However, substantial concentrations of Crotch bumble bee food plants were not observed during site visits in March 2021 and March 2022 except for burclover, which is ubiquitous throughout the region; therefore, the loss of burclover would not result in a significant loss of habitat for the species. Clearing and grubbing, excavation, and other activities could result in the destruction of nests or mortality of bees from being crushed or buried by equipment. Crotch bumble bees could also be struck by vehicles and equipment traveling along access roads during construction.

Maintenance activities involving herbicide and pesticide use have the potential to affect monarch butterflies and Crotch bumble bees and cause the loss of foraging habitat or illness or mortality of individuals.

Construction of the proposed project would result in potentially significant impacts on the monarch butterfly and Crotch bumble bee from loss of individuals. These impacts would be significant because they could reduce the local populations of these rare butterflies and bumblebees through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-1f, BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to identify substantial patches of native food plants, temporarily disturbed habitat would be restored, permanent loss of habitat containing suitable native food plants would be compensated for through onsite or offsite habitat restoration or preservation, and potential effects of herbicide and pesticide use on the monarch butterfly and Crotch bumble bee and their food plants would be avoided or minimized.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1f: Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction.

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland.

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat.

This measure is described below under Impact BIO-17.

Impact BIO-3: Potential mortality or disturbance of western pond turtle

Construction of the slurry cutoff wall and installation of rock slope protection could result in the injury and mortality of western pond turtles if they are occupying aquatic or upland habitat in work areas during activities such as grading, excavation, vegetation removal, and the use of construction-related vehicles. Western pond turtles could also be trapped in open trenches or other excavations and become vulnerable to predation. Construction activities could also result in the exposure of western pond turtles to construction-related fluids, such as fuels, oils, and cement, which could result in the injury and mortality of eggs, hatchlings, and adults. Construction noise and vibration could also disrupt normal behaviors and result in increased energy expenditures and predation risk. The potential impacts of injury, mortality, and the disruption of normal behaviors of western pond turtle from project construction would be potentially significant, but implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, and BIO-MM-3 would reduce this impact to a less-than-significant level by requiring training of construction staff on procedures for protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures; by implementing spill prevention and containment plans that would avoid material spills that could affect the viability of nearby aquatic and upland habitat; and by conducting pre-construction surveys for western pond turtle and having a biological monitor present to monitor construction activities if turtles are present within work areas to ensure that non-disturbance buffers and associated construction fencing are intact and all other protective measures are being implemented, where applicable.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training.

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-3: Conduct Pre-construction Surveys for Western Pond Turtle and Monitor Construction Activities if Turtles are Observed

One week before and within 24 hours of beginning work in suitable aquatic habitat, a qualified biologist (one who is familiar with different species of turtles) will conduct pre-construction surveys for western pond turtle. The surveys will be timed to coincide with the time of day when turtles are most likely to be active (during the cooler part of the day, between 8:00 a.m. and 12:00 p.m., during spring and summer). Prior to conducting the surveys, the biologist will locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to quietly observe turtles. Each survey will include a 30-minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey will consist of a minimum 15-minute observation time per area where turtles could be observed.

If western pond turtles are observed during either survey, the qualified biologist will conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may result in take of western pond turtle. If a turtle is observed, the qualified biologist will implement the following species observation and handling protocol. Only qualified biologists will participate in activities associated with the capture, handling, and monitoring of western pond turtles. If a turtle is encountered in a construction area, activities within the vicinity of the individual will cease immediately, and the construction manager and qualified biologist will be notified. The turtle will be allowed to leave the area of its own volition, and work may resume when it is no longer in harm's way. All personnel onsite will be notified of the finding and at no time will work occur in the vicinity of the turtle without a qualified biologist present. If the turtle does not move out of the area on its own, and it is determined by the qualified biologist that relocating the turtle is necessary, relocation will be done in coordination with CDFW. Any handling of turtles will be done by a biologist with a valid memorandum of understanding from CDFW authorizing the capture and relocation of turtles and as determined during coordination with CDFW. Biologists will wear clean, new disposable surgical-style (e.g., nitrile) gloves while handling and relocating individuals.

The qualified biologist will be mindful of suitable nesting and overwintering areas in proximity to suitable aquatic habitat and periodically inspect these areas for nests and turtles.

If there is a lapse in construction in a work area for 7 days or more, these surveys will be repeated before activities resume.

Impact BIO-4: Potential mortality or disturbance of and loss of suitable habitat for giant garter snake

No suitable aquatic or upland giant garter snake habitat would be permanently or temporarily affected by the proposed project. There is one ditch in the study area, to the west of the proposed offsite borrow site, that provides marginal aquatic habitat for giant garter snake because of the presence of emergent vegetation and standing water (observed March 2021 and March 2022). If snakes were using this ditch for dispersal or cover and moved into the construction area, they could be injured or crushed by construction equipment. Construction-related fluid (e.g., fuel, oil) spills from equipment into aquatic habitat could also cause the injury or mortality of giant garter snakes, if present. The movement of vehicles on nearby developed access roads also has the potential to result in the injury or mortality of an unknown number of giant garter snakes, if present.

Giant garter snake has the potential to be affected by noise, vibration, and visual disturbance associated with the operation of construction equipment, which could reduce foraging efficiency, potentially resulting in decreased fitness or increased dispersal time away from cover and making individuals more vulnerable to predators. Noise and vibration could also cause snakes to emerge from refugia, increasing their vulnerability to predation or injury from construction equipment.

The potential impacts of injury, mortality, and the disruption of normal behaviors of giant garter snake from project construction would be potentially significant, but implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, and BIO-MM-4 would reduce this impact to a less-than-significant level by requiring training of construction staff on procedures for protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures; by implementing spill prevention and containment plans that would avoid material spills that could affect the viability of nearby aquatic and upland habitat; by enforcing the restriction of access routes to established roadways and the demarcation of construction area boundaries; and by requiring a CDFW- and USFWS-approved biologist to conduct pre-activity surveys, clear all work areas to ensure that no snakes are present, and monitor project activities in potential areas of impact.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-4: Avoid and Minimize Impacts on Giant Garter Snake

The following protocols will be implemented for giant garter snake in the study area and to avoid and minimize potential impacts if any are found.

- Pre-activity surveys for giant garter snake and potential refugia (i.e., burrows, soil cracks) will be conducted by a CDFW- and USFWS-approved biologist within 1 week prior to ground disturbance within the study area. The biologist will also survey along the access routes.
- At least 15 days prior to any ground-disturbing activities, SRWSLD will prepare and submit a relocation plan for CDFW's and USFWS's written approval. The relocation plan will contain the name(s) of the biologist(s) to relocate giant garter snakes, the method of relocation (if different than described), a map, and a description of the proposed release site(s) within 300 feet downstream of the work area or at a distance otherwise agreed to by CDFW and USFWS, and written permission from the landowner to use their land as a relocation site.
- To the extent practicable, all activities will be conducted within paved roads, farm roads, road shoulders, and similarly disturbed and compacted areas; ground disturbance and habitat removal will be confined to the minimal area necessary to facilitate construction activities.
- The perimeter of construction sites (except for work sites within areas of open water, such as the Sacramento River) within or adjacent to giant garter snake habitat will be fenced with exclusion fencing no more than 14 days prior to the start of construction activities (e.g., staging, vegetation removal, grading) in a given area. The construction manager and the biologist will determine where exclusion fencing will be installed to minimize the potential for giant garter snake to enter the construction work area, including consideration of nearby vegetation that could facilitate giant garter snake entering the exclusion area. The placement of exclusion fencing will be determined, in part, by the locations of suitable habitat for the species. SRWSLD will include the exclusion fence specifications, including installation and maintenance criteria, in the bid solicitation package special provisions. The exclusion fencing will remain in place for the duration of construction and will be regularly inspected and fully maintained. The biological monitor and construction manager will be responsible for checking the exclusion fencing around the work areas each day of construction to ensure that they are intact and upright. This inspection will be especially critical during times of inclement weather that can damage the fencing. Repairs to the exclusion fence will be made within 24 hours of discovery of a breach. Where construction access is necessary, gates will

be installed in the exclusion fence and fencing will direct animals away from the work area to the extent practicable (e.g., fencing will flare out and turn back toward suitable habitat).

- Immediately prior to the initiation of any vegetation clearing, ground-disturbing activities, and exclusion fence installation, the CDFW- and USFWS-approved biologist will survey suitable aquatic and upland habitat in the entire work site for the presence of giant garter snakes. If there is a lapse in construction in a work area for 7 days or more, these surveys will be repeated before activities resume.
- If exclusionary fencing is found to be compromised, a survey of the exclusion fencing and the area inside the fencing will be conducted immediately preceding construction activity that occurs in delineated giant garter snake habitat or in advance of any activity that may result in take of the species. The biologist will search along exclusionary fences, in pipes, and beneath vehicles before they are moved.
- The biologist will survey the active work area within suitable habitat areas daily to visually check for giant garter snakes. Any vehicles or equipment left idle for more than 1 hour or parked in work areas overnight will be visually inspected prior to operation to ensure that no giant garter snakes have found shelter under them. The biologist will ensure that the contractor caps all materials located onsite within suitable habitat areas (e.g., conduits, pipe), precluding wildlife from becoming entrapped. The biologist will check any crevices or cavities in the work area where wildlife may be present, including stockpiles that have been left for more than 24 hours, where cracks or crevices may have formed.
- If a giant garter snake is observed in the work area, the biologist will have the authority to stop work until the snake is out of the work area. The snake will be allowed to leave on its own, and the qualified biologist will remain in the area until the biologist deems their presence is no longer necessary to ensure that the snake is not harmed. If authorized by USFWS, the biologist will relocate giant garter snakes to a designated location according to a giant garter snake relocation plan.
- All giant garter snake observations will be reported to CDFW and USFWS via email or telephone within 1 working day. The observation will be recorded in the CNDDB.
- After completion of the proposed action, any temporary debris associated with the construction activities will be removed, and all temporarily disturbed areas will be restored to pre-project conditions within the same season or, at most, the same calendar year.
- A report of daily records from monitoring activities and observations will be prepared and provided to CDFW and USFWS upon request after completion of project activities.

Impact BIO-5: Potential mortality or disturbance of and loss of suitable nesting and foraging habitat for Swainson's hawk and white-tailed kite

Construction of the slurry cutoff wall would result in the permanent and temporary loss of potential nesting and the temporary loss of foraging habitat for Swainson's hawk and white-tailed kite. Nesting habitat loss would result from tree removal within the levee footprint and, if necessary, for the construction of the seasonal floodplain. The restored floodplain area would be designed to support riparian habitat for salmonids and would be designed with sufficient topography to support mature trees. However, some suitable nest trees could be lost from more frequent inundation of the restored floodplain. Foraging habitat for Swainson's hawk and white-tailed kite within the levee footprint would be temporarily unavailable during construction activities and during floodplain inundation.

Clearing and grubbing, excavation, and other construction activities could result in destruction of Swainson's hawk or white-tailed kite nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Destruction of white-tailed kite nests and nest abandonment would have to be avoided because white-tailed kite is fully protected under the CFGC. Any necessary tree trimming, tree removal, and shrub removal would occur prior to January 31 of the construction year to limit disturbance of tree-nesting birds, including Swainson's hawk and white-tailed kite (Chapter 2, Section 2.4, *Construction Schedule*). Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment and presence of construction crews could result in temporary disturbance of active Swainson's hawk and white-tailed kite nests and foraging activities.

Construction of the proposed project would result in potentially significant impacts on Swainson's hawk and white-tailed kite from removal of suitable habitat and potential loss or disturbance of active nests. These impacts would be significant because they could reduce the local Swainson's hawk and white-tailed kite populations through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-5a, BIO-MM-5b, BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a would reduce the level of impact to less than significant by requiring training of construction staff on procedures for protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures, and, because surveys would be conducted to determine if Swainson's hawk or white-tailed kite is nesting in or near work areas, no-disturbance buffers would be established around active nest sites, and impacts on nesting and foraging habitat would be mitigated through habitat restoration and preservation.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-5a: Conduct Focused Surveys for Nesting Swainson's Hawk, White-tailed Kite, and Other Raptors Prior to Construction and Implement Protective Measures during Construction

SRWSLD will retain qualified wildlife biologists (experienced with raptor identification and behaviors) to conduct focused surveys for Swainson's hawk, white-tailed kite, and other raptor nesting areas before construction begins. Survey methodology will follow the Swainson's Hawk Technical Advisory Committee's methodology (Swainson's Hawk Technical Advisory Committee 2000).

Because the area surrounding the project area is largely undeveloped, focused surveys for Swainson's hawk and white-tailed kite will be conducted in the project area and in a buffer area up to 0.5 mile around the project area. The survey area for other nesting raptors will encompass potential habitat within 500 feet of work areas. The portions of the Swainson's hawk and white-tailed kite buffer area containing unsuitable nesting habitat and/or with an obstructed line of sight to the project area will not be surveyed.

No active Swainson's hawk or white-tailed kite nest trees will be removed during the nesting season. If the biologists find an active Swainson's hawk or white-tailed kite nest, the contractor will maintain a 0.25-mile no-work buffer between construction activities and the active nest(s) until it has been determined that the young have fledged. The biologists will mark the no-work buffer with stakes and signs and will check the location at least weekly to ensure that the signs are in place and the buffer is being maintained. No work will be authorized within the buffer except for vehicle travel. If a 0.25-mile buffer around the nest cannot be maintained, SRWSLD and a qualified biologist will consult with CDFW about implementing alternative protective measures that are sufficient to minimize the risk of disturbance, such as a reduced buffer with full-time nest monitoring by a qualified biologist. If nesting raptors exhibit agitated behavior, indicating stress, the biological monitor will have the authority to stop construction in that area until they determine that the young have fledged.

For active nests of other raptors, no-disturbance buffers will be established around the nest sites to avoid disturbance or destruction of the sites until the end of the breeding season (August 31) or until after a qualified wildlife biologist determines that the young have fledged and moved out of the project area (this date varies by species). The extent of these buffers will be determined by the biologist in coordination with USFWS and CDFW and will depend on the species, level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.

Mitigation Measure BIO-MM-5b: Compensate for the Permanent Loss of Nesting Habitat for Swainson's Hawk and White-tailed Kite

SRWSLD will compensate for the permanent loss of suitable Swainson's hawk and white-tailed kite nest trees by planting replacement trees onsite or offsite. This measure may be met through the implementation of Mitigation Measures BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

This measure is described below under Impact BIO-17.

Impact BIO-6: Potential disturbance of western yellow-billed cuckoo

The nearest suitable breeding habitat for western yellow-billed cuckoo (*Coccyzus americanus*) is located approximately 500 feet northeast of the construction footprint on the east side of the Sacramento River; therefore, noise or vibration from construction equipment during the breeding season is not expected to result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. Vegetation removal for the construction of the levee and, if necessary, for creation of the floodplain restoration area, would result in the loss of potential migratory habitat for western yellow-billed cuckoo. Any necessary tree trimming, tree removal, and shrub removal would occur prior to January 31 of the construction year to limit disturbance to birds (Chapter 2, Section 2.4, *Construction Schedule*).

Nighttime construction lighting could temporarily disturb migrating cuckoos if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment and presence of construction crews could also result in the temporary disturbance of western yellow-billed cuckoo migration and foraging activities.

Construction of the proposed project would result in potentially significant impacts on western yellow-billed cuckoo from removal of suitable migratory habitat and the potential disturbance of essential behaviors of a special-status species. Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-5b, BIO-MM-7a, BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a would reduce the level of impact to less than significant by requiring training of construction staff on procedures for protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures; because surveys would be conducted for nesting birds (which would also identify presence of cuckoos using the study area); and because impacts on migratory habitat would be mitigated through habitat restoration and preservation.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-5b: Compensate for the Permanent Loss of Nesting Habitat for Swainson's Hawk and White-tailed Kite

This measure is described above under Impact BIO-5.

Mitigation Measure BIO-MM-7a: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

This measure is described below under Impact BIO-7.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

This measure is described below under Impact BIO-17.

Impact BIO-7: Potential mortality or disturbance of and loss of suitable nesting and foraging habitat for special-status and non-special-status migratory birds

Special-status birds that may nest in riparian forest and shrubs in the study area include yellow warbler and Modesto song sparrow (*Melospiza melodia mailliardi*). Great egret and great blue heron (*Ardea herodias*) may nest in the riparian forest in cottonwoods and sycamores. Modesto song sparrow may also nest in emergent vegetation in the agricultural ditch to the west of the proposed borrow site. Northern harrier and burrowing owl (*Athene cunicularia*) may nest in ruderal areas such as the floodplain restoration area or the proposed borrow site. Loggerhead shrike may nest in shrubs and trees in more open portions of the study area. Numerous non-special-status birds also may nest in these habitats. Any necessary tree trimming, tree removal, and shrub removal would occur prior to January 31 of the construction year to limit disturbance of tree-nesting birds (Chapter 2, Section 2.4, *Construction Schedule*). However, ground-nesting birds such as northern harrier and burrowing owl could be affected by clearing, grubbing, and removal of herbaceous vegetation within the floodplain restoration area or the proposed borrow site. Vegetation removal and other construction activities could result in destruction of nests, which could cause injury or mortality of eggs or nestlings. Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment and presence of construction crews could result in temporary disturbance of nests and foraging activities. Removal of nests or suitable nesting habitat (trees, shrubs, ruderal areas) and construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. Such losses could affect the local population of special-status and non-special-status species and would be considered a potentially significant impact. The implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-7a, BIO-MM-7b, BIO-MM-7c, BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a would reduce the level of impact to less than significant by requiring training of construction staff on procedures for protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures, and, because surveys would be conducted for nesting birds, no-disturbance buffers would be established around active nest sites, and impacts on suitable nesting and foraging habitat would be mitigated through habitat restoration and preservation.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-7a: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

SRWSLD will, to the maximum extent feasible, remove trees, shrubs, and herbaceous vegetation during the non-breeding season for most migratory birds (generally between September 1 and January 31) to remove nesting substrate and avoid potential delays in construction caused by the presence of nesting birds. If vegetation cannot be removed between September 1 and January 31, or if ground cover re-establishes in areas where vegetation has been removed, the affected area will be surveyed for nesting birds, as discussed in Mitigation Measure BIO-MM-7b.

Mitigation Measure BIO-MM-7b: Conduct Pre-construction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found

For special-status species where survey protocols have been established by CDFW, USFWS, or technical advisory committees, those survey protocols will supersede this measure (i.e., Mitigation Measure BIO-MM-5a for Swainson's hawk and white-tailed kite). SRWSLD will retain qualified wildlife biologists with knowledge of the relevant species to conduct non-raptor nesting bird surveys no more than 14 days prior to the start of construction. Where suitable habitat is present to support yellow warbler, Modesto song sparrow, loggerhead shrike, northern harrier, burrowing owl, and other nesting birds, wildlife biologists will thoroughly survey habitat and/or listen for calls and songs of these species. Surveys for non-raptor nesting migratory birds will include examining all potential nesting habitat in and within 50 feet of work areas on foot and/or using binoculars. Surveys for nesting raptors will be conducted during Swainson's hawk and white-tailed kite surveys. If no active nests are detected during these surveys, no additional measures are required.

If an active nest is found in the survey area, a no-disturbance buffer will be established around the nest site, to avoid disturbance or destruction of the site, until the end of the breeding season (August 31) or until after a qualified wildlife biologist determines that the young have fledged and moved out of the project area (this date varies by species). The extent of these buffers will be determined by the biologist in coordination with USFWS and CDFW and will depend on the species, level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. If it is determined that the no-disturbance buffer cannot be maintained, SRWSLD and the qualified biologist will consult with USFWS and CDFW about implementing a reduced buffer but requiring full-time nest monitoring by a qualified biologist to watch for signs of stress. If behaviors indicating stress or potential nest abandonment (e.g., visible or audible agitation, leaving the nest at an unusual time or for an unusual length of time), the biologist will have the authority to stop work until the bird has returned to the nest or otherwise shows signs of recovery from the stress.

Mitigation Measure BIO-MM-7c: Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found

SRWSLD will retain a qualified biologist to conduct pre-construction take avoidance surveys for active burrows according to methodology in CDFW's 2012 *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012).

Regardless of results from the surveys described above, if suitable habitat is present in the project area, two pre-construction take avoidance surveys will be conducted in the project area (i.e., the area of ground disturbance and surrounding 500 feet) no less than 14 days before and 24 hours before initiating ground-disturbing activities. If suitable habitat within 500 feet of ground disturbance is not accessible because of landowner restrictions, then the survey will extend to the edge of where access is allowed. If no burrowing owls are found, no further mitigation is required. If burrowing owls are found, SRWSLD will implement the following measures summarized from the 2012 *Staff Report on Burrowing Owl Mitigation*.

- Occupied burrows will not be disturbed during the breeding season (February 1 to August 31).
- Depending on the time of year and level of disturbance, a 164-foot-wide to 1,640-foot-wide buffer area will be established around occupied burrows. No construction will be authorized within the buffer unless a qualified biologist determines through non-invasive methods that egg laying and incubation have not begun or that juveniles are foraging independently and are capable of independent survival.
- To the maximum extent possible, burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls will be avoided.
- To the maximum extent possible, destruction of unoccupied burrows in temporary impact areas will be avoided, and visible markers will be placed near burrows to ensure they are not collapsed.
- Occupied burrows that cannot be avoided will have exclusion devices installed and be collapsed. Burrow exclusion will be conducted only by qualified biologists during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping.
- Qualified biologists will conduct additional take avoidance surveys, as described above.
- Qualified biologists will monitor the project site for burrowing owls during project construction activities.
- Impacts on burrowing owls and their habitat will be minimized by using buffer areas, visual screens, and other measures during project construction activities. Recommended buffer distances in the 2012 *Staff Report on Burrowing Owl Mitigation* will be used or site-specific buffers and visual screens will be determined through information collected during site-specific monitoring and consultation with CDFW.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

This measure is described below under Impact BIO-17.

Impact BIO-8: Potential disturbance of greater sandhill crane and other foraging waterbirds

Greater sandhill crane (*Grus canadensis tabida*), mountain plover (*Charadrius montanus*), white-faced ibis (*Plegadis chihi*), and other waterbirds may forage in agricultural fields within and adjacent to the study area. The borrow area may provide suitable foraging habitat for mountain plover after the vegetation has been cleared. White-faced ibis and greater sandhill crane may forage in fields adjacent to the study area that are planted in winter wheat (*Triticum aestivum*). Nighttime construction lighting, noise and vibration from operation of vehicles and equipment, and presence of construction crews could make adjacent foraging habitat temporarily unavailable to these species but would not result in injury or mortality of individuals because birds would be expected to avoid these areas of disturbance during construction of the proposed project. The impact would be less than significant.

Impact BIO-9: Potential injury, mortality, or disturbance of tree-roosting bats and removal of roosting habitat

Construction is anticipated to occur during the maternity season of bats (April 1 through September 15) and at the beginning of the hibernation period (November 1). Trees removed for the construction of the slurry cutoff wall may provide suitable roosting habitat (cavities, crevices, furrowed bark, foliage) for special-status bats (western red bat [*Lasirurs blossevillii*] and pallid bat [*Antrozous pallidus*]) and bats for which conservation actions are warranted (hoary bat [*Aeorestes cinereus*], western small-footed myotis [*Myotis ciliolabrum*], and Yuma myotis [*Myotis yumanensis*]) (California Department of Fish and Wildlife 2022c). Removal of trees during construction could result in the permanent loss of roosting habitat for bats, including maternity, seasonal migration, and/or winter roosting habitats. Tree removal during construction could also result in injury or mortality of bats, including non-volant pups, or eviction from roosts during the daytime when they would be disoriented and vulnerable to predation. Bats displaced from roost sites would have to compete with other bats for new roost locations.

Nighttime construction lighting could temporarily disturb bat foraging activities. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of bats roosting near work areas.

Construction of the proposed project would result in potentially significant impacts on special-status bats from removal of suitable habitat and potential loss or disturbance of active roosts and displacement of bats from roost sites. Impacts from construction would be significant because they could reduce the local populations of these special-status bats through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-9, BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a would reduce the level of impact from construction to less than significant because surveys for special-status bats would be conducted, protective measures would be implemented, roosting habitat that is permanently lost would be replaced and protected onsite or at an offsite preservation area, impacts on oak woodland would be minimized, and impacts on valley foothill riparian habitat in which special-status bats may roost or forage would be compensated for through habitat restoration and preservation.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-9: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal

Prior to tree trimming or removal, SRWSLD will retain a qualified biologist to conduct pre-construction surveys and implement protective measures for hoary bat, western red bat, pallid bat, western small-footed myotis, and Yuma myotis and other tree-roosting bats. Prior to initiating tree trimming or removal, a qualified biologist will examine the trees to be removed or trimmed to identify suitable bat roosting habitat. Because of the limited timeframe for tree removal for bats (September 15 to October 31), the tree habitat assessment should be conducted early enough to provide information to inform tree removal planning. The biologists will identify high-quality habitat features (e.g., large tree cavities, basal hollows, loose or peeling bark, larger snags), and the area around these features will be searched for bats and indications of bat use. If the tree can be adequately assessed and no habitat for roosting bats is present, no further actions are necessary and tree removal or trimming may commence. Because signs of bat use are not easily found, and trees cannot be completely surveyed for bat roosts, SRWSLD will implement the following protective measures for trees containing potential roosting habitat, as determined by the biologist conducting the pre-construction surveys.

- Trimming or removal of trees with potentially suitable bat roosting habitat will be avoided during the maternity season (generally between April 1 and July 31) and the hibernation season (generally from November 1 to March 1).
- Removal of trees providing bat roosting habitat will be conducted only before maternity colonies establish (generally after March 1) or after they disperse (generally August 1 to October 31).
- If a maternity roost is found, the roost will be protected until July 31 or until the qualified biologist has determined that the maternity roost is no longer active. Appropriate no-work buffers around the roost will be established under direction of the qualified biologist. Buffer distances may vary depending on the species and activities being conducted.
- Trimming and removal of trees (between July 31 and October 31) with suitable roosting habitat will be monitored by a qualified biologist. Tree trimming and removal will be conducted using a two-phase removal process conducted over two consecutive days. In the afternoon on the first day, limbs and branches will be removed using chainsaws only. Only branches or limbs without cavities, crevices, or deep bark fissures will be removed; branches and limbs with these features will be avoided. On the second day, the entire tree will be removed. The qualified biologist will search through downed vegetation for injured or dead bats. Observation of injured or dead special-status bats will be reported to CDFW.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland

This measure is described below under Impact BIO-16.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

This measure is described below under Impact BIO-17.

Special-Status Fish

The proposed project has the potential to result in direct or indirect effects on candidate, sensitive, or special-status fish species, or their habitat, through (1) underwater noise (acoustic effects), (2) direct injury or mortality, (3) water quality effects (suspended sediment, turbidity, resuspension of contaminants in river sediments, unintentional contaminant spills), (4) direct impacts on riparian and SRA cover habitats, (5) increases in aquatic habitat associated with lowered floodplain area, and (6) introduction or spread of invasive species. These potential effects are summarized below. There are no expected changes in operations following project construction and, therefore, no further discussion of operations.

Impact BIO-10: Acoustic effects on candidate, sensitive, or special-status fish species

Activities with the potential to generate underwater noise would include pile driving (impact and/or vibratory)[2] of piles to support a necessary replacement or modification to pump structures and placement of revetment. Underwater noise from these implementation activities has the potential to disturb or result in the injury and/or mortality of state- and federally listed species or other special-status fish in the Sacramento River (Table 3.5-2). Impact pile driving (in water or on land within 200 feet of the river) would be of most concern as it generates sound levels that can injure or kill fish and other aquatic organisms. All proposed impact pile driving would occur on land above water surface elevations, working in the dry.

Pile Driving Effects on Fish

Research indicates that impact pile driving can result in adverse effects on fish because of the level of underwater sound produced (Popper and Hastings 2009:464–480). The effects of pile driving noise on fish may include behavioral responses, physiological stress, temporary and permanent hearing loss, tissue damage (auditory and non-auditory), and direct mortality. Factors that may influence the magnitude of effects include (1) species, life stage, and size of fish (smaller fish are more susceptible to injury); (2) type and size of pile and hammer (larger piles and bigger hammers result in more noise); (3) frequency and duration of pile driving (more strikes per day means greater accumulated energy); (4) site characteristics (e.g., water depth, channel bends [sound attenuates faster in shallow water and around bends]); and (5) distance of fish from the source (fish closer to the source of the noise are at greater risk of injury than fish farther away).

Dual interim criteria have been established to provide guidance for assessing the potential for injury of fish resulting from pile driving noise (Fisheries Hydroacoustic Working Group 2008:1) and were used in this evaluation. These "interim injury criteria" were agreed upon by the signatory agencies and are now routinely used to evaluate the effects of impact pile driving sound on fish. The dual criteria for impact pile driving are shown in Table 3.5-3.

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[2] Impact pile driving uses a hydraulic hammer mounted on a piling rig with a ram mass to dynamically drive piles into the ground, while vibratory pile driving uses a low-impact method of creating vertical vibrations that put soil particles into motion, thereby loosening the soil and allowing the pile to penetrate the soil. Impact pile driving results in high-intensity impulsive sounds that can potentially cause injury in fish. Vibratory hammers generally produce less sound than impact hammers and are often employed as a mitigation measure to reduce the potential for adverse effects on fish that can result from impact pile driving (California Department of Transportation 2015:2-17). In addition, there are no established injury criteria for vibratory pile driving (California Department of Transportation 2015:2-17); therefore, effects on fish from vibratory pile driving are typically behavioral.

Table 3.5-3. Interim Criteria for Injury to Fish from Impact Pile Driving Activities

Interim Criteria	Agreement in Principle
Peak sound pressure level	206 dB ref: 1 μPa—for all sizes of fish
Cumulative sound exposure level	187 dB ref: 1 μPa^2-sec—for fish sizes ≥ 2 grams 183 dB ref: 1 μPa^2-sec—for fish sizes < 2 grams

Source: Fisheries Hydroacoustic Working Group 2008.
≥ = greater than or equal to; < = less than; μPa = microPascal; dB = decibel; ref: = reference; sec = second.

The interim injury criteria indicated in Table 3.5-3 relate to impact pile driving only. The peak sound pressure level (SPL) is considered the maximum SPL a fish can receive from a single strike without injury. The cumulative sound exposure level (SEL) is considered the total amount of acoustic energy that a fish can receive from single or multiple strikes without injury. The cumulative SEL threshold is based on the cumulative daily exposure of a fish to noise from sources that are discontinuous (e.g., noise that occurs for only 8 to 12 hours in a day, with 12 to 16 hours between exposure). This quiet period assumes that a fish is able to recover from any pile driving effects during the 8- to 12-hour exposure period.

In the following analysis, the potential for injury to fish from exposure to pile driving sounds was evaluated using a spreadsheet model developed by NMFS to calculate the distances from the pile that sound attenuates to below the peak or cumulative criteria. These distances define the area in which the criteria are expected to be exceeded and potentially result in the injury of fish that may be present. This area is often referred to as the isopleth of impacts. The NMFS spreadsheet calculates these distances based on estimates of the single-strike sound levels for each pile type (measured at 10 meters [33 feet] from the pile) and the rate at which sound attenuates with distance. In the following analysis, the standard sound attenuation rate of 4.5 decibels (dB) per doubling of distance was used in the absence of other data and a correction of -2 dB was taken to account for the piles being driven on land at 10 and 50 feet from water. To account for the exposure of fish to multiple pile driving strikes, the model computes a cumulative SEL for multiple strikes based on the single-strike SEL and the estimated number of strikes per day or the pile driving event. The NMFS spreadsheet also employs the concept of “effective quiet.” This concept assumes that cumulative exposure of fish to pile driving sounds of less than 150 dB SEL does not result in injury.

The following analysis also considers the potential for pile driving sound to adversely affect fish behavior. Potential mechanisms include startle or avoidance responses that can disrupt or alter normal activities (e.g., migration, holding, feeding) or expose individuals to increased predation risk. Insufficient data are currently available to support the establishment of a noise threshold for behavioral effects (Hastings and Popper 2005:46; Popper and Hastings 2009:464). NMFS generally assumes that a noise level of 150 dB root mean square (RMS) is an appropriate threshold for behavioral effects, although neither research data nor related citations have been provided to support this threshold (California Department of Transportation 2015:4-23).

Vibratory pile driving methods produce more continuous, lower energy sounds below the thresholds associated with injury. There are currently no established noise thresholds associated with continuous sound waves, and vibratory methods are generally accepted as an effective measure for minimizing or eliminating the potential for injury of fish during in-water pile driving operations, though they are likely to still cause physiological and behavioral changes (McCauley et al. 2003; Popper and Hastings 2009).

Noise from Impact Driving of Piles

Table 3.5-4 summarizes the pile driving activities (location, timing, and duration) that were identified as having the potential to generate underwater noise levels exceeding the peak and cumulative injury thresholds in the Sacramento River. Although the specific details of pile type and size that would be used are not known at this time, the following noise analysis is based on 12-inch steel pipe piles. This pile type and size provides a reasonable estimate of the magnitude and extent of noise impacts that could occur during pile driving activities.

Table 3.5-4. Summary of Pile Driving Activities with Potential to Exceed Injury and/or Behavioral Thresholds for Fish

Activity	Location	Approximate Timing	Approximate Duration (Days)
Impact driving of 12-inch steel piles for pump plant structure and slant pump (4 piles at each location)	On land (2 piles each located approximately 10 and 50 feet from water)	July 1 to October 15	2

The reference levels used to estimate the noise levels for pile driving activities were selected from data reported for projects with similar types of pile driving and demolition operations and site characteristics (California Department of Transportation 2020). The peak level represents the maximum reported noise level. The single-strike SELs and RMS levels represent noise levels from a typical pile strike; typical pile strike levels are developed by averaging a range of data collected from past projects. The computation of cumulative SELs is based on the maximum number of piles that can reasonably be installed in one day and the estimated number of strikes required to drive each pile. Because of uncertainties in site conditions potentially encountered during pile driving operations (e.g., bed resistance), it is assumed that each pile would be impact driven only, although it is possible that each pile could be partially installed using vibratory pile driving, with impact driving used to drive the remaining portion. The computed distances over which pile driving sounds are expected to exceed the injury and behavioral thresholds assume an unimpeded sound propagation path. However, site conditions such as shallow water (less than 1 meter, or 3.3 feet), major channel bends, and other in-water structures can reduce these distances by impeding the propagation of underwater sound waves. Pile driving assumptions, source data, reference values, and results of the hydroacoustic analysis are provided in Table 3.5-5. The estimated number of pile strikes per day was provided by the project engineers. It is assumed that up to four piles could be installed in a day, for a total of 2 days of pile driving.

Table 3.5-5. Distances to Injury and Behavioral Thresholds for Impact Driving Based on 12-Inch Steel Pipe Piles

Pile Size/Type	Location	Number of Piles	Number of Piles per Day	Number of Strikes per Day	Distance to 206-dB Peak Criterion (feet)	Distance to 187-dB Cumulative SEL Criterion (feet)	Distance to 183-dB Cumulative SEL Criterion (feet)	Distance to 150-dB RMS Criterion (feet)
12-inch steel pipe pile	On land	8	4	400[a]	<33	62	112	1,522

< = less than; dB = decibels; RMS = root mean square; SEL = sound exposure level.

[a] Based on an estimate of 100 strikes per pile.

For driving 12-inch steel pipe piles, the pile driving analysis suggests that the distance from the source pile to sound level thresholds (i.e., upstream and downstream) would be 1 meter (3 feet) for the 206-dB injury threshold, 19 meters (62 feet) for the 187-dB SEL injury threshold, and 34 meters (112 feet) for the 183-dB SEL injury threshold, assuming an unimpeded propagation path (Table 3.5-5). However, the potential for behavioral effects would extend much farther. Based on the threshold of 150 dB RMS, potential behavioral effects are calculated to extend up to 464 meters (1,522 feet) from the source pile. These estimates likely reflect maximum distances from the source pile for potential direct injury and behavioral impacts on state- and federally listed fish and other special-status fish in the Sacramento River (Table 3.5-5). While the extent of the 187-dB, 183-dB, and 150-dB RMS thresholds overlap, only the 150-dB RMS behavioral threshold would cover the entire width of the Sacramento River near the proposed pile driving sites. Furthermore, this analysis assumes use of impact pile driving exclusively (i.e., no vibratory pile driving during initial pile installation). Thus, these effect estimates are conservative.

Noise from Placing Rock Revetment

Placement of revetment has the potential to result in temporary loud noises, although the available data from analogous situations suggest such effects would be limited. For example, sound data taken during the installation of rock barriers as part of the California Department of Water Resources Temporary Barriers Project in the South Delta led NMFS (2018:33) to conclude that noise levels generated during placement of rock below the waterline were not expected to reach levels that would incur tissue injury (i.e., greater than 206 dB peak; Table 3.5-3) from construction activities but were likely to result in adverse behavioral effects (150 dB) on fish within 328 feet of activities. Therefore, effects on fish in the Sacramento River would be limited to behavioral effects only while the revetment is being placed. These potential impacts would occur throughout the day during the proposed 2-week-long revetment installation effort.

Summary of Acoustic Effects

The proposed project could result in adverse acoustic effects on candidate, sensitive, or special-status fish species in the Sacramento River. However, seasonal work timing restrictions required in Mitigation Measure BIO-MM-10a would limit the localized effect of pile driving and placement of rock revetment to periods (July 1 to October 15) when life stages of some fish species are not present (e.g., adult winter-run Chinook salmon and juvenile spring-run Chinook salmon) or their abundance in the affected reach of the Sacramento River is relatively low (e.g., adult North American green sturgeon). Any fish present would be expected to pass through the affected area relatively quickly in response to pile driving, revetment installation, and general work-related noise, thereby limiting their exposure. Restricting pile driving in the Sacramento River to July 1 to October 15 would also limit exposure to only a proportion of the total population of more abundant species (e.g., adult steelhead and fall-run Chinook salmon) migrating through the affected area at this time of year. In combination with seasonal restrictions, limiting pile driving and rock revetment placement activities to 12-hour workdays only, as required in Mitigation Measure BIO-MM-10a, would give fish a 12-hour period to recover between exposures or migrate through the area unexposed during nighttime hours, further limiting the proportion of any given fish run exposed to underwater noise. In addition, the potential for injury to fish from exposure to impact pile driving noise would be reduced because measures would be taken to minimize exceedance of interim threshold sound levels during pile driving and hydroacoustic monitoring would be conducted during impact pile driving to ascertain compliance with established objectives (e.g., distances to cumulative noise thresholds) and identify corrective actions to be taken should the predicted threshold distances be exceeded as part of Mitigation Measures BIO-MM-10a, BIO-MM-10b, and BIO-MM-10c. Thus, noise generated by pile driving and placement of rock revetment would be expected to affect only a small proportion of these fish populations in the Sacramento River. Acoustic effects on candidate, sensitive, or special-status fish species, or their habitat, from implementation would therefore be less than significant with mitigation.

Mitigation Measure BIO-MM-10a: Implement Seasonal and Daily In- and Near-Water Work Restrictions

To avoid the primary migration periods and most vulnerable life stages of listed fish species that may occur in the project area, all in- and near-water work will be restricted to the period between July 1 and October 15. In addition, in-water work activities will be restricted to no more than 12 hours per day during daylight hours (7 a.m. to 7 p.m.) to provide fish with an extended period outside of working hours for unimpeded movement and forage opportunities. Activities restricted to these seasonal and daily periods include any work within the bed or bank of the Sacramento River below the OHWM, such as placement of rock revetment, or impact pile driving within 200 feet of the water.

Mitigation Measure BIO-MM-10b: Implement Measures to Minimize Exceedance of Interim Threshold Sound Levels during Pile Driving

The project proponent will require the contractor to implement the following avoidance and minimization measures, developed in coordination with project design engineers, to minimize the exposure of listed fish species to potentially harmful underwater sounds.

- If feasible, the contractor will vibrate all piles to the maximum depth possible before using an impact hammer.
- During impact driving, the contractor will limit the number of strikes per day to the minimum necessary to complete the work and will limit the total number of hammer strikes to the engineer's estimated maximum number of strikes needed to drive the pile to the depth assumed for the pile driving analysis.
- The smallest pile driver and minimum force necessary will be used to complete the work.
- During impact driving of piles in water, the project proponent will require the contractor to use a bubble curtain or similar device, if feasible, to minimize the extent to which the interim peak and cumulative SEL thresholds are exceeded.
- All pile driving (impact or vibratory) will be restricted to seasonal (July 1 to October 15) timing limitations to avoid primary migration periods for fish.
- All pile driving (impact or vibratory) will be restricted to daily (7 a.m. to 7 p.m.) timing restrictions to provide fish with an extended quiet period during nighttime hours on days pile driving is being conducted for feeding and unobstructed passage.

Mitigation Measure BIO-MM-10c: Develop and Implement a Hydroacoustic Monitoring Plan

The project proponent and/or its construction contractor will develop and implement a hydroacoustic monitoring plan. The monitoring plan will be submitted to the resource agencies

(CDFW, NMFS, and USFWS) for approval at least 60 days before the start of pile driving activities. The plan will include the following requirements.

- The project proponent and/or its construction contractor will monitor underwater noise levels during all impact pile driving activities on land and in water to ensure that peak and cumulative SELs do not exceed established objectives (e.g., distances to cumulative noise thresholds) stated in the project's biological opinion from NMFS and will identify corrective actions to be taken should the predicted threshold distances be exceeded. Corrective actions include stopping pile driving for the day before predicted threshold distances are exceeded and limiting the number of pile strikes per day on subsequent days to ensure compliance with the predicted threshold distances.
- The monitoring plan will describe the methods and equipment that will be used to document the extent of underwater sounds produced by pile driving, including the number, location, distances, and depths of the hydrophones and associated monitoring equipment.
- The monitoring plan will include a reporting schedule for daily summaries of the hydroacoustic monitoring results and for more comprehensive reports to be provided to the resource agencies on a monthly basis during the pile driving season. The daily reports will include the number of piles installed per day; the number of strikes per pile; the interval between strikes; the peak SPL, SEL, and RMS per strike; and the accumulated SEL per day at each monitoring station.
- The project proponent or its contractor will ensure that a qualified fish biologist is on site during impact pile driving to document any occurrences of stressed, injured, or dead fish. If stressed, injured, or dead fish are observed during pile driving, the project proponent and/or its construction contractor will reduce the number of strikes per day to ensure that fish are no longer showing signs of stress, injury, or mortality.

Impact BIO-11: Direct mortality of candidate, sensitive, or special-status fish species

The proposed project includes the installation of rock revetment, some of which could be installed directly into the water. In-water work activities could injure or kill fish by direct contact with equipment or materials that enter or operate within the open waters of the Sacramento River. Potential mechanisms include fish being crushed by falling rock during placement of rock revetment or struck by heavy equipment placing the rock. However, these risks would be expected to be low based on the limited spatial extent of the work, the relatively slow speed at which equipment in the water would operate, the high probability of fish avoiding such activities, the limited duration of the work (approximately 12 days total), and as required in Mitigation Measure BIO-MM-10a, the seasonal timing of activities when the abundance of sensitive species in the river is at its lowest (work most likely would be conducted in September). Displacement of fish away from habitat near construction activities seems the most likely adverse effect. This displacement can cause fish, especially juveniles, to leave protective habitat and be exposed to opportunistic predators (e.g., avian species, striped bass [*Morone saxatilis*], black bass, Sacramento pikeminnow [*Ptychocheilus grandis*]) that injure or kill individuals. However, the risks associated with displacement are also expected to be low based on the limited spatial extent of the work and the seasonal timing (July 1 to October 15) of in-river activities when abundances of juveniles of sensitive species in the river are at their lowest, as required in Mitigation Measure BIO-MM-10a.

Temporary water diversions from the Sacramento River may be necessary while existing water diversion equipment is rerouted during the construction process. These water diversions would be conducted under the water users' existing water rights and authorizations; the proposed project is only providing for the continuance of existing diversions during any temporary construction disruptions to existing pump equipment. Although the proportion of flow from the river that would be diverted would be small, fish could be entrained and killed if the diversion intakes are not properly screened or otherwise isolated from the river by nets or similar methods. However, this impact would be minimized or avoided by implementation of Mitigation Measure BIO-MM-11, which requires the use of fish screens or other exclusion devices recommended or approved by NMFS and CDFW on diversion intakes to minimize and avoid entrainment of fish. The risk of direct physical injury of candidate, sensitive, or special-status fish species during implementation would therefore be less than significant with implementation of Mitigation Measure BIO-MM-11.

Mitigation Measure BIO-MM-10a: Implement Seasonal and Daily In- and Near-Water Work Restrictions

This measure is described above under Impact BIO-10.

Mitigation Measure BIO-MM-11: Implement Fish Exclusion Devices on Temporary Water Intakes.

The project proponent or its contractor will screen, or otherwise exclude fish from, water intakes used for the temporary diversion of water from the Sacramento River when existing pumps are inoperable to minimize and avoid entrainment of fish. Only fish screens or other fish exclusion devices recommended or approved by CDFW and NMFS will be used, and fish screens will follow CDFW and NMFS screening guidelines for temporary diversions.

Impact BIO-12: Water quality impacts on candidate, sensitive, or special-status fish species

Suspended Sediment and Turbidity

Installation of the slurry cutoff wall and revetment and grading of the floodplain area would disturb the bed and bank of the Sacramento River and adjacent upland soils that could potentially cause in-river sediments to be resuspended and mobilized or lead to erosion of upland sediments that in turn are then transported and delivered to the Sacramento River. Resuspension and mobilization of in-river sediments, and input of upland sediments to the Sacramento River, could temporarily increase water column turbidity and sedimentation rates above ambient levels and potentially alter fish physiology, behavior, and habitat conditions in downstream river reaches. Activities that have the potential to result in channelbed disturbance and sediment transport and delivery to the river include (1) degrading and rebuilding the levee as a part of slurry cutoff wall installation, (2) installing revetment, and (3) grading and recontouring the floodplain area. Activities that would occur in or immediately adjacent to the river (e.g., placing rock below the water at the bank toe) have the greatest potential to disturb river sediments or contribute sediment to the Sacramento River.

As previously mentioned, elevated levels of suspended sediments have the potential to result in physiological, behavioral, and habitat effects on fish. The severity of these effects depends on the sediment concentration, duration of exposure, proximity of the action to the water body, and timing of the disturbance relative to the occurrence of the species and sensitive life stages. Short-term increases in turbidity and suspended sediment may disrupt normal behavior patterns of fish, potentially affecting foraging, rearing, and migration. The level of disturbance may also cause juvenile fish to abandon protective habitat or reduce their ability to detect predators, potentially increasing their vulnerability to predators (e.g., piscivorous birds and fish). Chronic exposure to high turbidity and suspended sediment may affect fish growth and survival by impairing respiratory function, reducing tolerance to disease and contaminants, and causing physiological stress (Waters 1995). Deposition of excessive fine sediment on the river bottom could eliminate habitat for aquatic insects; reduce density, biomass, number, and diversity of aquatic insects and vegetation; reduce the quality and quantity of rearing and spawning habitat (for species that spawn in this segment of the Sacramento River); and block the interchange of surface and subsurface waters. See Section 3.3, *Hydrology and Water Quality*, for additional information on potential effects on fish and aquatic habitats related to elevated levels of suspended sediments.

As described in Section 3.3, *Hydrology and Water Quality*, increases in turbidity and suspended sediment generated during slurry cutoff wall installation, rock placement, and floodplain grading activities would be temporary and localized, and unlikely to reach levels causing direct injury or mortality to fish or the permanent displacement of juvenile or adult fishes or benthic macroinvertebrates (an important prey item for fish). In some cases, increases in turbidity could produce minor positive effects. For example, turbidity has been known to reduce vulnerability to predation in some species interactions (Gregory and Levings 1998:275). NMFS (2008:95) reviewed observations of turbidity plumes during installation of riprap for bank protection projects on the Sacramento River and concluded that visible plumes are expected to be limited to only a portion of the channel width, extend no more than 1,000 feet downstream, and dissipate within hours of cessation of in-water activities. Based on these observations, NMFS (2008:95) concluded that such activities could result in turbidity levels exceeding 25–75 Nephelometric Turbidity Units (NTU). This level of effect is considered representative of potential turbidity effects associated with this project.

Given the relatively short exposure time and the restricted area of in-water work relative to the distribution and temporal occurrence of state- and federally listed fish and other special-status species in the Sacramento River between July 1 and October 15, the period when in-water work activities would be allowed per Mitigation Measure BIO-MM-10a, the effect of contaminants mobilized by in-water work is not expected to substantially affect the survival or growth of fish in the Sacramento River. Limiting in-water work activities to daylight hours only, as required in Mitigation Measure BIO-MM-10a, would further limit the exposure of fish to turbidity and suspended sediments from project activities. The risk of impacts on candidate, sensitive, or special-status fish species from increases in suspended sediment and turbidity during levee degrade/regrade, installation of rock revetment, and floodplain grading and contouring would therefore be less than significant with implementation of Mitigation Measure BIO-MM-10a.

Increased Exposure to Contaminants

Disturbance and resuspension of river bottom sediments during rock revetment placement poses a risk to state and federally listed fish and other special-status species in the Sacramento River because of potential increases in the exposure to contaminated sediments. Sand, silt, and gravel likely dominate bottom substrates in the project area. Non-soluble contaminants with a tendency to adsorb[3] to sediments (as opposed to soluble contaminants, which tend to be readily diluted in water) can accumulate in the substrate over time. Non-soluble contaminants that are known to be

[3] Adsorb refers to the adhesion of atoms, ions or molecules from a gas, liquid or dissolved solid to a surface, in this case sediment particles.

present in the Sacramento River include polychlorinated biphenyls (PCBs), mercury, pesticides and insecticides (i.e., dieldrin, DDT), and other unknown toxicities (State Water Resources Control Board 2018). Resuspension of sediments with adsorbed metals during any in-water rock revetment placement potentially could lead to degradation of water quality and food resources in the Sacramento River. In addition, resuspended particulate material could be transported to other locations in the Sacramento River as a result of transport by river currents, thus leading to potential degradation of water quality and food resources beyond the immediate work site. Restricting in-water rock revetment activities to the July 1 to October 15 window would minimize or avoid exposure of most state and federally listed fish and other special-status species in the Sacramento River to contaminants because most of these species occur less frequently in the Sacramento River during this time of year.

In-water activities, if they occur, would be limited to placement of rock revetment and final breach of the floodplain grading. These activities would be limited to 12 hours during daylight hours only each day they occur, as required Mitigation Measure BIO-MM-10a. Thus, disturbance of channel substrate and the potential for increased contaminants would be temporary (up to 12 hours each day) and localized. Assuming that mobilization of sediment is also an indication of contaminant mobilization, the proposed in-water construction methods consisting of working from shore should minimize the potential exposure of fish to increases in contaminants.

Given the relatively short exposure time and the restricted area of in-water activities relative to the distribution and temporal occurrence of state and federally listed fish and other special-status species in the Sacramento River between July 1 and October 15, the period when in-water construction activities would be allowed per Mitigation Measure BIO-MM-10a, the effect of contaminants mobilized by in-water activities is not expected to substantially affect the survival or growth of these species in the Sacramento River. The risk of impacts on candidate, sensitive, or special-status fish species from increased exposure to contaminants during placement of rock revetment activities would therefore be less than significant with implementation of Mitigation Measure BIO-MM-10a.

Unintentional Contaminant Spills

The levee degrade/regrade associated with slurry cutoff wall installation, installation of rock revetment, and floodplain grading and contouring would require the use of fuels, oils, grease, and hydraulic fluids to operate equipment and vehicles onsite. Accidental spills of these materials during handling and equipment operation could enter the river directly or contaminate soils where they could be transported by stormwater runoff to the river, resulting in localized water quality degradation. This degradation could subsequently lead to adverse effects on fish through direct injury and mortality (e.g., damage to gill tissue that causes asphyxiation) or delayed effects on growth and survival (e.g., increased stress or reduced feeding), depending on the nature and extent of the spill and the contaminants involved.

The greatest potential for an adverse water quality impact is associated with an accidental spill from activities occurring immediately adjacent to the river. Other implementation elements (e.g., use of excavators, dump trucks, bulldozers, front end loaders) that occur in upland areas or are isolated from the river have little potential for accidental spills that could affect fish because of the distance separating work activities from the river. See Section 3.3, *Hydrology and Water Quality*, for additional information on potential surface water quality effects associated with project implementation.

The proposed project would be subject to a construction-related stormwater permit and dewatering requirements of the CWA and National Pollutant Discharge Elimination System (NPDES) program. The project proponent would obtain required permits through the CVRWQCB before any ground-disturbing activity occurs. As required in Mitigation Measure BIO-MM-12, the project proponent would develop and implement a Stormwater Pollution Prevention Plan (SWPPP) before and throughout the work period to protect fish and aquatic habitat from exposure to elevated levels of contaminants and sediment by preventing water runoff, spills, and sediment from entering waterways in immediate proximity to work activities by using physical barriers or by locating work and staging activities not in proximity of waterways to the extent practicable. The spill prevention, control, and countermeasure plan and response measures described in Mitigation Measure BIO-MM-12 would prevent and minimize the introduction of hazardous materials during proposed project implementation into surface waters through specific equipment, workforce, procedural, and training requirements for the prevention of, preparedness for, and response to hazardous materials spills. These measures would ensure that stormwater runoff would be controlled with physical and procedural means to reduce or avoid degradation of water quality in watercourses downstream of the work sites that could have both short- and long-term effects on fish populations and aquatic habitat. All in-water activities would be limited to allowable seasonal in-water work windows and daily restrictions, as required in Mitigation Measure BIO-MM-10a. Implementation of the aforementioned permit requirements and associated BMPs would ensure that ground disturbance activities do not violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality that would adversely affect fish populations and habitat.

The permit requirements and associated BMPs described above for sediment disturbance would also reduce and minimize effects associated with water quality and potential effects on state- and federally listed fish and other special-status fish species in the Sacramento River because they would prevent water runoff, spills, and sediment from entering waterways in immediate proximity to work activities by using physical barriers and sediment basins or by locating work sites and staging areas away from the river to the extent practicable. The risk of impacts on candidate, sensitive, or special-status fish species from unintentional contaminant spills during implementation of the proposed project would therefore be less than significant with implementation of Mitigation Measures BIO-MM-10a and BIO-MM-12.

Mitigation Measure BIO-MM-10a: Implement Seasonal and Daily In- and Near-Water Work Restrictions

This measure is described above under Impact BIO-10.

Mitigation Measure BIO-MM-12: Protect Water Quality and Prevent Erosion and Sedimentation in Drainages and Wetlands

The project proponent or their construction contractor will comply with all construction site BMPs specified in the final SWPPP that will be developed for the proposed project, as well as any other permit conditions to minimize introduction of construction-related contaminants and mobilization of sediment in the Sacramento River. Broadly, these BMPs will address soil stabilization, sediment control, wind erosion control, vehicle tracking control, non-stormwater management, and waste management practices. The BMPs will be based on the best conventional and best available technology.

The proposed project is subject to stormwater quality regulations established under the NPDES, described in Section 402 of the CWA. In California, the NPDES program requires that any construction activity disturbing 1 or more acres comply with the statewide General Permit, as authorized by the State Water Board. The General Permit requires elimination or minimization of non-stormwater discharges from construction sites and development and implementation of a SWPPP for the site. The primary elements of the SWPPP include the following.

- Description of site characteristics—including runoff and streamflow characteristics and soil erosion hazard—and construction procedures.
- Guidelines for proper application of erosion and sediment control BMPs.
- Description of measures to prevent and control toxic materials spills.
- Description of construction site housekeeping practices.

In addition to these primary elements, the SWPPP specifies that the extent of soil and vegetative disturbance will be minimized by control fencing or other means, and that the extent of soil disturbed at any given time will be minimized. The SWPPP must be retained at the construction site.

The BMPs will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable; they are subject to review and approval by the project proponent. The project proponent will perform routine inspections of the construction area to verify that the BMPs are properly implemented and maintained. The project proponent will notify the contractor immediately of a noncompliance issue and will require compliance.

The BMPs will include, but are not limited to, the following.

- Conduct all in-water work within the Sacramento River between July 1 and October 15 to minimize or avoid potential impacts on sensitive life stages (migration, spawning, egg and embryo incubation, and rearing) of special-status fish species.
- Use equipment in and around the Sacramento River and other waterways that is in good working order and free of dripping or leaking engine fluids. All vehicle maintenance will be performed at least 300 feet from all drainages and watercourses. Any necessary equipment washing will be carried out where the water cannot flow into waterways.
- Develop a hazardous material spill prevention, control, and countermeasure plan before construction begins. The plan will include strict onsite handling rules to keep construction and maintenance materials from entering the river, including procedures related to refueling, operating, storing, and staging construction equipment and procedures for preventing and responding to spills. The plan also will identify the parties responsible for monitoring a spill response. During construction, any spills will be cleaned up immediately according to the spill prevention, control, and countermeasure plan. The project proponent will review and approve the contractor’s spill prevention, control, and countermeasure plan before allowing construction to begin.
- Prohibit the following types of materials from being rinsed or washed where they can flow to any drainage or watercourse: concrete, solvents and adhesives, thinners, paints, fuels, sawdust, dirt, gasoline, asphalt and concrete saw slurry, and heavily chlorinated water.
- Take any surplus concrete rubble, asphalt, or other rubble from construction to a local landfill.

- Prepare and implement an erosion and sediment control plan for the proposed project that will include the following provisions and protocols. The SWPPP for the proposed project will detail the applications and type of measures and the allowable exposure of unprotected soils.
    - Runoff from disturbed areas will be made to conform to the water quality requirements of the waste discharge permit issued by the CVRWQCB.
    - Apply temporary erosion control measures, such as silt fences, throughout construction of the proposed project and remove them after the working area is stabilized or as directed by the engineer. Soil exposure will be minimized through use of temporary BMPs, ground cover, and stabilization measures. Exposed dust-producing surfaces will be sprinkled daily, if necessary, until wet; this measure will be controlled to avoid producing runoff. Paved roads will be swept daily following construction activities.
    - The contractor will conduct periodic maintenance of erosion and sediment control measures.
    - Plant an appropriate seed mix on disturbed areas upon completion of construction.
    - Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 2 weeks or more) that could contribute sediment to waterways.
    - Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways. Material stockpiles will be located in non-traffic areas only. All stockpile areas will be surrounded by silt fencing, straw wattle, or other measures addressed by other BMPs.
    - Contain soil and filter runoff from disturbed areas by using berms, vegetated filters, silt fencing, straw wattle, plastic sheeting, catch basins, or other means necessary to prevent the escape of sediment from the disturbed area.
    - Use other temporary erosion control measures (e.g., silt fences, straw wattles, silt or sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) to control erosion from disturbed areas as necessary.
    - Prevent earth or organic material from being deposited or placed where it may be directly carried into the Sacramento River.

The project proponent also will obtain a 401 Water Quality Certification from the CVRWQCB that may contain additional BMPs and water quality measures to ensure the protection of water quality.

Impact BIO-13: Loss of riparian vegetation (including SRA cover) and potential for increased water temperature

Implementation of the proposed project is expected to result in the removal of some areas of riparian vegetation and associated SRA cover along the shoreline to make way for the installation of the slurry cutoff wall, and, in a more limited area, the placement of rock revetment and grading of the floodplain area. In addition, the installation of approximately 400 linear feet of rock slope protection could inhibit establishment of riparian vegetation and recruitment and retention of sediment and woody debris, and eliminate shallow, low-velocity river margins preferred by juvenile fish.

SRA cover is a component of riparian vegetation and is defined as the unique, nearshore aquatic area occurring at the interface between a river (or stream) and adjacent woody riparian habitat (Fris and DeHaven 1993). Riparian vegetation, including vegetation supporting SRA cover, occurs in two land cover types: cottonwood riparian and willow riparian scrub (Figure 3.5-1).

Under the proposed project, construction would directly affect up to approximately 10 acres of riparian habitat, some of it also supporting SRA cover habitat (see Impact BIO-17). Up to 1,235 linear feet of riparian vegetation supporting SRA cover habitat could be affected by the proposed project. Impacts on riparian and SRA cover habitat would occur in natural bank areas (Figure 3.5-1). SRA cover habitat is an essential component of salmonid rearing habitat as it provides fish with protection from predators (fish and avian) and velocity refugia, increases streambank stability, increases habitat complexity, provides habitat for food organisms, and provides shade. Salmonids in particular are highly influenced by the amount of available cover (Raleigh et al. 1984). Replacing riparian and SRA cover habitat with rock would reduce the beneficial qualities these habitat elements provide fish in the project area. Without appropriate mitigation, removal of streamside vegetation is likely to adversely affect anadromous species because riparian and SRA cover habitats are essential components of rearing habitat that may limit production and abundance of anadromous species in the Sacramento River.

USFWS mitigation policy identifies California's riparian habitats, including SRA cover habitat, as a Resource Category 2 habitat. The designation criterion for habitat in Resource Category 2 is "habitat to be impacted is of high quality for evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion section" (U.S. Fish and Wildlife Service 1993) for which "no net loss of in-kind habitat value" is recommended (46 Federal Register 7644, January 23, 1981). The quantity of mitigation required may vary depending on the timing of its creation (e.g., prior to construction, during construction, after construction) and will be determined in coordination with NMFS and USFWS as part of consultation under Section 7 of ESA. In combination with Mitigation Measure BIO-MM-17a (described below under "Impact BIO-17), implementation of Mitigation Measure BIO-MM-13 would compensate for impacts on fish from removal of riparian and SRA cover habitats.

The removal of SRA cover habitat that shades the river could lead to increases in water temperature with potential adverse effects on fish, depending on species-specific temperature preferences. However, such increases would be extremely localized as the linear extent of SRA cover habitat that would be removed along the Sacramento River would be localized and relatively limited in extent, relative to the amount of existing habitat. NMFS (2017:220) noted that the Sacramento River is a wide, faster-moving water body and is less likely to experience warming of water temperatures caused by limited decreases in riparian vegetation, such as would occur with construction of the proposed project. This is because, as river channels become wider, a smaller fraction of the channel is affected by shading from the riparian vegetation found along those riverbanks. As further described by NMFS (2017:220), the volume of water present in the river channel acts as a thermal sink, resisting temperature changes caused by shading along a narrow riparian zone. Temperature changes are more influenced by the greater surface area of exposed open water in the river channel, ambient air temperatures over those exposed areas, solar radiation, and the influence of water layers mixing within the main river channel. Because any water temperature increases as a result of decreased riparian vegetation under the proposed project are anticipated to be small and localized, the effects on fish from changes in water temperature would be expected to be minimal.

Mitigation Measure BIO-MM-13: Implement Onsite and Offsite Compensation Measures to Replace Riparian and SRA Cover Losses

SRWSLD will implement onsite and, if necessary, offsite compensation measures to compensate for losses of riparian vegetation and SRA cover on the waterside slope of the existing levee. Onsite compensation will be used to the maximum extent practicable. However, compliance with the USACE levee vegetation policy and other regulatory or engineering constraints may limit the ability to achieve full onsite compensation. Therefore, offsite compensation may be needed to achieve no net loss of existing habitat values.

Because of restrictions on the planting of woody riparian vegetation on the waterside slope of the existing levee, potential onsite compensation measures include planting vegetation, placing instream woody material, and creating shallow water (to create the components of natural SRA cover) in the floodplain lowering area.

Compensation requirements will be determined following quantification of SRA cover losses and determination of compensation ratios. Lowering the floodplain to achieve more frequent inundation of the floodplain will provide an opportunity to compensate and expand the amount of riparian habitat and SRA cover available to fish over a broad range of flows. Floodplain lowering is a key component of the overall design to restore hydraulic connectivity between the river and floodplain and provide the necessary hydrologic conditions to support riparian and wetland vegetation on the restored floodplain. Compensation and enhancement of SRA cover will be important objectives of the final design. The current conceptual restoration design for the lowered floodplain includes the creation of a floodplain swale bordered by wetland and/or riparian benches to facilitate drainage of the floodplain and movement of fish between the river and floodplain during flood events. The swale and wetland and riparian benches will interface with the Sacramento River at a low-elevation transition area that extends from the floodplain to the river channel at the downstream end of the floodplain. SRA cover along the swale and on portions of the floodplain will be available to fish on a seasonal or year-round basis depending on flows. Attainment of maximum compensation values for riparian and SRA cover is expected to take a minimum of 10 to 15 years as the vegetation matures and contributes to nearshore aquatic habitat values. Any potential for fish stranding will be minimized by developing and implementing a drainage and grading plan that minimizes the extent of ponding and facilitates complete drainage of the active floodplain to the main river.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

This measure is described below under Impact BIO-17.

Impact BIO-14: Increases in aquatic/riparian habitat associated with lowered floodplain area

Creation of the lowered floodplain area would result in restoration of up to approximately 15 acres of the historical Sacramento River floodplain. The goal of the final restoration design would be to increase river–floodplain connectivity and restore ecologically functional floodplain habitat consistent with the flood-risk reduction goals of the proposed project. Hydrodynamic, geomorphic, and ecological considerations would be addressed during the final planning and design process.

Future studies would determine the expected flooding regime (inundation extent, frequency, duration), hydraulic conditions (depths and velocities), and ecological benefits (habitat quantity and quality) of the proposed alternatives.

Based on preliminary investigations, the restored floodplain surface would be completely or partially inundated during a 2-year-recurrence interval river discharge. Portions of the floodplain would be lowered to increase floodplain inundation area and duration and create planting surfaces that would support native riparian and wetland vegetation communities. Floodplain elevations and grading patterns would be designed to result in complete drainage and dewatering of the lowered floodplain area as seasonal flows recede. These characteristics are expected to result in a substantial direct beneficial effect to native fishes and overall productivity of the river-floodplain system in this portion of the Sacramento River. This would be a beneficial impact and would serve as onsite compensation for other project impacts. No mitigation is required.

Impact BIO-15: Introduction or spread of invasive aquatic animal or plant species

Aside from the bucket of the excavator that would place revetment, no other equipment would encroach on the wetted river channel.

The operation of equipment conducting in-water work that originates from regions or areas outside the project area could result in the introduction and spread of invasive aquatic animals and plants, including the Asian overbite clam (*Corbula amurensis*), quagga mussel (*Dreissena bugensis*), zebra mussel (*Dreissena polymorpha*), hydrilla (*Hydrilla verticillata*), and Brazilian elodea (*Egeria densa*) (California Department of Fish and Game 2008). These species can adversely affect native fishes and other ecologically and economically important species through a number of mechanisms, including competition for resources, predation, parasitism, interbreeding, disease transmission, or changes in the physical or chemical attributes of aquatic habitat. However, this impact would be minimized or avoided by implementation of Mitigation Measure BIO-MM-15, which requires the project proponent or its contractor to ensure that appropriate BMPs, such as cleaning equipment before operating within the Sacramento River, are implemented to avoid or minimize the introduction and spread of invasive species in project waterways. The risk of introducing or spreading aquatic invasive species (AIS) during in-water activities would therefore be less than significant with implementation of Mitigation Measure BIO-MM-15.

Invasive terrestrial vegetation related to land-based construction activities, including excavation of the floodplain area, is discussed in Impact BIO-17 and mitigation measures are provided in BIO-MM-17b.

Mitigation Measure BIO-MM-15: Prevent the Spread or Introduction of Aquatic Invasive Species

The project proponent or their contractor will implement the following actions to prevent the potential spread or introduction of AIS associated with the operation of barges and other in-water construction activities. Invasive species of concern related to the operation of barges, boats, and other equipment in the Sacramento River include invasive mussels (e.g., quagga mussels and zebra mussels) and aquatic plants (e.g., Brazilian elodea and hydrilla) (California Department of Fish and Game 2008).

- Coordinate with the CDFW Invasive Species Program to ensure that the appropriate BMPs are implemented to prevent the spread or introduction of AIS.

- Educate construction supervisors and managers about the importance of controlling and preventing the spread of AIS.
- Train vessel and equipment operators and maintenance personnel in the recognition and proper prevention, treatment, and disposal of AIS.

If feasible, prior to departure of vessels from their place of origin and before in-water construction equipment is allowed to operate within the waters of the Sacramento River, thoroughly inspect and remove and dispose of all dirt, mud, plant matter, and animals from all surfaces that are submerged or may become submerged, or places where water can be held and transferred to the surrounding water.

b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Impact BIO-16: Loss of valley oak woodland

Construction activities for the slurry cutoff wall between project stations 11+00 and 19+00, the widening of 2nd Street, and use of the southern end of the study area as a truck turn-around could require trimming and/or removal of valley oak trees within patches of valley oak woodland. Removal of trees would be a permanent impact, and trimming would be considered a temporary impact. Indirect impacts on valley oak woodland could occur from changes in hydrology outside the construction area due to erosion and sedimentation during construction.

Valley oak woodland is a sensitive natural community and is tracked in the CNDDB. While impacts of the proposed project would likely be minimal, the loss of valley oak trees is potentially significant. Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-16a, and BIO-MM-16b would minimize impacts of the proposed project on valley oak woodland, compensate for the loss of oak woodlands that cannot be avoided, and ensure that the project impacts would be less than significant.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources.

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction

This measure applies to all valley oaks that have a diameter at breast height (dbh) of at least 6 inches, or if it has multiple trunks of less than 6 inches each, a combined dbh of at least 10 inches.

All valley oak trees that can be retained, but may be affected by project construction, will be preserved and protected as follows.

- A circle with a radius measurement from the trunk of the tree to the tip of its longest limb will constitute the dripline protection area of the tree. Limbs must not be cut back in order to change the dripline. The area beneath the dripline is a critical portion of the root zone and defines the minimum protected area of the tree. Removing limbs that make up the dripline does not change the protected area.

- Construction exclusion fencing or a similar protective barrier will be installed 1 foot outside the driplines of oak trees prior to initiating project construction in order to avoid damage to the trees and their root system.
- No signs, ropes, cables (except cables that may be installed by a certified arborist to provide limb support), or other items will be attached to oak trees.
- No vehicles, construction equipment, mobile homes or offices, supplies, materials, or facilities will be driven, parked, stockpiled, or located within the driplines of oak trees.
- Any soil disturbance (scraping, grading, trenching, and excavating) is to be avoided within the driplines of oak trees. Where these activities are necessary, an International Society of Arboriculture (ISA) Certified Arborist will provide specifications for this work, including methods for root pruning, backfill specifications, and irrigation management guidelines.
- Trenching within protected tree driplines will be avoided wherever feasible. If trenching must encroach upon the dripline, the trenching should be tunneled or bored under the tree under the supervision of an ISA Certified Arborist.
- If temporary haul or access roads must pass within the driplines of oak trees, a roadbed of 6 inches of mulch or gravel will be created to protect the root zone. The roadbed will be installed from outside the dripline and while the soil is in a dry condition, if possible. The roadbed material will be replenished as necessary to maintain a 6-inch depth.
- Drainage patterns on the site will not be modified so that water collects or stands within, or is diverted across, the dripline of oak trees.
- Tree pruning that may be required for clearance during construction must be performed by an ISA Certified Arborist or Tree Worker and in accordance with the American National Standards Institute A300 pruning standards and the ISA *Best Management Practices – Pruning, 3rd edition* (Lilly et al. 2019)..

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland

SRWSLD will minimize the loss of oak woodland habitat during construction by limiting the movement of construction equipment to only the area necessary for installation of the slurry cutoff wall, restoration of habitat and floodplain borrow (i.e., mitigation area), and installation of the rock slope protection. Prior to any construction activities, the boundaries of necessary equipment access areas will be marked with construction exclusion fencing.

Per protection of oak trees in oak woodland in Policy CON 1-9 of the *Colusa County General Plan,* SRWSLD, in coordination with Colusa County, will develop a management plan for the protection and enhancement of oak woodlands to offset the loss of oak woodlands. This plan will mitigate the loss of oak woodlands using one or more of the following options.

- Offsite deed restriction or conservation easement acquisition and/or acquisition in fee title by a land conservation organization for purposes of offsite oak woodland conservation.
- In-lieu fee payment to the Oak Woodlands Conservation Fund.

- Replacement planting onsite in an area subject to deed restriction or conservation easement.
- Replacement planting off site in an area subject to a conservation easement; or
- A combination of these options.

Mitigation will be implemented consistent with the requirements of regulating agencies. If SRWSLD elects to undertake onsite replacement planting(s), SRWSLD will monitor any permittee-responsible mitigation areas annually, for a period consistent with the requirements of regulating agencies, to verify that the community suitability is maintained, including survival and cover of plantings. For these mitigation areas, SRWSLD will prepare and implement an operations and management plan for the oak woodland community. Monitoring criteria may include survival, size, vigor, and percent cover of planted species, and any other relevant performance standards of the permittee-responsible mitigation required by agencies as part of the permits. In any years in which the performance standards are not met, causes for the failure, such as inadequate maintenance, irrigation, or other biotic factors, will be assessed; remedial measures will be developed and implemented; and replacement plantings will be installed. The monitoring period for any subsequent plantings will restart from the date of planting. SRWSLD will submit annual monitoring reports to the appropriate permitting agency(ies) for review and verification that the proposed project remains in compliance with the mitigation.

Impact BIO-17: Loss of riparian habitat

Construction of the slurry cutoff wall, restoration of habitat and floodplain borrow, and installation of rock slope protection would result in direct effects on up to approximately 10 acres of riparian habitat.

Although the slurry cutoff wall would be located at the top of the levee, outside of the riparian habitat, creating a suitable work area and movement of equipment for constructing the wall could remove or damage adjacent riparian vegetation.

Excavation of borrow material from the habitat restoration area to lower the floodplain would potentially disturb the root systems of existing riparian vegetation, including California sycamore and valley oak trees in the riparian forest and narrowleaf willow in the willow riparian scrub. The goal of work in this area, however, is to restore and increase the area of riparian habitat in the floodplain and any impacts on individual riparian trees would be offset by the riparian plantings throughout the floodplain area. This would be a beneficial impact.

Construction activities for installing the rock slope protection would cause the permanent loss of riparian habitat on the southeast bank of the Sacramento River. Project construction would require equipment to access the southwest bank for placement of rock slope protection between project stations 23+00 and 27+00. Equipment access would require the removal of riparian vegetation.

Additional temporary impacts on adjacent riparian habitat could occur during construction. Movement of construction equipment adjacent to the riparian vegetation could cause damage to riparian trees and understory vegetation.

Indirect impacts on riparian habitat could occur from changes in hydrology outside the construction area due to erosion and sedimentation during construction.

The impacts on riparian habitat that is also a component of SRA cover for fish are described for Impact BIO-13, *Loss of riparian vegetation (including SRA cover) and potential for increased water temperature*.

Riparian habitat is regulated by CDFW, and cottonwood riparian forest is considered a sensitive natural community and is tracked in the CNDDB as Great Valley cottonwood riparian forest. Additionally, the west Sacramento River levee is federally regulated, and tree replacement on and adjacent to the levee within specific parameters would not be permitted without a variance for USACE's standard levee vegetation guidelines (U.S. Army Corps of Engineers 2014). Therefore, all loss of trees and shrubs in riparian habitat on the levee slope and within 15 feet of the levee toe would be permanent. The loss of riparian habitat would be considered significant because the removal of mature woody vegetation would adversely affect the amount of existing riparian habitat in this area and would need to be mitigated to a no-net loss status.

Implementation of Mitigation Measures BIO-MM-1a, BIO-MM-1b, BIO-MM-17a, and BIO-MM-17b would minimize the impacts on riparian habitat and compensate for the permanent removal of riparian vegetation and SRA cover habitat, reducing the impact on riparian habitats to a less-than-significant level.

Mitigation Measure BIO-MM-1a: Conduct Mandatory Biological Resources Awareness Training

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-1b: Implement General Measures to Avoid and Minimize Effects on Sensitive Biological Resources

This measure is described above under Impact BIO-1.

Mitigation Measure BIO-MM-13: Implement Onsite and Offsite Compensation Measures to Replace Riparian and SRA Cover Losses

This measure is described above under Impact BIO-13.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

SRWSLD will minimize the loss of riparian habitat during construction by limiting the movement of construction equipment to only the area necessary for installation of the slurry cutoff wall, restoration of habitat and floodplain borrow (i.e., mitigation area), and installation of the rock slope protection. Prior to any construction activities, the boundaries of necessary equipment access areas will be marked with construction exclusion fencing.

SRWSLD will implement onsite and, if necessary, offsite compensation measures to mitigate for losses of riparian vegetation and SRA cover on the waterside slope of the existing levee. In riparian areas where vegetation removal is unavoidable, SRWSLD will compensate for the permanent loss of up to approximately 10 acres of riparian forest habitat with onsite replanting at various locations along the levee and within the floodplain borrow area. As stated in BIO-MM-13, SRWSLD will implement onsite compensation in the floodplain area. If offsite compensation is also required, mitigation credits can be purchased at an approved mitigation bank in order to result in no-net loss of riparian habitat.

In combination with mitigating the loss of riparian habitat, specific measures will be included to compensate for the loss of SRA cover, as portions of the affected riparian habitat also provide SRA cover for fish (see Mitigation Measure BIO-MM-13). Permanent loss of SRA cover will be mitigated as determined through coordination with state and federal agencies (CDFW, USFWS, and NMFS). The mitigation credits for SRA cover mitigation will apply toward riparian habitat mitigation requirements (i.e., the acreage required for compensation will not be duplicated).

SRWSLD will monitor any permittee-responsible mitigation areas annually, for a period consistent with the requirements of regulating agencies, to verify that the community suitability is maintained, including survival and cover of plantings. For these mitigation areas, SRWSLD will prepare and implement an operations and management plan for the riparian community. Monitoring criteria may include survival, size, vigor, and percent cover of the dominant tree species for percent cover of shrubs for riparian habitat and herbaceous species for grassland habitats; percent cover of invasive species for all sensitive community types; and any other relevant performance standards of the permittee-responsible mitigation required by agencies as part of the permits. In any years in which the performance standards are not met, causes for the failure, such as inadequate maintenance, irrigation, or other biotic factors, will be assessed; remedial measures will be developed and implemented; and replacement plantings will be installed. The monitoring period for any subsequent plantings will restart from the date of planting. SRWSLD will submit annual monitoring reports to the appropriate permitting agency(ies) for review and verification that the proposed project remains in compliance with the mitigation.

Mitigation Measure BIO-MM-17b: Avoid the Introduction and Spread of Invasive Plants during Construction

SRWSLD or its contractor will be responsible for avoiding the introduction of new invasive plants and the spread of invasive plants previously documented in the project area. Accordingly, the following measures will be implemented during construction.

- Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of invasive weeds.
- Dispose of invasive species material removed during project construction offsite at an appropriate disposal facility to avoid the spread of invasive plants into natural areas.
- Minimize surface disturbance to the greatest extent feasible to complete the work.

c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?

Impact BIO-18: Loss of waters of the United States and waters of the state

Direct impacts of the proposed project on waters of the United States and of the state in the Sacramento River, seasonal wetlands, and ditches would occur due to installation of the slurry cutoff wall and rock slope protection and the use of the offsite borrow area.

Rock slope protection would be placed within the Sacramento River, a perennial drainage that is a water of the United States and water of the state. The extent of the rock slope protection would be approximately 400 linear feet of the channel and a total area of up to approximately 0.6 acre within the OHWM of the Sacramento River. Because the affected bank and channelbed in this area are currently native soil, the rock slope protection would be considered fill in a non-wetland water of the United States. The placement of rock slope protection would be included in the CWA Section 404 nationwide permit and Section 401 water quality certification, and in the CFGC Section 1602 lake and streambed alteration agreement. The loss of perennial drainage as a result of rock slope protection placement would also be considered a long-term degradation of critical habitat for special-status fish species.

Installation of the slurry wall could result in the filling and replacement of an agricultural ditch. Use of the offsite borrow area could remove up to 0.13 acre of seasonal wetland if the entire area is excavated. This acreage is subject to verification by USACE and could change.

Temporary impacts on the Sacramento River surrounding the rock slope protection area could occur as a result of construction access to the area.

Indirect impacts on the part of the perennial drainage outside of the rock slope protection area could occur as a result of disturbing sediment in the channelbed and on the bank during placement of the rock slope protection. This impact would be avoided by the installation of silt fencing or curtains around the extent of the in-water work area to prevent any sediment that may be disturbed and suspended during construction from increasing turbidity in the Sacramento River. Potential impacts on water quality in the Sacramento River and mitigation measures are described further in Section 3.3, *Hydrology and Water Quality*.

Direct, temporary, and indirect impacts on the Sacramento River and seasonal wetland as a result of the proposed project would be considered significant because these activities would place permanent fill in or remove waters of the United States and waters of the state. Implementation of Mitigation Measures BIO-MM-18a, BIO-MM-18b, BIO-MM-18c, and HYD-MM-1 (described in Section 3.3, *Hydrology and Water Quality*) would reduce these impacts to a less-than-significant level. Mitigation would include avoidance and minimization, to the extent feasible, and compensation if required by USACE.

Mitigation Measure HYD-1: Implement a Spill Prevention, Control, and Countermeasure Plan

This measure is described in Section 3.3, *Hydrology and Water Quality.*

Mitigation Measure BIO-MM-18a: Minimize and Compensate for Loss of Perennial Drainage.

Placement of rock slope protection in the Sacramento River will be limited to the smallest area necessary to prevent additional erosion of the levee bank, and any temporary impact will be avoided. Construction exclusion fencing will be installed to limit equipment movement to the 400-foot-long rock slope protection area. Due to the minor extent of fill in a perennial drainage, no compensatory mitigation is likely to be required. However, if USACE requires compensatory mitigation for the loss of up to 0.8 acre of perennial drainage at the rock slope protection site, SRWSLD will either purchase mitigation bank credits at an accredited bank, such as Wildlands' Fremont Landing Conservation Bank, or pay into the National Fish and Wildlife Foundation Sacramento District California In-Lieu Fee Program. The mitigation ratio will be a minimum of 1 to 1 (1 acre of mitigation for each acre of loss), or as determined by USACE during the permitting process.

Mitigation Measure BIO-MM-18b: Minimize and Compensate for Loss of Seasonal Wetland

Excavation in the offsite borrow area will be limited to the smallest area necessary to meet the project purpose, and excavation will minimize the extent of temporary impacts as much as possible. If the seasonal wetland can be avoided by excavation, construction exclusion fencing will be placed around the wetland with an additional 50-foot buffer to avoid direct and indirect impacts. If avoidance is not feasible, and the wetland is excavated, USACE may require compensatory mitigation for these losses (up to 0.13 acre of seasonal wetland). SRWSLD will either purchase mitigation bank credits at an accredited bank or pay into the National Fish and Wildlife Foundation Sacramento District California In-Lieu Fee Program. The mitigation ratio will be 1 to 1 (1 acre of mitigation for each acre of loss), or as determined by USACE during the permitting process.

Mitigation Measure BIO-MM-18c: Minimize and Compensate for Loss of Ditch

Improvements to the landside portions of the levee will be limited to the smallest area necessary to meet the project purpose, and impacts will be minimized as much as possible during construction. A portion of one ditch is expected to be rerouted a few feet during landside levee improvements. This portion of the ditch will be reconstructed to its original acreage and condition as part of the project. The ditch is used to convey irrigation water and is considered a closed system that does not connect to the Sacramento River; it is therefore a non-jurisdictional feature. This determination is preliminary, as the aquatic resources delineation has not been completed with a jurisdictional review by USACE and the State Water Board. If the ditch is considered jurisdictional and reconstruction is not equal to original conditions, a mitigation ratio of 1 to 1 (1 acre of mitigation for each acre of loss), or as determined by USACE during the permitting process, could be required.

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?

Impact BIO-19: Substantial interference with the movement of any native resident or migratory fish species

The Sacramento River is an important migratory corridor for adults and juveniles of state- and federally listed fish species as well as several other species of management concern (e.g., striped bass, American shad [*Alosa sapidissima*]). Shoreline and in-water construction activities (if they occur) would have the potential to affect the movement of these species in the Sacramento River through behavioral effects related to underwater noise, visual disturbance, and water quality effects (e.g., turbidity and suspended sediments). Underwater noise associated with driving of piles for pump stations would produce the most noise and would have the greatest potential to interfere with the movement of fish based on the spatial extent of noise impacts (see Impact BIO-10, *Acoustic effects on candidate, sensitive, or special-status fish species*). These sound levels would extend across most, but not all, of the channel width and for a short distance upstream and downstream from the activity, thereby providing fish with a physical “zone of passage” around areas of the river affected by underwater noise that exceeds the interim criteria for injury. In addition, these more intense sound levels would be limited to a maximum of a 12-hour period on each of the 2 days that piles would be driven on land, providing fish with a 12-hour period each day to pass through the affected area unaffected by underwater noise generated from shore-based pile driving. Furthermore, potential effects would be restricted to July 1 to October 15, when the abundance of listed species and their most sensitive life stages are relatively low.

Activities such as rock placement would also be physically restricted to the levee slope or immediate river margin (if rock slope protection is placed directly into the water). Therefore, underwater noise, physical disturbance, and any water quality effects (e.g., turbidity) associated with these activities would be limited to the immediate shoreline of the southwest bank of the river, thereby providing fish with unobstructed passage around areas affected by construction activities. This impact would be less than significant with implementation of Mitigation Measures BIO-MM-10a and BIO-MM-10b.

Mitigation Measure BIO-MM-10a: Implement Seasonal and Daily In- and Near-Water Work Restrictions

This measure is described above under Impact BIO-10.

Mitigation Measure BIO-MM-10b: Implement Measures to Minimize Exceedance of Interim Threshold Sound Levels during Pile Driving

This measure is described above under Impact BIO-10.

e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Impact BIO-20: Conflict with local policies or ordinances protecting biological resources

Through compliance with state and federal regulations protecting other sensitive biological resources—including waters of the United States and special-status species—the proposed project would not conflict with any of the *2030 Colusa County General Plan* policies. Therefore, project impacts would be reduced to a less-than-significant level through adherence to permit requirements and with implementation of Mitigation Measures BIO-MM-16a, BIO-MM-16b, and BIO-MM-17a.

Mitigation Measure BIO-MM-16a: Protect Valley Oak Trees during Construction

This measure is described above under Impact BIO-16.

Mitigation Measure BIO-MM-16b: Compensate for Loss of Valley Oak Woodland

This measure is described above under Impact BIO-16.

Mitigation Measure BIO-MM-17a: Minimize Effects on Riparian Vegetation and Compensate for Loss of Riparian Habitat

This measure is described above under Impact BIO-17.

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 study area does not overlap with or conflict with any adopted habitat conservation plans or natural community conservation plans. Therefore, there would be no impact.

3.6 Air Quality

3.6.1 Introduction

Air quality describes the amount of air pollution to which the public is exposed. Air quality is an important consideration for construction of the proposed project because of current regional air quality conditions, which exceed certain federal and state ambient air quality standards. The air quality study area encompasses the areas directly and indirectly affected by construction of the proposed project and operations and maintenance (O&M) activities. Two geographic scales define the study area—the *local* study area is the construction footprint plus areas within 1,000 feet of the proposed project, and the *regional* study area is the affected air basin. These two study areas encompass the project area identified in Figure 2-1. The project would be constructed in the town of Grimes in Colusa County, which is within the Sacramento Valley Air Basin (SVAB). Materials would be transported through Sutter and Placer Counties, which are also in the SVAB.

This section describes ambient air quality conditions, including existing pollutant concentrations, meteorology, and locations of sensitive receptors in Grimes and the larger air quality study area. The section also discusses applicable air quality regulations as they pertain to the proposed project and analyzes the potential for the proposed project to affect air quality resources. Appendix F presents supporting air quality calculations for the impact analysis, as referenced later in this section.

3.6.2 Existing Conditions

Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following sections summarize how air pollution moves through the air, water, and soil within the SVAB and how it is chemically changed in the presence of other chemicals and particles. This section also summarizes local climate conditions, existing air quality conditions, and sensitive receptors that may be affected by the emissions generated by the proposed project.

3.6.2.1 Pollutants of Concern

Criteria Pollutants

Criteria pollutants are a group of six common air pollutants for which the federal and state governments have set ambient air quality standards (national ambient air quality standards [NAAQS] and California ambient air quality standards [CAAQS], respectively). Criteria pollutants are defined as ozone, carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter, which consists of particulates 10 microns in diameter or less (PM10) and 2.5 microns in diameter or less (PM2.5). Ozone is considered a regional pollutant because its precursors affect air quality on a regional scale; nitrogen oxides (NO_X) and reactive organic gases (ROG) react photochemically to form ozone, and this reaction occurs at some distance downwind of the emissions source. Pollutants such as CO, NO_2, SO_2 and Pb are considered local pollutants that tend to accumulate in the air locally. Particulate matter is both a local and regional pollutant.

Concentrations of criteria pollutants are commonly used indicators of ambient air quality for which acceptable levels of exposure can be determined. The ambient air quality standards for these pollutants are set with an adequate margin of safety for public health and the environment (Clean

Air Act Section 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants and form the scientific basis for new and revised ambient air quality standards.

Table 3.6-1 provides a brief description of sources and health effects of the six criteria pollutants. The primary criteria pollutants that would be generated by the proposed project are ozone precursors (NO_X and ROG) and PM. Additional discussion on these pollutants follows Table 3.6-1. The proposed project and project alternatives would also generate CO, NO_2, and SO_2, although as discussed further below, the study area attains federal and state standards for these pollutants.[1]

Table 3.6-1. Sources and Potential Health and Environmental Effects of Criteria Pollutants

Pollutant	Primary Sources	Potential Effects
Ozone (O_3)	Formed by a chemical reaction between ROG and NO_X in the presence of sunlight. Primary sources of ROG and NO_X are vehicle exhaust, industrial combustion, gasoline storage and transport, solvents, paints, and landfills.	Inflammation of the mucous membranes and lung airways; wheezing; coughing and pain when inhaling deeply; decreased lung capacity; aggravation of lung and heart problems. Reduced crop yield and damage to plants, rubber, some textiles, and dyes.
Particulate matter (PM)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, and automobiles.	Irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Carbon monoxide (CO)	A component of motor vehicle exhaust that is formed when carbon in fuel is not burned completely.	Reduced ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impaired vision and dizziness that can lead to unconsciousness or death.
Nitrogen dioxide (NO_2)	Motor vehicles, electric utilities, and other sources that burn fuel.	Aggravation of lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming and nutrient overloading, which deteriorates water quality. Brown discoloration of the atmosphere.
Sulfur dioxide (SO_2)	Petroleum refineries, cement manufacturing, metal processing facilities, locomotives, large ships, and fuel combustion in diesel engines.	Aggravation of lung and heart problems. Converts to sulfuric acid, which can damage marble, iron, and steel. Damage to crops and natural vegetation. Impaired visibility.

[1] Pb is also a criteria pollutant, and there are state standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility particulates. However, these pollutants are typically associated with industrial sources, which are not included as part of the proposed project. Accordingly, they are not evaluated further.

Pollutant	Primary Sources	Potential Effects
Lead (Pb)	Metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries.	Anemia; damage to the kidneys, liver, brain, reproductive and nervous systems, and other organs; and neurological problems, including learning deficits and lowered IQ. Affects animals, plants, and aquatic ecosystems.

Source: California Air Pollution Control Officers Association n.d.

Ozone

Ozone, or smog, is a photochemical oxidant that is formed when ROG and NO_X (both by-products of the internal combustion engine) react with sunlight. ROG are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. In addition to serving as an integral participant in ozone formation, NO_X also directly acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens by impairing the immune system.

Ozone poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoors. Exposure to ozone at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggravate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term ozone exposure and nonaccidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (U.S. Environmental Protection Agency 2021a). The concentration of ozone at which health effects are observed depends on an individual’s sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrease in forced airway volume in the most responsive individual. Although the results vary, evidence suggests that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (U.S. Environmental Protection Agency 2021b). In addition to human health effects, ozone has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death (U.S. Environmental Protection Agency 2021c).

Particulate Matter

Particulate pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter that is less than 10 microns in diameter, about 1/7 the thickness of a human hair, is referred to as PM10. Particulate matter that is 2.5 microns or less in diameter, roughly 1/28 the diameter of a human hair, is referred to as PM2.5. Major sources of PM10 include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources;

windblown dust from open lands; and atmospheric chemical and photochemical reactions. PM2.5 results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. Particulate matter also forms when gases emitted from industries and motor vehicles, such as SO_2, NO_X, and ROG, undergo chemical reactions in the atmosphere.

Particulate pollution can be transported over long distances and may adversely affect the human respiratory system, especially for people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked particulate matter exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms.

Depending on its composition, both PM10 and PM2.5 can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (U.S. Environmental Protection Agency 2021d).

Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for toxic air contaminants (TACs). Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the California Air Resources Board (CARB) has consistently found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). The primary TACs of concern associated with the proposed project are diesel particulate matter (DPM) and asbestos.

DPM is generated by diesel-fueled equipment and vehicles. CARB estimates that DPM emissions are responsible for about 70 percent of the total ambient air toxics risk (California Air Resources Board 2000:8). Exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness, nausea), and respiratory symptoms (e.g., coughing, phlegm). The International Agency for Research on Cancer (2012:1) has classified diesel engine exhaust as "carcinogenic to humans, based on sufficient evidence that exposure is associated with an increased risk for lung cancer."

Asbestos is the name given to several naturally occurring fibrous silicate minerals. Before the adverse health effects of asbestos were identified, asbestos was widely used as insulation and fireproofing in buildings, and it can still be found in some older buildings. It is also found in its natural state in ultramafic rock (i.e., igneous and metamorphic rock with low silica content) that has undergone partial or complete alteration to serpentine rock (or serpentinite) and often contains chrysotile asbestos. The inhalation of asbestos fibers into the lungs can result in a variety of adverse health effects, including inflammation of the lungs, respiratory ailments (e.g., asbestosis, which is scarring of lung tissue that results in constricted breathing), and cancer (e.g., lung cancer and mesothelioma, which is cancer of the linings of the lungs and abdomen) (U.S. Environmental Protection Agency 2021e). While naturally occurring asbestos is not found in the study area, (California Department of Conservation 2000:1), the proposed project requires demolition of existing structures. Depending on when these structures were constructed, asbestos containing materials may be present.

Odors

Although offensive odors rarely cause physical harm, they can be unpleasant and lead to citizen complaints to local governments and air districts. According to CARB's (2005:34) *Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, manufacturing, and livestock operations. None of these uses are within the immediate vicinity of the proposed project.

3.6.2.2 Regional Climate and Meteorology

The primary factors that determine air quality are the locations of air pollutant sources and the amounts of pollutants emitted from those sources. Meteorological and topographical conditions are also important. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Land use and land management also contribute to microclimates through the absorption and emission of greenhouse gases.

California is divided into 15 air basins based on geographic features that create distinctive regional climates. The regional air quality study area is the SVAB. The SVAB is bounded on the north by the Cascade Range, on the south by the San Joaquin Valley Air Basin, on the east by the Sierra Nevada, and on the west by the Coast Ranges. The SVAB contains all of Tehama, Glenn, Butte, Colusa, Yolo, Sutter, Yuba, Sacramento, and Shasta Counties, as well as portions of Solano and Placer Counties (17 California Code of Regulations [Cal. Code Regs.] §60106).

The SVAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During winter, the north Pacific storm track intermittently dominates Sacramento Valley weather, and fair-weather alternates with periods of extensive clouds and precipitation. Periods of dense and persistent low-level fog, which is most prevalent between storms, are also characteristic of winter weather in the valley. The frequency and persistence of heavy fog in the valley diminish with the approach of spring. The average yearly temperature range for the local study area is 30 degrees Fahrenheit (°F) to 95°F, although periodic lower and higher temperatures are common.

In general, the prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells collect over the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with temperature inversions (warm air over cool air), which trap pollutants near the ground. During the summer months, sinking air traps pollution within a shallow layer near the ground, causing photochemical smog and visibility problems.

3.6.2.3 Existing Air Quality Conditions

Ambient Criteria Pollutant Concentrations

Ambient conditions in the air quality study area can also be characterized by monitoring data. CARB collects ambient air quality data through a network of air monitoring stations throughout the state. The only monitoring station in Colusa County is the Colusa-Sunrise Blvd monitoring station, which is located approximately 9.5 miles north of the project area. The station monitors for ozone, PM10, and

PM2.5. Table 3.6-2 presents the results of the ambient monitoring at the Colusa-Sunrise Blvd station, where available, for the most recent 3 years (2018–2020). Air quality concentrations are expressed in terms of parts per million (ppm) or micrograms per cubic meter (μg/m^3). Between 2018 and 2020, monitored ozone concentrations did not exceed any federal or state standards. However, the station experienced widespread violations of the state and federal PM2.5 and PM10 standards. The magnitude and frequency of these violations in 2018 and 2020 were primarily influenced by wildfires in Northern California.

The ambient air quality standards define clean air and represent the maximum amount of pollution that can be present in outdoor air without any harmful effects on people and the environment. Existing violations of the particulate matter ambient air quality standards indicate that certain individuals exposed to these pollutants may experience certain health effects, including increased incidence of cardiovascular and respiratory ailments.

Table 3.6-2. Ambient Air Quality Data at the Colusa-Sunrise Blvd Monitoring Station

Pollutant Standards	2018	2019	2020
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.073	0.062	0.085
Maximum 8-hour concentration (ppm)	0.062	0.055	0.068
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	0	0
CAAQS 8-hour (>0.070 ppm)	0	0	0
NAAQS 8-hour (>0.070 ppm)	0	0	0
Particulate Matter (PM10)			
National[b] maximum 24-hour concentration (μg/m^3)	257.2	118.1	304.8
National[b] second-highest 24-hour concentration (μg/m^3)	167.1	111.2	210.9
State[c] maximum 24-hour concentration (μg/m^3)	274.6	119.9	299.2
State[c] second-highest 24-hour concentration (μg/m^3)	177.8	113.6	210.6
National annual average concentration (μg/m^3)	32.4	28.2	37.4
State annual average concentration (μg/m^3)[d]	*	29.2	37.2
Number of days standard exceeded[a, e]			
NAAQS 24-hour (>150 μg/m^3)	2	0	7
CAAQS 24-hour (>50 μg/m^3)	66	45	77
Particulate Matter (PM2.5)			
National[b] maximum 24-hour concentration (μg/m^3)	113.2	26.5	96.7
National[b] second-highest 24-hour concentration (μg/m^3)	60.1	24.2	59.3
State[c] maximum 24-hour concentration (μg/m^3)	113.2	26.5	96.7
State[c] second-highest 24-hour concentration (μg/m^3)	60.1	24.2	59.3
National annual average concentration (μg/m^3)	*	7.0	12.1
State annual average concentration (μg/m^3)	*	7.0	*
Measured number of days standard exceeded[a]			
NAAQS 24-hour (>35 μg/m^3)	3	0	4

Source: California Air Resources Board 2022a.
ppm = parts per million; NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter.
* = insufficient data available to determine the value.

[a] An exceedance is not necessarily related to a violation of the standard.
[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
[c] State statistics are based on approved local samplers and local conditions data.
[d] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[e] Measurements usually are collected every 6 days.

Criteria Pollutant Attainment Status

Local monitoring data (Table 3.6-2) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are further defined as:

- Nonattainment—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- Attainment—assigned to areas where pollutant concentrations meet the standard in question over a designated period.
- Unclassified—assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.6-3 summarizes the attainment status of Colusa County with regard to the NAAQS and CAAQS. As shown, the county currently attains all federal standards and state standards, except the state PM10 standard.

Table 3.6-3. Federal and State Ambient Air Quality Attainment Status for Colusa County

Criteria Pollutant	Federal Designation	State Designation
O_3 (8-hour)	Attainment	Attainment
CO	Attainment	Unclassified
PM10	Attainment	Nonattainment
PM2.5	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen Sulfide	(No Federal Standard)	Unclassified
Visibility Reducing Particles	(No Federal Standard)	Unclassified

Sources: California Air Resources Board 2022b; U.S. Environmental Protection Agency 2022.
CO = carbon monoxide; PM10 = particulate matter less than or equal to 10 microns in diameter; PM2.5 = particulate matter less than or equal to 2.5 microns in diameter; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide.

Background Air Pollution and Environmental Burdens

The primary sources of ambient TAC emissions in and surrounding the study area are river boats and agricultural equipment. Background TAC concentrations, as well as background criteria pollutant concentrations, collectively represent the existing air pollution burden for the study area.

Existing environmental burdens (including air pollution) across the state can be represented by OEHHA's (2022) California Communities Environmental Health Screening Tool (CalEnviroScreen).

CalEnviroScreen provides relative rankings of census tracts based on 21 environmental, health, demographic, and socioeconomic indicators (e.g., ozone concentrations, groundwater threats, education levels). Ranking scores are provided for each indicator, which are also combined to provide an overall ranking score for the census tract. The scores are not a measure of health risk; rather, they reflect the relative pollution burden and vulnerabilities in one census tract compared to other census tracts in the state. Scores are given on a scale of 0 to 100, with larger numbers representing areas with relatively high existing pollution burdens and population sensitivities. Based on data from CalEnviroScreen (version 4.0), the census tract in which the project is located has a moderate score (65), indicating that the local study area has slightly higher existing pollution burdens and population sensitivities. (Office of Environmental Health Hazard Assessment 2022.)

3.6.2.4 Sensitive Receptors

A *sensitive receptor* is generically defined as a location where human populations (especially children, seniors, or ill persons) are found, and there is reasonable expectation of human exposure to air pollutants of concern. Examples of sensitive receptors include residences, hospitals, day-care centers, and schools. The local study area is rural, for the most part, with residences located near areas proposed for construction through the town of Grimes. The nearest homes are adjacent to the project footprint between about river mile 33 and 48. Additional scattered residences are along the extent of the cutoff wall. There are no schools or medical facilities within 1,000 feet of primary construction activities, although Grand Island Elementary School is about 800 feet southeast of State Route 45, which is proposed as a construction haul route.

3.6.3 Regulatory Setting

This section summarizes key federal, state, and local or regional regulations, laws, and policies relevant to air quality in the study area for the proposed project.

3.6.3.1 Federal

Clean Air Act and National Ambient Air Quality Standards

The federal Clean Air Act (CAA) was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as NAAQS, for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 3.6-4 shows the NAAQS currently in effect for each criteria pollutant, as well as the CAAQS (discussed further below).

Table 3.6-4. National and California Ambient Air Quality Standards

			National Standards[a]	
Criteria Pollutant	Average Time	California Standards	Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8-hour	0.070 ppm	0.070 ppm	0.070 ppm
Coarse Particulate Matter	24-hour	50 μg/m³	150 μg/m³	150 μg/m³
	Annual mean	20 μg/m³	None	None
Fine Particulate Matter	24-hour	None	35 μg/m³	35 μg/m³
	Annual mean	12 μg/m³	12.0 μg/m³	15 μg/m³
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide[c]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.014 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m³	None	None
	Calendar quarter	None	1.5 μg/m³	1.5 μg/m³
	3-month average	None	0.15 μg/m³	0.15 μg/m³
Sulfates	24-hour	25 μg/m³	None	None
Visibility-reducing Particles	8-hour	–[d]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2016.
ppm= parts per million; μg/m³ = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; SO_2 = sulfur dioxide; CAAQS = California Ambient Air Quality Standards.
[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.
[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for State Implementation Plans.
[c] The annual and 24-hour NAAQS for SO_2 only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual NAAQS.
[d] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.

U.S. Environmental Protection Agency Non-Road Diesel Rule

The United States Environmental Protection Agency (USEPA) has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and locomotives. New equipment used by the proposed project, including heavy-duty trucks and off-road equipment are required to comply with the emission standards.

National Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy (CAFE) standards were first enacted in 1975 to improve the average fuel economy of cars and light duty trucks. In September 2019, the National Highway Traffic Safety Administration (NHTSA) and USEPA established "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule," which withdrew California's ability to create its own fuel economy standards under the CAA (84 Fed. Reg. 51310) and revised the national fuel economy standards for light duty vehicles to 32 miles per gallon (mpg) through model year (MY) 2026 (85 Fed. Reg. 24174). However, on March 9, 2022, rescinded the SAFE Vehicles Rule and reinstated California's authority under the Clean Air Act to implement its own greenhouse gas emission standards and zero emission vehicle sales mandate.

3.6.3.2 State

California Clean Air Act and California Ambient Air Quality Standards

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown in Table 3.6-4.

CARB and local air districts bear responsibility for meeting the CAAQS, which are to be achieved through district-level air quality management plans incorporated into the SIP. In California, USEPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures.

California Air Resources Board Advanced Clean Truck Regulation

CARB adopted the Advanced Clean Truck Regulation in June 2020 to accelerate a large-scale transition of zero-emission medium-and-heavy-duty vehicles. The regulation requires the sale of zero-emission medium-and-heavy-duty vehicles as an increasing percentage of total annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55 percent of Class 2b – 3 truck sales, 75 percent of Class 4 – 8 straight truck sales, and 40 percent of truck tractor sales. By 2045, every new medium-and-heavy-duty truck sold in California will be zero-emission. Large employers including retailers, manufacturers, brokers, and others are required to report information about shipments and shuttle services to better ensure that fleets purchase available zero-emission trucks.

California Air Resources Board Truck and Bus Regulation

Originally adopted in 2005, the on-road truck and bus regulation requires heavy trucks to be retrofitted with particulate matter filters. The regulation applies to privately and federally owned diesel-fueled trucks with a gross vehicle weight rating greater than 14,000 pounds. Compliance with the regulation can be reached through one of two paths: (1) vehicle retrofits according to engine year, or (2) phase-in schedule. Compliance paths ensure that by January 2023, nearly all trucks and buses will have 2010 model year engines or newer.

California Air Resources Board Tailpipe Emission Standards

Like the USEPA at the federal level, CARB has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft operating in California. New equipment used by the proposed project would be required to comply with the standards.

Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer the Carl Moyer Program.

Toxic Air Containment Identification and Control Act

California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (AB 1807) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health threat, and facility plans to reduce these hazards.

In September 2000, the CARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled engines and vehicles (California Air Resources Board 2000). The plan identifies 14 measures that target new and existing on-road vehicles (e.g., heavy-duty trucks and buses), off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats), portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators). The Tanner Act sets forth a formal procedure for the CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before the CARB designates a substance as a TAC. To date, the CARB has identified 21 TACs, and has also adopted the USEPA's list of hazardous air pollutants (HAPs) as TACs.

The Hot Spots Act requires that existing facilities that emit toxic substances above specified levels complete the following.

- Prepare a toxic emission inventory.
- Prepare a risk assessment if emissions are significant.
- Notify the public of significant risk levels.

- Prepare and implement risk reduction measures.

CARB has adopted several regulations that will reduce diesel emissions from in-use vehicles and engines throughout California. For example, CARB adopted an idling regulation for on-road diesel-fueled commercial vehicles in July 2004 and updated in October 2005. The regulation applies to public and privately owned trucks with a gross weight rating greater than 10,000 pounds. Vehicles subject to the regulation are prohibited from idling for more than 5 minutes in any one location. CARB also adopted a regulation for diesel-powered construction and mining vehicles operating. Fleet owners are subject to retrofit or accelerated replacement/repower requirements for which CARB must obtain authorization from USEPA prior to enforcement. The regulation also imposes a 5-minute idling limitation on owners, operators, and renters or lessees of off-road diesel vehicles. In some cases, the particulate matter reduction strategies also reduce smog-forming emissions such as NO_X. As an ongoing process, the CARB reviews air contaminants and identifies those that are classified as TACs. CARB also continues to establish new programs and regulations for the control of TACs, including DPM, as appropriate.

3.6.3.3 Local and Regional

In California, CARB delegates air quality management responsibilities to local air quality management districts. Primary responsibilities of local air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA. The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

Primary construction activities fall under the jurisdiction of Colusa County Air Pollution Control District (CCAPCD). The CCAPCD has local air quality jurisdiction over projects in Colusa County. CCAPCD develops air quality plans to provide a comprehensive strategy to meet or maintain compliance with the NAAQS and CAAQS. CCAPCD, along with the other air districts in the Northern Sacramento Valley Planning Area (NSVPA),[2] developed the *Northern Sacramento Valley Planning Area Air Quality Attainment Plan* (NSVPA Plan) in 1994 to demonstrate attainment of the 8-hour ozone CAAQS by the earliest practicable date. The NSVPA Plan is updated every 3 years, with the most recent update being the *2018 Triennial Air Quality Attainment Plan* (2018 Ozone Plan) (Sacramento Valley Air Quality Engineering and Enforcement Professionals 2018). The air district also has established rules and regulations, of which the following may apply to the proposed project.

- Rule 200 (Nuisance)—prevents air contaminants from causing injury, detriment, nuisance or annoyance to surrounding persons or properties.
- Rule 202 (Particulate Matter Concentration)—restricts emissions of PM greater than 0.3 grains per cubic foot of gas at dry standard conditions.
- Rule 204 (Dust and Fumes)—describes the maximum emissions rate of dust or fumes a person can discharge in one hour, depending on the process weight per hour.

[2] Air districts in the NSVPA include CCAPCD, Butte County Air Quality Management District, Glenn County Air Pollution Control District, Tehama County Air Pollution Control District, Feather River Air Quality Management District, and Shasta County Air Quality Management District.

- Rule 231 (Cutback and Emulsified Asphalt)—limits emissions of volatile organic compounds from the use of cutback and emulsified asphalt in paving, construction, or maintenance of parking lots, driveways, streets, and highways.
- Rule 252 (Stationary Internal Combustion Engines)—limits NOx and CO emissions from stationary internal combustion engines.

As discussed in Chapter 2, *Project Description*, bentonite clay and slag cement will be trucked from distributors in Roseville. Hauling from Grimes to Roseville will require trucks to pass through the Feather River Air Quality Management District (FRAQMD) and Placer County Air Pollution Control District (PCAQMD). FRAQMD has local air quality jurisdiction in Sutter and Yuba Counties, and PCAPCD has air quality justification in the non-Lake Tahoe portion of Placer County. Materials for rock slope protection (RSP) may also be sourced from Parks Bar Quarry, which is in FRAQMD. PCAPCD and FRAQMD have both adopted the 2018 Ozone Plan, as well as other air quality plans for their local jurisdictions.

3.6.4 Environmental Effects

Potential impacts of the proposed project related to air quality are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section III, *Air Quality*, asks whether the project would result in any of the following conditions.

a. Conflict with or obstruct implementation of the applicable air quality plan?

A project is deemed inconsistent with air quality plans if it results in regional population, employment, or vehicle miles traveled (VMT) growth that exceeds estimates used to develop the applicable air quality plans, which are based in part on growth projections from local plans, including Colusa County's general plan. Projects that propose development that are consistent with the growth anticipated by general plans would be consistent with 2018 Ozone Plan.

The proposed project would achieve multiple objectives including improved flood protection for the town of Grimes and habitat improvements for salmonids. While Grimes is not currently mapped by the Federal Emergency Management Agency (FEMA) as a flood hazard area, the proposed project would improve levee resiliency to prevent future designation as a FEMA 100-year floodplain, which could create potential barriers to growth. However, because growth in Grimes is not currently limited by flood risk, the proposed project would not directly induce growth or result in long-term development that would conflict with the Colusa County's general plan growth forecast.

Accordingly, the proposed project would not conflict with or obstruct the implementation of 2018 Ozone Plan; therefore, this impact would be less than significant.

b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard?

Emission generating activities under the proposed project include construction of a 1.8-mile-long slurry cutoff wall, restoration of riparian habitat adjacent to the levee, and waterside hardening of a 400-foot-long site. The predominant pollutants associated with the proposed project are combustion pollutants, particularly ozone precursors, from heavy equipment and vehicles. Fugitive dust (PM10 and PM2.5) emissions would also be generated by material handling and transport, demolition of existing structures, and operation of SCCB slurry mixing plant. Fugitive off-gassing of

ROG could occur during paving activities associated with the 2nd Street Widening. Emissions vary substantially depending on the level of activity, length of the active work periods, types of equipment, number of personnel, and wind and precipitation conditions.

Emissions generating activities would take place between January and November. Combustion exhaust, fugitive dust (PM10 and PM2.5), and fugitive off-gassing (ROG) were estimated using a combination of emission factors and methods from CalEEMod, version 2020.4.0; CARB's EMFAC2021 model; and USEPA's Compilation of Air Pollutant Emission Factors (AP-42) based on project-specific construction data (e.g., schedule, equipment, truck volumes) provided by the project engineering team (KSN) (Lorenzen pers. comm.). The following assumptions and methods were applied to quantify emissions resulting from each source. A full list of assumptions can be found in Appendix F.

- **Off-road equipment**—Emission factors for off-road construction equipment (e.g., loaders, graders, bulldozers) were obtained from the CalEEMod (version 2020.4.0) User's Guide appendix, which provides values per unit of activity (in grams per horsepower-hour) by calendar year (Trinity Consultants 2021). Criteria pollutants generated by off-road equipment were quantified by multiplying the CalEEMod emission factors by the equipment inventory provided by KSN.
- **On-road vehicles**—On-road vehicles (e.g., pickup trucks, flatbed trucks) would be required for material and equipment hauling, onsite crew and material movement, and employee commuting. Analysts estimated exhaust emissions from on-road vehicles using the EMFAC2021 emissions model and activity data (trips and miles traveled per day) provided by KSN. Emission factors for haul trucks traveling on offsite roads are based on aggregated-speed emission rates for EMFAC's heavy-heavy duty truck (HHDT) vehicle category. All materials except bentonite and RSP materials would be sourced or disposed of within CCAPCD. Bentonite would be imported from Placer County, and RSP materials from Yuba County. Accordingly, emissions resulting from bentonite and rock hauling were apportioned to CCAPCD, FRAQMD, and PCAPCD based on the distance traveled in each air district. Emission factors for employee commute vehicles are based on a weighted average for all vehicle speeds for EMFAC's light-duty automobile (LDA)/light-duty truck (LDT) vehicle categories. Emission factors for vendor trips are based on a weighted average for all vehicle speeds for EMFAC's medium-heavy duty truck (MHDT)/HHDT vehicle categories. Fugitive re-entrained paved road dust emissions were estimated using USEPA's AP-42, Section 13.2.1 (U.S. Environmental Protection Agency 2011).

  Emission factors for mechanic and water trucks traveling onsite are based on 5 mph emission rates for EMFAC's MHDT vehicle category. Fugitive re-entrained unpaved road dust emissions were estimated using USEPA's AP-42, Section 13.2.2 (U.S. Environmental Protection Agency 2006a).
- **Earthmoving and demolition**—Fugitive dust emissions from earth movement (e.g., site grading, bulldozing, and truck loading) and demolition activities were quantified using emission factors from CalEEMod. These factors were multiplied by the acreage graded, quantity of cut-and-fill material, and square footage of existing structures to be removed, which were provided by KSN.
- **Slurry wall batching**—Fugitive dust emissions from slurry wall batching at the new temporary batch plant were quantified using emission factors from the USEPA's AP-42 (U.S. Environmental Protection Agency 2006b). Daily and total batch quantities (cubic yards) were provided by KSN.

- **Paving**—Fugitive ROG emissions associated with paving for the 2nd Street widening were calculated using activity data (e.g., square feet paved) provided by KSN and the CalEEMod default emission factor of 2.62 pounds of ROG per acre paved (Trinity Consultants 2021).

The emissions calculations for all source categories were summed together to obtain total emissions, and maximum daily emissions calculated based on concurrent construction activity. The daily estimates were converted to annual totals based on the detailed construction schedule, which was developed by KSN.[3]

Table 3.6-5 summarizes emissions that would be generated by project emission sources in CCAPCD. CCAPCD has not developed quantitative emissions thresholds for CEQA evaluations. In the absence of CEQA thresholds for CCAPCD, thresholds from FRAQMD (2010:14) are used for this analysis. This approach reflects the geographic proximity of project activities relative to the county line, which meanders with the Sacramento River. While construction activities for the proposed project would occur on the Colusa County side of the Sacramento River, they would be geographically adjacent to Sutter County (FRAQMD). Sutter County and the FRAQMD are located within the SVAB and thus possess similar air circulation patterns and temperature inversion layers as experienced in Colusa County and the project area. FRAQMD air quality thresholds of significance are therefore appropriate. Moreover, FRAQMD's daily thresholds are consistent with the Best Available Control Technology (BACT) thresholds outlined in CCAPCD's Rule 430 (New Source Review [NSR]) for stationary sources. NSR is designed to prevent new emission sources from affecting attainment progress and deteriorating ambient air quality. The emissions thresholds therefore represent the maximum emissions a project may generate before it would result in a cumulatively considerable adverse contribution to existing air quality conditions.

Table 3.6-5. Criteria Pollutant and Precursor Emissions from Construction of the Proposed Project in Colusa County

Rate	ROG	NOx	PM10
Pounds per day	1.31 [a]	12.80 [a]	77.89 [b]
Threshold	25.00	25.00	80.00
Exceeds?	No	No	No
Total Tons	0.22	2.13	3.77
Threshold	4.16 [c]	4.16 [c]	— [d]
Exceeds?	No	No	— [d]

NOx = nitrogen oxides; PM10 = particulate matter less than or equal to 10 microns in diameter; ROG = reactive organic gases

[a] Pursuant to FRAQMD guidance (2010:17), ROG and NOx emissions should be averaged over the construction duration for comparison to their average daily threshold of 25 pounds per day. Total ROG and NOx generated by the project was therefore divided by 333 days of construction activity (January through November).

[b] Unlike ROG and NOx, which are average daily emission rates, the emissions presented for PM10 are maximum daily and represent the highest emissions that are predicted to occur on a single day based on concurrent construction activity. Consideration of maximum daily PM10 emissions is consistent with FRAMQD (2010:17) guidance for comparison to their maximum daily threshold of 80 pounds per day.

[3] Based on information available at the time of the CEQA analysis modeling, emissions were quantified assuming project construction would occur in 2023. Depending on project specific circumstances, construction may begin later than the modeled year of 2023. It is projected that the emissions intensity of equipment and vehicle operation in 2024 and beyond would be lower than under 2023 conditions because of improvements in engine technology and regulations to reduce combustion emissions. Accordingly, if construction is delayed, the analysis would reflect a conservative representation of emissions.

[c] Because construction of the proposed project would not occur over multiple years, the maximum allowable total emissions rate was calculated by multiplying 25 pounds per day by the construction duration (333 days) and converting the product to tons (FRAQMD 2010:17).
[d] FRAQMD does not have an annual threshold for PM10.

Table 3.6-6 summarizes the material hauling emissions that would be generated in FRAQMD and PCAPCD. Emissions are compared to the respective air district threshold of significance.

Table 3.6-6. Criteria Pollutant and Precursor Emissions from Material Hauling through Feather River Air Quality Management District and Placer County Air Pollution Control District

Location	ROG	NOx	PM10
FRAQMD (pounds/tons)	0.73 [a] (0.02)	6.06 [a] (0.18)	3.21 [b] (0.08)
Threshold (pounds/tons)	25.00 (0.73 [c])	25.00 (0.73 [c])	80.00 (— [d])
Exceeds?	No	No	No
PCAPCD (pounds)	0.50 [e]	4.00 [e]	2.06 [e]
Threshold (pounds)	82.00	82.00	82.00
Exceeds?	No	No	No

NOx = nitrogen oxides; PM10 = particulate matter less than or equal to 10 microns in diameter; ROG = reactive organic gases.
[a] Pursuant to FRAQMD guidance (2010:17), ROG and NOx emissions should be averaged over the construction duration for comparison to their average daily threshold of 25 pounds per day. Total ROG and NOx generated by hauling activities in FRAQMD was therefore divided by duration of those phases in which hauling would occur (SB Cutoff Wall, SCCB Wall, and Rock Slope Protection). The combined duration of these phases is 58 days.
[b] Unlike ROG and NOx, which are average daily emission rates, the emissions presented for PM10 are maximum daily and represent the highest hauling emissions that are predicted to occur in FRAQMD among the SB Cutoff Wall, SCCB Wall, and Rock Slope Protection phases. Consideration of maximum daily PM10 emissions is consistent with FRAMQD (2010:17) guidance for comparison to their maximum daily threshold of 80 pounds per day.
[c] Because hauling activities in FRAQMD would not occur over multiple years, the maximum allowable total emissions rate was calculated by multiplying 25 pounds per day by the duration of those phases in which hauling would occur (58 days) and converting the product to tons (FRAQMD 2010:17).
[d] FRAQMD does not have an annual threshold for PM10.
[e] The emissions presented for PCAPCD are maximum daily and represent the highest hauling emissions that are predicted to occur in PCAPCD between the SB Cutoff Wall and SCCB Wall phases. Consideration of maximum daily emissions is consistent with PCAPCD (2017:21) guidance for comparison to their maximum daily threshold of 82 pounds per day.

As shown in Tables 3.6-5 and 3.6-6, neither construction activities nor inter-district material hauling would exceed the analysis thresholds. The threshold levels have been established by the local air quality management districts to prevent emissions from new projects from contributing to violations of the CAAQS or NAAQS. Because construction of the proposed project would not exceed these thresholds, it would not result in a cumulatively considerable net increase of ozone precursors or particulate matter emissions. Impacts would be less than significant.

Postconstruction, observation and maintenance of the levee would not change operational activities or associated emissions relative to existing conditions. Accordingly, there would be no long-term operational impact.

c. Expose sensitive receptors to substantial pollutant concentrations?

The primary pollutants of concern with respect to health risks to sensitive receptors are criteria pollutants (regional and local) and TAC. Ozone precursors (ROG and NO_X) and particulate matter are regional pollutants because they affect air quality on a regional scale. Localized pollutants are deposited and potentially affect population near the emissions source. The localized criteria pollutant of concern that would be generated by the proposed project is fugitive dust (particulate matter). The TACs of concern are DPM from diesel fueled engines and asbestos during demolition activities. Each of these pollutants is discussed below.

Regional Criteria Pollutants

As discussed in Section 3.6.2.1, *Pollutants of Concern*, some individuals exposed to high concentrations of ozone or particulate matter may experience certain health effects, including increased incidence of cardiovascular and respiratory ailments. The air quality thresholds used in the analysis have developed in consideration of existing air quality concentrations and attainment or nonattainment designations under the NAAQS and CAAQS. Recognizing that air quality is a cumulative problem, local air districts typically consider projects that generate particulate matter and ozone precursor emissions that are below the thresholds to be minor in nature. Such projects would not adversely affect air quality or exceed the health protective NAAQS or CAAQS. As shown in Tables 3.6-5 and 3.6-6, neither construction activities nor inter-district material hauling would generate ozone precursors (ROG and NOx) or particulate matter emissions above air district thresholds. As such, the proposed project would not be expected to contribute a significant level of air pollution that would degrade long-term, regional air quality within the SVAB. Impacts would be less than significant.

Localized Fugitive Dust

Exposure to fugitive dust at certain concentrations can irritate the respiratory system, especially for people who are naturally sensitive or susceptible to breathing problems. Slurry wall batching would generate fugitive dust emissions, but emissions would be limited considering no more than 100 cubic yards will be batched per day over 6 days. The mixer will also employ BACT to control and minimize emissions. The primary source of localized fugitive dust under the proposed project is vehicle travel over unpaved surfaces. These emissions would be controlled through adherence to CCAPCD rules (200, 202, and 204). Moreover, as shown in Table 3.6-5, construction activities in CCAPCD would not generate fugitive dust (particulate matter) emissions above the analysis thresholds. Accordingly, the proposed project would not expose sensitive receptors to substantial fugitive dust concentrations. Impacts would be less than significant.

Diesel Particulate Matter

DPM is a TAC generated by diesel-fueled equipment and vehicles. Exposure to DPM can increase the risk of developing some cancers. Diesel combustion would be limited to equipment and vehicle use during the 11-month construction period. This duration is substantially lower than the 30-year exposure period typically associated with chronic cancer health risks. Moreover, equipment and vehicle use would be spread along the 1.8-mile-long slurry cutoff wall and associated haul roads. DPM emissions therefore would not be concentrated at a single location for an extended time. Accordingly, the proposed project would not expose sensitive receptors to substantial DPM concentrations. Impacts would be less than significant.

Asbestos

Asbestos is a TAC that occurs naturally in some locations and was previously used in the building construction industry. The proposed project will demolish 5 existing structures and 1 pump station. The demolition of asbestos-containing materials is subject to the limitations of the National

Emissions Standards for Hazardous Air Pollutants (40 Code of Federal Regulations Parts 61 and 63) regulations and would require an asbestos inspection. Compliance with existing asbestos standards would prevent exposure of sensitive receptors to substantial pollutant concentrations with respect to asbestos (if present in buildings being demolished). Impacts would be less than significant.

d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Sources of odor during construction would include diesel exhaust from construction equipment and asphalt paving. All odors would be localized and generally confined to the immediate area surrounding the construction site. The proposed project would use standard construction techniques, and the equipment odors would be typical of most construction sites. These odors would be temporary and localized, and they would cease once construction activities have been completed. CCAPCD has adopted Rule 231 that limit the amount of volatile organic compound emissions from cutback asphalt, which would also reduce construction-related odors. Accordingly, odors generated during construction would not be expected to affect a substantial number of people or result in nuisance complaints. Impacts would be less than significant.

3.7 Greenhouse Gas Emissions

3.7.1 Introduction

Greenhouse gases (GHGs) are gaseous compounds that limit the transmission of Earth's radiated heat out to space. GHG emissions generated from implementation of the proposed project can contribute to global climate change. Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors), which are primarily pollutants of regional and local concern. Given the long atmospheric lifetimes of GHGs, GHGs emitted by many sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Thus, GHG impacts are inherently cumulative, and the study area for impacts on GHGs includes the entire state and global atmosphere.

This section analyzes the proposed project's potential impacts related to GHG emissions. It describes existing conditions in the project area and summarizes the overall regulatory framework for GHG emissions, and it analyzes the potential for the proposed project to affect these resources.

3.7.2 Existing Conditions

This section discusses the environmental setting relevant to GHG emissions in the study area. As noted above, the study area for GHG emissions consists of the entire state and global atmosphere because climate change is the result of the individual contributions of countless past, present, and future sources throughout the world.

3.7.2.1 Global Climate Change

The process known as the *greenhouse effect* keeps the atmosphere near Earth's surface warm enough for the successful habitation of humans and other life forms. The greenhouse effect is created by sunlight that passes through the atmosphere. Some of the sunlight striking Earth is absorbed and converted to heat, which warms the surface. The surface emits a portion of this heat as infrared radiation, some of which is re-emitted back toward the surface by GHGs in the atmosphere, and some of which results in warming of the atmosphere. Human activities that generate GHGs increase the amount of infrared radiation absorbed by the atmosphere, thus enhancing the greenhouse effect and amplifying the warming of Earth.

Increases in fossil fuel combustion and deforestation have exponentially increased concentrations of GHGs in the atmosphere since the Industrial Revolution (Intergovernmental Panel on Climate Change 2018:4). Rising atmospheric concentrations of GHGs in excess of natural levels result in increasing global surface temperatures—a process commonly referred to as *global warming*. Higher global surface temperatures, in turn, result in changes to Earth's climate system, including increased ocean temperature and acidity, reduced sea ice, variable precipitation, and increased frequency and intensity of extreme weather events (Intergovernmental Panel on Climate Change 2018:7–10). Large-scale changes to Earth's climate system are collectively referred to as *climate change.*

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC estimates that human-induced warming reached approximately 1 degree Celsius (°C) above preindustrial levels in 2017, increasing at 0.2°C per decade. Under the current nationally determined contributions of mitigation from each country until 2030, global warming is expected to rise 3°C by 2100, with warming to continue afterward (Intergovernmental Panel on Climate Change 2018:4). Large increases in global temperatures could have significant impacts on the natural and human environments worldwide and in California.

3.7.2.2 Greenhouse Gases

The principal anthropogenic (human-made) GHGs contributing to global warming are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds, including sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic sources.

The primary GHGs of concern that would be associated with the proposed project are CO_2, CH_4, and N_2O. Principal characteristics of these pollutants are discussed in the following sections. Note that fluorinated compounds are not discussed because these gases are primarily generated by industrial and manufacturing processes, which are not anticipated to be part of the proposed project.

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify reporting and analysis. The most accepted way to compare GHG emissions is by using the global warming potential (GWP) method. IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalent (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a global warming potential of 1 by definition) (California Air Resources Board 2021a).

Table 3.7-1 lists the GWPs of CO_2, CH_4, and N_2O and their lifetimes in the atmosphere. The GWPs are from the IPCC's fourth assessment report, consistent with statewide GHG emissions reporting protocol (California Air Resources Board 2021a).

Table 3.7-1. Lifetimes and Global Warming Potentials of Key Greenhouse Gases

Greenhouse Gas	Global Warming Potential (100 years)	Lifetime (years)
CO_2	1	–
CH_4	25	12
N_2O	298	114

Source: California Air Resources Board 2021a.
CH_4 = methane; CO_2 = carbon dioxide; N_2O = nitrous oxide.

All GWPs used for the California Air Resources Board's (CARB) GHG inventory and to assess attainment of the state's GHG reduction targets are considered over a 100-year time frame (as shown in Table 3.7-1). However, CARB recognizes the importance of short-lived climate pollutants (SLCP) and reducing these emissions to achieve the state's overall climate change goals. SLCPs have atmospheric lifetimes on the order of a few days to a few decades, and their relative climate forcing impacts, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2 (California Air Resources Board 2017a:36). Recognizing their short-term lifespan and warming impact, SLCPs are measured in terms of CO_2e using a 20-year time frame. The use of GWPs with a time horizon of 20 years better captures the importance of the SLCPs and gives a clearer perspective on the speed at which SLCP emission controls will affect the atmosphere relative to CO_2 emission controls. The *SLCP Reduction Strategy* addresses the three primary SLCPs—CH_4, HFC gases, and anthropogenic black carbon. CH_4 has a lifetime of 12 years and a 20-year GWP of 72. HFC gases have lifetimes of 1.4 to 52 years and 20-year GWPs of 437 to 6,350. Anthropogenic black carbon has a lifetime of a few days to weeks and a 20-year GWP of 3,200 (California Air Resources Board 2017a:40).

Carbon Dioxide

CO_2 accounts for more than 80 percent of all GHG emissions emitted in California (California Air Resources Board 2021b). CO_2 enters the atmosphere through fossil fuels (oil, natural gas, and coal) combustion, solid waste decomposition, plant and animal respiration, and chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or *sequestered*) when it is absorbed by plants as part of the biological carbon cycle.

Methane

CH_4, the main component of natural gas, is the second most abundant GHG (California Air Resources Board 2021b). Sources of anthropogenic emissions of CH_4 include growing rice, raising cattle, using natural gas, landfill outgassing, and mining coal. Certain land uses also function as a both a source and sink for CH_4. For example, wetlands are a terrestrial source of CH_4, whereas undisturbed, aerobic soils act as a CH_4 sink (i.e., they remove CH_4 from the atmosphere).

Nitrous Oxide

Anthropogenic sources of N_2O include agricultural processes (e.g., fertilizer application), nylon production, fuel-fired power plants, nitric acid production, and vehicle emissions. N_2O also is used in rocket engines, racecars, and as an aerosol spray propellant. Natural processes, such as nitrification and denitrification, can also produce N_2O, which can be released into the atmosphere by diffusion.

3.7.2.3 Greenhouse Gas Inventories

A GHG inventory is a quantification of all GHG emissions and sinks within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. Table 3.7-2 outlines the most recent global, national, and statewide local GHG inventories to help contextualize the magnitude of potential project-related emissions.

Table 3.7-2. Global, National, and State Greenhouse Gas Emissions Inventories

Year and Area [a]	CO_2e (metric tons)
2010 Global	52,000,000,000
2019 United States	6,558,300,000
2019 California	418,200,000

Sources: Intergovernmental Panel on Climate Change 2014:5; U.S. Environmental Protection Agency 2021:ES-4; California Air Resources Board 2021c.

CO_2e = carbon dioxide equivalent
[a] A GHG emissions inventory for Colusa County is currently unavailable.

3.7.3 Regulatory Setting

This section summarizes key federal, state, and local or regional regulations, laws, and policies relevant to GHG emissions in the study area for the proposed project.

3.7.3.1 Federal

Although currently there is no comprehensive federal law specifically related to the reduction of GHG emissions, in 2021, the United States rejoined the Paris Agreement to reduce national GHG emissions, and the federal government submitted the U.S. Nationally Determined Contribution (NDC), which aims to reduce national GHG emissions 50 to 52 percent by 2030 from 2005 levels. Additionally, the U.S. Environmental Protection Agency (USEPA) has adopted a Greenhouse Gas Reporting Rule for facilities emitting more than 25,000 metric tons of GHGs, and USEPA and the National Highway Traffic and Safety Administration (NHTSA) jointly implement fuel efficiency standards that have a direct effect on GHG emissions (e.g., Corporate Average Fuel Economy [CAFE] standards for light-duty vehicles). USEPA and NHTSA have also established GHG emission standards for medium- and heavy-duty vehicles through the *Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles* (76 Fed. Reg. 7106).

3.7.3.2 State

California has adopted statewide legislation addressing various aspects of GHG emissions reduction. The governor of California has also issued several executive orders (EO) related to the state's evolving climate change policy. Summaries of key policies, regulations, and legislation at the state level that are relevant to the proposed project are described below.

State Legislative Greenhouse Gas Reduction Targets

Assembly Bill (AB) 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, required the state to reduce GHG emissions to 1990 levels by 2020. Senate Bill (SB 32) (2016) requires the state to reduce emissions to 40 percent below the 1990 level by 2030. The state's plan to reach these targets is presented in periodic scoping plans. CARB (2017b) adopted *California's 2017 Climate Change Scoping Plan* (Scoping Plan) in November 2017 to meet the GHG reduction requirement set forth in SB 32. It proposes continuing the major programs of the previous Scoping Plan, including Cap-and-Trade Regulation; low carbon fuel standards; more fuel efficient cars, trucks, and freight movement; Renewables Portfolio Standard (RPS); and reducing CH_4 emissions from agricultural and other wastes.

Executive Order Greenhouse Gas Reduction Targets

In 2005, EO S-3-05 established goals to reduce California's GHG emissions to: (1) 2000 levels by 2010 (achieved); (2) 1990 levels by 2020 (achieved); and (3) 80 percent below the 1990 levels by 2050. In 2018, EO B-55-18 established a new state goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Executive orders are binding on state government agencies but are not legally binding on cities and counties or on private development.

Renewables Portfolio Standards

SBs 1078 (2002), 107 (2006) 2 (2011) and 100 (2015) govern California's RPS under which investor-owned utilities, energy service providers, and Community Choice Aggregators must procure additional retail sales per year from eligible renewable sources. The current goals for renewable sources are 33 percent by 2020 (achieved), 40 percent by 2024, 50 percent by 2026, 60 percent by 2030, and 100 percent by 2045.

Vehicle Emissions Reduction Strategies

EO S-01-07 established a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In 2018, CARB passed amendments to the low carbon fuel standard that set a target to reduce fuel carbon intensity by 20 percent by 2030, compared to a 2010 baseline.

AB 1493 (2002) (Pavley I) required CARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the model year 2009. Additional strengthening of the Pavley standards (referred to previously as Pavley II and now referred to as the Advanced Clean Cars measure) was adopted for vehicle model years 2017–2025 in 2012. Together, the two standards are expected to increase average fuel economy of light-duty vehicles to roughly 54.5 miles per gallon in 2025.

As discussed in Section 3.6, *Air Quality*, CARB adopted the Advanced Clean Truck Regulation in June 2020 to accelerate a large-scale transition to zero-emission medium- and heavy-duty vehicles. The regulation will reduce GHG emissions from medium- and heavy-duty vehicles by requiring the sale of zero-emission vehicles as an increasing percentage of total annual California sales.

Short-Lived Climate Pollutants Reduction Strategy

SB 605 directed CARB, in coordination with other state agencies and local air districts, to develop a comprehensive SLCP Reduction Strategy. SB 1383 directed CARB to approve and implement the SLCP Reduction Strategy to achieve the following reductions in SLCPs.

- 40 percent reduction in CH_4 below 2013 levels by 2030
- 40 percent reduction in HFCs below 2013 levels by 2030
- 50 percent reduction in anthropogenic black carbon below 2013 levels by 2030

CARB adopted the SLCP Reduction Strategy in March 2017 as a framework for achieving the CH_4, HFC, and anthropogenic black carbon reduction targets set by SB 1383. The SLCP Reduction Strategy includes 10 measures to reduce SLCPs, which fit within a wide range of ongoing planning efforts throughout the state. Regulations to achieve these goals became effective on January 1, 2022.

3.7.3.3 Local

CARB states that local governments are "essential partners" in the effort to reduce GHG emissions. Specifically, the Scoping Plan acknowledges that local governments have broad influence and, in some cases, exclusive jurisdiction over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations (California Air Resources Board 2017b:97). Many of the proposed measures to reduce GHG emissions rely on local government actions.

Primary construction activities fall under the jurisdiction of Colusa County Air Pollution Control District (CCAPCD. As discussed in Chapter 2, *Project Description*, bentonite clay and slag cement will be trucked from distributors in Roseville. Hauling from Grimes to Roseville will require trucks to pass through the Feather River Air Quality Management District (FRAQMD) and Placer County Air Pollution Control District (PCAQMD). FRAQMD has local air quality jurisdiction in Sutter and Yuba Counties, and PCAPCD has air quality justification in the non-Lake Tahoe portion of Placer County. Materials for rock slope protection may also be sourced from Parks Bar Quarry, which is in FRAQMD.

Neither CCAPCD nor FRAQMD has adopted guidance or thresholds for the analysis of GHG emissions under CEQA. PCAPCD (2017:24) has adopted construction and operational GHG thresholds.

3.7.4 Environmental Effects

Potential impacts of the proposed project related to GHG emissions are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section VIII, *Greenhouse Gas Emissions*, asks whether the project would result in any of the following conditions.

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Impact GHG-1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment

Emission generating activities under the proposed project include construction of a 1.8-mile-long slurry cutoff wall, restoration of riparian habitat adjacent to the levee, and repair of a 400-foot-long waterside erosion site. The predominant source of emissions associated with the proposed project is vehicle and equipment fuel combustion. Indirect GHG emissions would also be generated by electricity consumed during construction. Removal of approximately 204 trees would also result in a one-time change in carbon sequestration capacity.

Emissions generating activities would take place between January and November . Combustion exhaust emissions (CO_2, CH_4, and N_2O) were quantified using the methods described in Section 3.6, *Air Quality*. GHG emissions generated by electricity used to power onsite contractor trailers and equipment were quantified using activity data (e.g., megawatt hours) provided by the project engineering team (KSN) and emission factors calculating using data from Pacific Gas and Electric Company (PG&E) and the USEPA (PG&E 2021; U.S. Environmental Protection Agency 2022).[1] Changes in carbon sequestration capacity from tree removal were quantified using CalEEMod (version 2020.4.0).

[1] Based on information available at the time of the CEQA analysis modeling, emissions were quantified assuming project construction would occur in 2023. Depending on project specific circumstances, construction may begin later than the modeled year of 2023. It is projected that the emissions intensity of electricity generation and equipment and vehicle operation in 2024 and beyond would be lower than under 2023 conditions because of increased penetration of renewables, improvements in engine technology, and new regulations to reduce combustion emissions. Accordingly, if construction is delayed, the analysis would reflect a conservative representation of emissions.

Table 3.7-3 summarizes emissions that would be generated during construction by project emission sources in CCAPCD and from material hauling through FRAQMD and PCAPCD. As discussed in Section 3.7.3.3, *Local*, neither CCAPCD nor FRAQMD has developed quantitative emissions thresholds for CEQA evaluations. PCAPCD (2017:24) has adopted a construction threshold of 10,000 metric tons CO_2e per year. This threshold is based on emissions levels generated by construction projects over a 13-year period in Placer County. Recognizing that land use development projects in Placer County may differ from construction activities required for a levee repair project, this MND uses a two-pronged approach for analyzing the significance of project generated GHGs. First, emissions are compared to PCAPCD's 10,000 metric ton CO_2e threshold to assess their magnitude. Second, the analysis evaluates the extent to which the proposed project complies with applicable plans and policies adopted to reduce construction GHG emissions. Compliance with regulatory programs is recognized by the California Supreme Court as a potential pathway for evaluating GHG emissions consistent with CEQA (*Center for Biological Diversity v. Department of Fish and Wildlife*).

Table 3.7-3. Greenhouse Emissions from Construction of the Proposed Project (metric tons)

Air District	CO_2	CH_4	N_2O	CO_2e
CCAPCD [a]	732	0.07	0.04	747
FRAQMD [b]	46	0.01	<0.01	47
PCAPCD [b]	23	<0.01	<0.01	23
Total	801	0.08	0.05	817

CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; CCAPCD = Colusa County Air Pollution Control District; CH_4 = methane; FRAQMD = Feather River Air Quality Management District; PCAPCD = Placer County Air Pollution Control District; N_2O = nitrous oxide.
[a] Includes emissions from changes in carbon sequestration capacity.
[b] Emissions would be generated by hauling materials through the district.

As shown in Table 3.7-3, construction of the proposed project is predicted to generate 817 metric tons CO_2e. These emissions are considerably less than PCAPCD's 10,000 metric ton CO_2e threshold. Postconstruction, observation and maintenance of the levee would not change operational activities or associated emissions relative to existing conditions. Accordingly, there would be no exceedance of PCAPCD's threshold.

USEPA and NHTSA have adopted standards for CO_2 emissions and fuel consumption from heavy- and medium-duty vehicles. The CALGreen Code contains mandatory requirements aimed at reducing construction waste and reducing environmental impacts during and after construction. For example, nonresidential projects must recycle and/or salvage for reuse a minimum of 65 percent of nonhazardous construction and demolition debris or meet local construction and demolition waste management ordinance requirements, whichever is more stringent (Sections 4.4081.1 and 5.408.1). In addition, 100 percent of trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing for nonresidential projects must be reused or recycled (Section 5.408.3). The proposed project would comply with these mandatory requirements.

The state's near-term GHG strategy is defined by SB 32. The Scoping Plan provides a framework to reduce statewide GHG emissions and achieve the state's 2030 GHG reduction target pursuant to SB 32. The Scoping Plan identifies increasing sequestration as crucial to achieving the state's long-term climate change strategy (CARB 2017b). It outlines objectives to maintain natural lands as a resilient carbon sink and sets a goal to reduce GHG emissions from natural and working lands by at least 15 to 20 million metric tons of CO_2e by 2030. SB 1386 also identifies the protection and management of natural and working lands as a key strategy towards meeting the state's 2030 GHG reduction target. As discussed above, the project would remove 204 trees during construction. This would conflict with the state's land use and sequestration goals, resulting in a significant impact before mitigation.

Beyond sequestration, the Scoping Plan includes broad policy objectives to help meet the state's 2030 target across the California economy. While the Scoping Plan does not have explicit regulatory requirements related to construction equipment, actions undertaken to achieve some policies will GHG reductions in the construction sector. Table 3.7-4 analyzes consistency of the proposed project with the policy objectives of the Scoping Plan.

Table 3.7-4. Consistency of the Proposed Project with Scoping Plan Policies

Policy	Primary Objective	Consistency Analysis
Senate Bill 350	Reduce greenhouse gas (GHG) emissions in the electricity sector by implementing the 50 percent Renewables Portfolio Standard, doubling energy savings, and taking other actions as appropriate to achieve the GHG emissions reductions planning targets in the Integrated Resource Plan process.	This policy is a state program that requires no action at the local or project level.
Low-Carbon Fuel Standard	Transition to cleaner/less-polluting fuels that have a lower carbon footprint.	This policy is a state program that requires no action at the local or project level. Nonetheless, Mitigation Measure GHG-MM-1 requires alternatively or renewably fueled vehicles/equipment in at least 15 percent of the construction fleet.
Mobile-Source Strategy (Cleaner Technology and Fuels [CTF] Scenario)	Reduce GHGs and other pollutants from the transportation sector by transitioning to zero-emission and low-emission vehicles, operating cleaner transit systems, and reducing vehicle miles traveled.	This policy is a state program that requires no action at the local or project level. Nonetheless, Mitigation Measure GHG-MM-1 requires alternatively or renewably fueled vehicles/equipment in at least 15 percent of the construction fleet.
Senate Bill 1383	Approve and implement short-lived climate pollutant strategy to reduce highly potent GHGs.	The proposed project does not include any new or expanded sources of high global warming potential GHGs.
California Sustainable Freight Action Plan	Improve freight efficiency, transition to zero-emission technologies, and increase competitiveness of California's freight system.	The proposed project does not include a freight component.
Post-2020 Cap-and-Trade Program	Reduce GHGs across largest GHG emissions sources.	The proposed project does not propose any major sources of GHG emissions (i.e., sources with annual emissions greater than 25,000 metric tons of carbon dioxide equivalent).

Mitigation Measure GHG-MM-1 is required to replace all removed trees at a 1:1 ratio. The measure also requires best management practices recommended by CARB (2017b) for the reduction of construction generated GHGs. With implementation of Mitigation Measure GHG-MM-1, this impact would be less than significant.

Mitigation Measure GHG-MM-1: Implement Best Management Practices to Mitigate Tree Loss and Reduce Construction Generated Greenhouse Gas Emissions

The Sacramento River West Side Levee District will reduce GHG emissions generated during short-term construction by implementing the following measures.

- All trees removed during project construction will be replaced at a 1:1 ratio.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- Encourage construction contractors to operate vehicles with the highest tier engines commercially available.
- Utilize existing grid power for electric energy rather than operating temporary gasoline/diesel powered generators.
- Utilize alternative fuel (e.g., biodiesel, electric) or renewable diesel in construction vehicles/equipment in at least 15 percent of the fleet.

b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases

Colusa County does not currently have a climate action plan or local policy for the reduction of GHG emissions. The Scoping Plan is the state's plan for reducing GHG emissions to achieve the 2030 GHG reduction target outlined by SB 32. Outside of the Scoping Plan, the state has adopted several other regulations and programs to achieve future GHG reductions. The proposed project's consistency with SB 32 (including the Scoping Plan) and other applicable state regulations is assessed below to determine the significance of this impact. Consistency with EO B-55-18/S-3-05 is not specifically reviewed because all emissions generated by construction of the project are expected to occur before 2025, which is well before the 2045/2050 milestone years of the EOs.

Senate Bill 32

SB 32 codifies the state's GHG emissions reduction target for 2030. CARB adopted the Scoping Plan in November 2017 as a framework for achieving the 2030 GHG emissions target. As discussed under Impact GHG-1, removal of existing trees would conflict with the Scoping Plan's objective to maintain natural lands as a resilient carbon sink. This is a significant impact before mitigation. Mitigation Measure GHG-MM-1 requires 1:1 replacement ratio of all removed trees. This measure also outlines best management practices for the reduction of construction generated GHG emissions, which is consistent with the broad policy objectives of the Scoping Plan. With implementation of Mitigation Measure GHG-MM-1, there would not conflict with SB 32, and this impact would be less than significant.

Other State Regulations

As described further in Section 3.7.3.2, *State,* California has adopted statewide legislation addressing various aspects of GHG emissions reduction. Regulations, such as the SB 100-mandated 100 percent carbon-free RPS by 2045; implementation of the state's SLCP Reduction Strategy, including forthcoming regulations for composting and organics diversion; and new vehicle mandates and emission standards, will be necessary to attain the magnitude of reductions required for the state's 2030 GHG target. The proposed project would be required to comply with all regulations applicable to new infrastructure construction or would be directly affected by the outcomes (e.g., energy consumption would be less carbon intensive due to the increasingly stringent RPSs). Unlike the Scoping Plan, which explicitly calls for additional emissions reductions from local governments and new projects, none of these state regulations identify specific requirements or commitments for new development beyond what is already required by existing regulations or will be required in forthcoming regulation. Therefore, there is no conflict or inconsistency.

Mitigation Measure GHG-MM-1: Implement Best Management Practices to Mitigate Tree Loss and Reduce Construction Generated Greenhouse Gas Emissions

Refer to the measure description under Impact GHG-1.

3.8 Noise

3.8.1 Introduction

This section analyzes the proposed project's potential impacts related to noise. This analysis describes existing conditions in the project area, summarizes the regulatory framework for assessment of noise levels, and analyzes the potential for the proposed project to affect sensitive receptors.

3.8.1.1 Fundamental Concepts of Noise and Vibration

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. *Noise* can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, the logarithmic decibel scale is used to keep sound intensity numbers at a convenient and manageable level.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1-dB changes in sound levels, when exposed to steady midfrequency (in the range of 1,000 to 8,000 Hertz) pure-tone signals. A doubling of sound energy (e.g., doubling the volume of traffic on a highway) would result in a 3-dB increase in noise, which is generally perceived by the human ear as a detectable but not readily noticeable increase in sound level. A 10-dB increase is generally perceived by the human ear as a doubling of loudness, and distinctly noticeable.

The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting." Because humans are less sensitive to low-frequency sound than to high-frequency sound, A-weighted decibel (dBA) levels place greater emphasis on midfrequency and high frequency sound energy and less emphasis on low-frequency sound energy, to better represent how humans hear sound.

Below are brief definitions of these measurements and other terminology used in this section.

Sound. A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

Noise. Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

Ambient noise. The composite of noise from all sources near and far in a given environment exclusive of particular noise sources to be measured.

Decibel (dB). A unitless measure of sound. A sound level measurement in decibels describes the logarithmic ratio of a measured sound pressure level to a reference sound pressure level of 20 micropascals.

A-Weighted Decibel (dBA). An overall frequency-weighted sound level that approximates the frequency response of the human ear.

Maximum Sound Level (L_{max}). The maximum sound level measured during a specified interval.

Equivalent Sound Level (L_{eq}). L_{eq} represents an average of the sound energy occurring over a specified period. In effect, 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 duration of the measurement is commonly indicated in the subscript; for example, a 1-hour L_{eq} sound level would be indicated as dBA L_{eq} (1 hr).

Day-Night Level (L_{dn}). The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

Noise-Sensitive Receptors. Noise-sensitive receptors are defined as residences, hospitals, convalescent homes, schools, churches, hotels and motels, and sensitive wildlife habitat (Governor's Office of Planning and Research 2017).

For a point source, such as a stationary compressor, sound attenuates based on geometry at a rate of 6 dB per doubling of distance. For a line source, such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface, such as grass, attenuates at a greater rate than sound that travels over a hard surface, such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers, such as buildings, levees, and topography that block the line of site between a source and receiver, also increase the attenuation of sound over distance.

Auditory and non-auditory effects can result from excessive or chronic exposure to elevated noise levels. Auditory effects of noise on people can include temporary or permanent hearing loss. Non-auditory effects of exposure to elevated noise levels include sleep disturbance, speech interference, and psychological effects, such as annoyance. Land use compatibility standards for noise typically are based on research related to these non-auditory effects.

In contrast to airborne sound, groundborne vibration is not a phenomenon that most people experience every day. Background vibration velocity level in residential areas is usually much lower than the threshold of human perception. Most perceptible indoor vibration is caused by transient sources within buildings, such as mechanical equipment while in operation, people moving, or doors slamming. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. Dynamic construction equipment, such as pile drivers, can create vibrations that radiate along the surface and downward into the earth. These surface waves can be felt as groundborne vibration. Vibration can result in impacts that range from annoyance to structural damage. Variations in geology and distance result in different vibration levels with different frequencies and displacements.

3.8.2 Existing Conditions

The study area for noise analysis of the proposed project consists of land within 1 mile of the limits of construction. Existing noise levels in the study area would be considered typical of a small-town rural setting, with ambient sound levels in the range of 40 to 50 dBA. Vehicle traffic is a source of noise on State Route (SR) 45 and local roads. Noise from agricultural equipment, commercial activity and watercraft also contribute to the noise environment in the area.

The limits of construction for the proposed project are located adjacent to the population center of Grimes in Colusa County, which has a high density of single-family residences. Grand Island Elementary School is located about 1,500 feet away from the proposed project limits of construction. The area surrounding the population center of Grimes consists primarily of agricultural use and undeveloped land, with some single-family residences with driveway access to SR 45. The Grimes Boat Launch is located within the construction limits. The use of the boat launch facility would be maintained during construction work. The nearest sensitive use to the borrow area is a single-family residence, about 3,000 feet away.

Land use within 1 mile of the proposed project east of the Sacramento River in Sutter County consists primarily of agricultural use. The nearest residence in Sutter County is about 2,000 feet away from the limits of construction.

3.8.3 Regulatory Setting

This section summarizes key federal, state, and local or regional regulations, laws, and policies relevant to noise and vibration in the study area.

3.8.3.1 Federal

Noise Control Act of 1972

The Noise Control Act of 1972 (Public Law 92 574) established a requirement for all federal agencies to administer their programs in a manner that promotes an environment that is free of noise that jeopardizes public health or welfare. The U.S. Environmental Protection Agency (USEPA) was given the following responsibilities.

- Providing information to the public regarding the identifiable effects of noise on public health and welfare.
- Publishing information on the levels of environmental noise to protect the public health and welfare with an adequate margin of safety.
- Coordinating federal research and activities related to noise control.
- Establishing federal noise emission standards for selected products distributed in interstate commerce.

U.S. Environmental Protection Agency Standards for Environmental Noise

In 1974, USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, a comprehensive document that identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference.

In response to the requirements of the Noise Control Act, USEPA identified indoor and outdoor noise limits to protect public health and welfare. Outdoor L_{dn} limits of 55 dB and indoor L_{dn} limits of 45 dB were identified as desirable for protecting against speech interference and sleep disturbance in residential areas and at educational and health care facilities. The sound-level criterion for protecting against hearing damage in commercial and industrial areas is identified as the 24-hour L_{eq} value of 70 dB (both outdoors and indoors). Based on attitudinal surveys, USEPA determined that a 5 dB increase in L_{dn} or L_{eq} is the minimum required for a change in community reaction (U.S. Environmental Protection Agency 1974).

The Noise Control Act also directed federal agencies to comply with applicable federal, state, interstate, and local noise control regulations. Although USEPA was given a major role in disseminating information to the public and coordinating with federal agencies, each federal agency retained authority to adopt noise regulations pertaining to agency programs. USEPA can, however, require federal agencies to justify their noise regulations in terms of Noise Control Act policy requirements.

Key federal agencies that have adopted noise regulations and standards are listed below.

- Housing and Urban Development: Noise standards for federally funded housing projects.
- Federal Aviation Administration: Noise standards for aircraft.
- Federal Highway Administration: Noise standards for federally funded highway projects.
- Federal Transit Administration (FTA): Noise standards for federally funded transit projects.
- Federal Railroad Administration: Noise standards for federally funded rail projects.

Federal Transit Administration Standards for Construction Noise

FTA has developed methods for evaluating construction noise levels, which are discussed in the *FTA Manual* (Federal Transit Administration 2018). The manual does not contain standardized criteria for assessing construction noise impacts but provides guidelines for suggested noise limits for residential uses exposed to construction noise to describe levels that may result in a negative community reaction. These guidelines are summarized in Table 3.8-1.

Table 3.8-1. Federal Transit Administration Construction Noise Impact Guidelines

Land Use	8-hour L_{eq} (dBA), Day	8-hour L_{eq} (dBA), Night
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: Federal Transit Administration 2018.
Leq = equivalent sound level; dBA = A-weighted decibel.

3.8.3.2 State

California Noise Control Act

The California Noise Control Act was enacted in 1973. In preparing its general plan noise element, a city or county must identify local noise sources and analyze and quantify to the extent practicable current and projected noise levels from various sources, including highways and freeways;

passenger and freight railroad operations; ground rapid transit systems; commercial, general, and military aviation and airport operations; and other stationary ground noise sources.

The *State of California General Plan Guidelines* (Governor's Office of Planning and Research 2017) provides noise compatibility guidelines for land use planning according to the existing community noise level; however, these guidelines offer no information regarding construction noise.

California Department of Transportation Vibration Guidelines

Groundborne vibration and noise can also disturb people. Numerous studies have been conducted to characterize the human responses to vibration, which are discussed in FTA and California Department of Transportation (Caltrans) guidance (Federal Transit Administration 2018; California Department of Transportation 2020a). People are generally more sensitive to vibration during nighttime hours when they are sleeping than in the daytime. Vibration is measured in terms of peak particle velocity (PPV), defined as the maximum instantaneous peak of the vibration signal in inches per second. Caltrans provides guidelines regarding vibration associated with construction and operation of transportation infrastructure (California Department of Transportation 2020a). Table 3.8-2 lists the Caltrans vibration guidelines for potential damage to different types of structures. Table 3.8-3 provides the Caltrans guidelines regarding vibration annoyance potential.

Table 3.8-2. Caltrans Vibration Guidelines for Potential Damage to Structures

	Maximum PPV (in/sec)	
Structure Type and Condition	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation 2020a.
Notes: Transient sources create a single, isolated vibration event (e.g., blasting or the use of drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity in inches per second (in/sec).

Table 3.8-3. Caltrans Guidelines for Vibration Annoyance Potential

	Maximum PPV (in/sec)	
Human Response	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2020a.

Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity in inches per second (in/sec).

3.8.3.3 Local

The project is located in Grimes, an incorporated community in Colusa County adjacent to the Sacramento River, which follows the county line between Colusa County and Sutter County. Because noise from the project would be audible within Sutter County as well as Colusa County, local standards from the Sutter County jurisdiction east of the Sacramento River are also considered in the analysis.

Colusa County General Plan

The Noise Element of the Colusa County General Plan states that non-transportation noise sources shall be in compliance with performance standards for all sensitive land uses, which indicate exterior noise limits of 55 dBA Leq during daytime hours (7:00 a.m. to 10:00 p.m.), 45 dBA Leq for nighttime hours (10:00 p.m. to 7:00 a.m.), and an interior level of 45 dBA Lmax.

The Noise Element specifies the following with respect to vibration:

> As part of the project review and approval process, require construction projects and new development anticipated to generate a significant amount of groundborne vibration to ensure acceptable interior vibration levels at nearby noise-sensitive uses based on Federal Transit Administration criteria.

Colusa County Municipal Code

Chapter 13 of the County municipal code indicates maximum allowable sound pressure levels at the property line of the property containing the noise source. These limits are shown in Table 3.8-4.

Table 3.8-4. Maximum 1-Hour Equivalent Sound Pressure Levels, Colusa County

Time of Day	Residential	Commercial	High Traffic Noise Corridor
7:00 a.m. to 9:00 p.m.	55	60	65
9:00 p.m. to 7:00 a.m.	50	55	65

The code provides an exception for construction site noise between the hours of 7:00 a.m. and 7:00 p.m., Monday to Friday and 8:00 a.m. to 8:00 p.m. Saturday and Sunday. However, construction activities are required to satisfy one of the following noise limitations.

> (1) No individual piece of equipment produces a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.
>
> (2) The noise level at any point outside of the property plane of the project does not exceed eighty-six dBA.

Sutter County General Plan

The Sutter County General Plan was recently updated and the final plan was adopted in March 2011. The General Plan Noise Element (Sutter County 2011) states that new non transportation noise sources will be mitigated to the noise level standards indicated in the Sutter County Municipal Code. The noise standards for Sutter County are shown in Table 3.8-5. Policy N 1.6 relates to construction noise and states:

> require discretionary projects to limit noise-generating construction activities within 1,000 feet of noise-sensitive uses (i.e., residential uses, daycares, schools, convalescent homes, and medical care facilities) to daytime hours between 7:00 a.m. and 6:00 p.m. on weekdays, 8:00 a.m. and 5:00 p.m. on Saturdays, and prohibit construction on Sundays and holidays unless permission for the latter has been applied for and granted by the County.

Table 3.8-5. Sutter County Noise Standards for Non-Transportation Sources

Noise Level Descriptor	Daytime	Nighttime
Hourly L_{eq}, dB	55	45
Maximum level, dB	70	65

Source: Sutter County 2010.
Note: Noise levels are measured at the property line of the noise-sensitive use.
dB = decibels; L_{eq} = overall 24-hour sound level.

Sutter County Municipal Code

The noise standards for Sutter County are implemented through the Sutter County General Plan, as discussed above.

3.8.4 Environmental Effects

Potential impacts of the proposed project related to noise are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XIII, *Noise*, asks whether the project would result in any of the following conditions.

a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

Construction Equipment

The assessment of potential construction noise levels was based on methodology developed by the FTA (2018) and construction noise criteria from applicable local guidance (such as local general plan documents or noise ordinances). Noise levels produced by commonly used construction equipment are shown in Table 3.8-6. Individual types of construction equipment are expected to generate maximum noise levels ranging from 80 to 101 dBA at a distance of 50 feet. The construction noise level at a given receiver location depends on the type of construction activity and the distance and shielding between the activity and noise-sensitive receivers.

Table 3.8-6. Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 Feet from Source
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Haul/Water Truck	84
Excavator	85
Impact Hammer (Hoe Ram)	90
Bulldozer	85
Roller	85
Skid Steer	80
Forklift	80
Compactor	82
Backhoe	80
Crane	83
Grader	85
Generator	82

Source: Federal Transit Administration 2018.
dBA = A-weighted decibel.

Construction equipment used would vary by component or construction phase of the Project and would involve the use of impact pile drivers (or possibly vibratory pile drivers or drills), excavators, bulldozers, heavy trucks, pumps, generators, graders, compactors, , and other heavy equipment. To provide a conservative assessment, this construction noise analysis assumes that piles would be driven using impact methods. However, other methods may be used, such as vibratory or drilling methods, which would result in lower levels of noise levels relative to impact pile-driving. The source levels used to calculate noise exposure are based on the L_{max} of equipment emission levels developed by FTA. Usage factors for construction noise are used in the analysis to develop reasonable worst-case L_{eq} noise exposure values. The L_{eq} value accounts for the energy-average of noise over a specified interval (usually 1 hour), and usage factors represent the amount of time a type of equipment is used during a typical interval.

To characterize the overall noise level of the worst-case noise condition during a given phase of construction, the two loudest pieces of equipment were assumed to operate simultaneously at a perimeter location, at a receiver distance of 50 feet. Impact pile drivers were assumed to operate up to 25 percent of a given hour, and other equipment, such as excavators and trucks, were assumed to operate up to 100 percent of a given hour. Pumps and generators were also assumed to operate up to 100 percent of the time. Sound levels by project phase are shown in Table 3.8-7.

Table 3.8-7. Construction Noise Levels by Phase and Distance to Allowable Sound Levels

Construction Phase	Equipment Used [a]	Estimated Duration of Phase (days) [b]	Combined Source Level at 50 feet (dBA L_{eq}) [c]	Distance to Daytime Sound Level Limit of 55 dBA L_{eq} (feet) [d]	Distance to Nighttime Sound Level Limit of 45 dBA L_{eq} (feet) [e]
Utility Relocations and Clearing/Grubbing	Excavator, Haul Truck	95	88	900	n/a
Demolition of Structures	Excavator, Haul Truck	10	88	900	n/a
2nd Street Widening	Roller, Grader	5	88	900	n/a
Setting K-rail/Fencing	Excavator, Haul Truck	12	88	900	n/a
Levee Degrading	Excavator, Haul Truck	13	88	900	2,100 [g]
Irrigation Bypass Evaluation, Pipe Removal	Excavator, Haul Truck	30	86	750	1,800 [g]
Pump Station Reconstruction	Impact Pile Driver, Excavator	30	95 [f]	1,750 [f]	4,200 [g]
SB/SCCB Cutoff Wall	Excavator, Dozer	72	87	900	2,100 [g]
Levee Regrading	Dozer, Truck	54	88	900	2,100 [g]
Pipe Replacements	Excavator, Compactor	72 total, 6 for night work	83	600	1,400
Levee Crown Aggregate Base	Roller, Grader	25	88	900	2,100 [g]
Rock Slope Protection	Excavator, Dozer	12	87	800	2,100 [g]
Demobilization	Excavator, Forklift	30	85	700	n/a

Note: Distance calculation do not include the effects, if any, of local shielding from walls, topography or other barriers which may further reduce sound levels.

L_{eq} = equivalent sound level; dBA = A-weighted decibel; SB = soil-bentonite; SCCB = soil-cement-cement-bentonite; n/a = not available.

[a] The two loudest pieces of equipment that may operate in one location simultaneously.

[b] Based on an 8- to 10-hour workdays for all phases, except 11-hour workdays for SB or SCCB cutoff walls.

[c] Based on usage factors of 25 percent to 100 percent, depending on construction phase, for types of equipment used.

[d] The maximum distance where the combined equipment level may potentially exceed the daytime standard of 55 dBA L_{eq} for non-transportation sources for Colusa County and Sutter County. Daytime is defined as the hours from 7:00 a.m. to 10:00 p.m.

[e] The maximum distance where the combined equipment level may potentially exceed the nighttime standard of 45 dBA L_{eq} for non-transportation sources for Colusa County and Sutter County. Nighttime is defined as the hours from 10:00 p.m. to 7:00 a.m.

[f] The analysis assumes a maximum level of 101 dBA for impact drivers, however vibratory drivers, which have a maximum level of 96 dBA, may also be used.

[g] During this phase of construction, work during County-regulated hours would occur only between the hours of 6:00 a.m. to 7:00 a.m. and 6:00 p.m. to 7:00 p.m.

The nearest single-family residences to the limits of construction are those nearest to the Sacramento River levee. Generally, equipment noise during construction would be most noticeable at residences between 2nd Street and the Sacramento River levee.

The demolition phase would generate the highest levels of noise at sensitive receptors. During this phase, an excavator and haul truck may be used simultaneously and near one another. The demolition phase would remove five structures adjacent to the levee, which share property lines to single-family residences, which are as near as 30 feet to the existing structures that would be demolished. Noise levels during demolition would potentially be as high as 93 dBA L_{eq} at the nearest residences, and the daytime noise level standard would be exceeded up to 900 feet from structure demolition areas. As shown in Table 3.8-7, demolition would occur for a period of about 10 days, accounting for all structures to be removed. As such, this activity would occur only for a short period of time. While other phases of levee construction would also occur in these locations, as shown in Table 3.8-7, the use of equipment would be intermittent and overall levels would be lower compared to the demolition phase. However, because of the location of the construction limit compared to the Grimes population center, the daytime noise standard would be exceeded at the nearest residences as well as single-family homes up to 900 feet away from construction areas during most phases of construction, as shown in Table 3.8-7.

Reconstruction of the pump station facility would involve the use of pile drivers for pile installation. The piles would be driven using impact or vibratory methods as required. The use of impact or vibratory pile drivers would have the potential to generate the most noise of any construction equipment type or phase. This analysis assumes that an impact pile driver would be used to provide a conservative analysis. The location of the pump station and intake is about 500 feet away from the nearest residence, which would result in a level of 69 dBA L_{eq} during periods of pile driving at this location. As shown in Table 3.8-7, noise levels would exceed the daytime standard for non-transportation noise at 1,750 feet, which would potentially exceed noise limits for many residences in the Grimes population center but would not exceed the daytime noise limit at Grand Island Elementary School, which is about 2,000 feet away from the pump structure. While pile drivers produce the highest noise level of the equipment types used, the driving would occur adjacent to the existing pump station structure. As pile installation progresses, noise from the pile driver would be progressively attenuated by the levee and surrounding terrain. In addition, the use of pile drivers would be intermittent and short term (about 2 days) relative to other phases of the project and would only be done during daytime hours.

During the construction phases involving utility relocation, clearing, grubbing, widening of 2nd Street, and demobilization, work hours would be 7:00 a.m. to 4:30 p.m., which are times of day when noise from construction is not regulated by Colusa County or Sutter County. For construction of the levee, cutoff wall and associated infrastructure, work would occur during hours of the day when noise is regulated by both Colusa County and Sutter County. Work on these phases is planned to be done between the hours of 6:00 a.m. to 7:00 p.m., and noise from construction is not regulated by either Colusa County or Sutter County between the hours of 7:00 a.m. and 6:00 p.m., therefore construction potentially could occur during the regulated hours of 6:00 a.m. to 7:00 a.m. and 6:00 p.m. to 7:00 p.m. However, construction of the levee, cutoff wall and associated infrastructure would be temporary, and is scheduled to last about 6 months. Duration of construction by phase is shown in Table 3.8-7. In general, use of heavy equipment would be short term relative to a given work area, as construction progresses along the 2-mile section of the levee alignment throughout the construction window, and noise from heavy equipment would affect different areas at different times over the course of project construction. Accounting for all phases of construction, the project is scheduled to take 11 months to complete, including site preparation and demobilization. It should be noted that the population center of Grimes also occupies only a fraction of the levee and much of the work along the levee would not be audible in town. In general, the duration of excessive noise exposure from heavy equipment that an individual receptor would experience during periods of construction would be limited. Noise from construction of the proposed project would cease once work is complete.

As described above, construction would generally occur during daytime hours, however some night work would be required during installation of new utility pipes crossing SR 45 at potentially several locations at the south end of town. This would be done between the hours of 7:00 p.m. and 4:30 a.m. and would require up to 6 days to complete. During night work, the noise standard of 45 dBA L_{eq} may be exceeded at up to 1,400 feet from work areas; however, the duration of this exceedance would be short term.

Haul Truck and Worker Trips

Noise from haul trucks may be noticeable on local roads that connect to SR 45. However, the haul truck deliveries would move along the levee alignment as construction progresses, so noise from haul trucks over the project construction window would affect different areas at different times.

The project haul route would use SR 45 and a dirt road adjacent to the borrow area. Up to 160 haul and water truck trips per day could be required for transfer of material to levee work areas. For other phases, fewer trucks would be used. Up to 20 worker and vendor trips would access the work areas per day. This increase in haul truck and commuter vehicle traffic on local roads would result in a temporary increase in traffic noise along haul routes to these areas. However, this effect would be short term and would take place during daytime hours when people are less sensitive to noise and when ambient noise levels are typically higher.

The haul route segment of SR 45 has an average daily traffic volume ranging from 1,050 to 1,400 vehicles per day according to Caltrans (2020b). Based on the existing volumes on these routes, the added truck and worker trips per day would result in a noise level increase of less than 1 dB compared to existing conditions, which would not be a noticeable increase in traffic noise levels at receptors along the haul route. For this reason, temporary and intermittent increases in noise from project haul trucks would not result in a substantial temporary increase in noise levels.

Operation and Maintenance

Operation and maintenance of the new levee and associated features would be required on a periodic basis. The activities and equipment used for operation and maintenance would be similar to existing conditions and would not result in a permanent increase in noise levels relative to existing conditions.

Impact NOI-1: Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies

As described above, while use of heavy equipment is generally short term relative to individual receptors and would mostly be done during daytime hours not regulated by Colusa County or Sutter County, the use of construction equipment during County-regulated hours as described above could potentially exceed the Colusa County noise limit of 45 dBA Leq at single-family residences in Grimes during several phases of construction, within the distances indicated in Table 3.8-7. The impact from temporary noise during construction is, therefore, considered to be potentially significant. Implementation of Mitigation Measure NOI-MM-1 would reduce this impact to a less-than-significant level by minimizing construction noise levels in the community during construction.

Mitigation Measure NOI-MM-1: Implement Best Noise Control Practices During Construction

Best noise control practices will be followed to minimize construction noise levels in the community. These include the following.

- Minimizing use of heavy equipment during the hours of 10:00 p.m. to 7:00 a.m.
- Locating stationary equipment (e.g., generators, idling trucks) as far as possible from noise-sensitive land uses.
- Requiring that all construction equipment powered by gasoline or diesel engines have sound-control devices such as exhaust mufflers that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Using equipment powered by electric motors instead of gasoline- or diesel-powered engines where feasible.
- Preventing excessive noise by shutting down idle vehicles or equipment.
- Using noise-reducing enclosures around noise-generating equipment where feasible.
- Constructing barriers between noise sources and noise-sensitive land uses or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission to noise-sensitive land uses to the extent feasible. The barriers should be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment.
- Notifying adjacent residents in advance of construction work.
- Where noise-generating activities are conducted within 300 feet of noise sensitive receptors and may exceed County regulations, the Contractor will install sound level meters at the property line of the nearest receptors or the nearest suitable location to continuously measure sound levels generated by the project-related work activities. The recorded results will be provided to the project engineer.
- Prior to construction, the Contractor will make a construction schedule available to residents living in the vicinity of the construction areas before construction begins and designate a noise disturbance coordinator with contact information. The coordinator will be responsible for responding to complaints regarding construction noise, determine the source of the complaint, and ensure that reasonable and appropriate measures are implemented.

b. Generate excessive groundborne vibration or groundborne noise levels?

Construction of the proposed project would involve the use of construction equipment that may intermittently generate groundborne vibration in the immediate vicinity of a piece of equipment in operation. Typical vibration levels associated with heavy-duty construction equipment at various distances from the source are shown in Table 3.8-8.

Table 3.8-8. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet	PPV at 50 Feet	PPV at 75 Feet	PPV at 100 Feet
Impact Pile Driver	1.518	0.054	0.292	0.190
Vibratory Roller	0.210	0.074	0.040	0.026
Bulldozer	0.089	0.032	0.017	0.011
Loaded trucks	0.076	0.027	0.015	0.010

Source: Federal Transit Administration 2018.
PPV = peak particle velocity.

The project would involve use of an impact pile driver for work at the pumping facility, and this is the most vibration-intensive type of construction equipment that would be used for the proposed project. Operation of impact pile drivers would result in high levels of groundborne vibration immediately adjacent to the locations of piles. Structures within 100 feet of pile driving activity could be exposed to vibration levels of 0.19 inch per second PPV or greater. The residence nearest to the location where pile driving would take place is approximately 500 feet away, and at this distance the vibration levels would be approximately 0.02 inches per second PPV, which would generally not be perceptible considering the transient nature of pile driving vibration, and vibration at this level would not have a potential to result in damage to building structures.

Regarding other types of heavy equipment, vibration levels would generally only be perceptible in the localized area of up to approximately 50 feet from each source, which may potentially occur on an intermittent basis. A roller would be used for the widening of 2nd Street, and this would pass near residences, causing a vibration level of up to 0.210 inch per second PPV for a brief period at the nearest residence. Vibration at this level would be below the damage threshold of 0.5 inches per second PPV for residential structures, and would potentially be distinctly perceptible, but only for a brief period.

Equipment used more frequently near to structures may include a bulldozer, and vibration from a bulldozer at a distance of 50 feet would be approximately 0.03 inches per second PPV, which is below the distinctly perceptible level outlined in Table 3.8-3. This vibration level is also below the damage criteria for all building types outlined in Table 3.8-2. Therefore, vibration from project construction is not expected to result in damage to any of the structures nearest to the construction areas or result in excessive effects related to annoyance. Project-related vibration impacts would be less than significant. No mitigation is required.

c. Be 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 and expose people residing or working in the project area to excessive noise levels?

There are no airports or airstrips within 2 miles of the project area. There would be no impact.

3.9 Hazards and Hazardous Materials

3.9.1 Introduction

This section analyzes the proposed project's potential impacts related to hazards and hazardous materials. It describes existing conditions in the project area and summarizes the overall regulatory framework for hazards and hazardous materials, and it analyzes the potential for the proposed project to affect these resources.

3.9.2 Existing Conditions

3.9.2.1 Hazardous Materials

Hazardous materials are chemicals and other substances defined as hazardous by a number of federal and state laws and regulations, including Title 29, Part 1910.1200 of the Code of Federal Regulations (CFR) and Title 22, Division 4.5, Chapter 11 of the California Code of Regulations (CCR). In general, these materials are substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may have harmful effects on public health or the environment during their use or when released to the environment. Hazardous materials also include waste chemicals and spilled materials. There are three listed in the area (SWRCB 2022, DTSC 2022a):

- **Dasan Farms:** This is a closed leaking underground storage tank site that was completed and closed as of December 1997.
- **Grand Island Elementary School:** This is a closed leaking underground storage tank site that was completed and closed as of December 2004.
- **Thayer Aviation Company:** This is an open but inactive site where the concern is related to water used to clean aviation equipment flowing to an agricultural drain. The site is an airstrip used for crop-dusting and there is past pesticide contamination. There is a land use covenant on the site, and annual inspections occur. This site is southwest and across SR 45 from the potential landside borrow area.

The homes in the project area were constructed prior to 1978 and as a result may contain lead paint (EPA 2022a). They may also contain asbestos (EPA 2022b). Both of these materials can be hazardous to human health.

The Sacramento River West Levee in the vicinity of Grimes was constructed in the mid- to late-1800s by local interests using unknown construction methods. It is therefore unknown what kinds of materials may be within the levee in addition to soils. There is the possibility that unknown contaminants (e.g., pesticides, contaminant-laden river sediments, aerially deposited lead from vehicles using SR 45) may have been inadvertently incorporated into the levee during construction or subsequent repairs. Additionally, soil conditions at the potential borrow sites are unknown and may also contain contamination. For example, the habitat restoration area may contain contaminant-laden sediment, and the offsite borrow site may also contain pesticides from agricultural uses.

3.9.2.2 Wildland Fires

Please refer to the Existing Conditions description in Section 3.21, Wildfire, regarding wildland fires, state and local responsibility areas, and the risk of wildfire in the project area.

3.9.2.3 Airports and Airstrips

Several private airstrips are located within a few miles of the project area (SkyVector 2022):

- Thayer Aviation Airport is the closest to the project site and is southwest and across SR 45 from the potential landside borrow area.
- Moronis Airport is located about 2.5 miles northeast of the project area.
- Sanborn Airport is located about 1.6 miles north of the project area.
- Balsdon Airport is located about 3.5 miles southwest of the project area.
- Farnsworth Ranch Airstrip is located about 1.5 miles northwest of the project area.

These airstrips appear to be largely for agricultural operations and tend to lack services like fuel and storage.

3.9.2.4 Emergency Response and Evacuation

The Colusa County General Plan addresses emergency access in the Circulation Element but does not delineate emergency access routes (Colusa County 2012).

3.9.2.5 Schools

Grand Island Elementary School is located in Grimes and is located about 0.25 mile from the project area.

3.9.3 Environmental Effects

Potential impacts of the proposed project related to hazards and hazardous materials are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section IX, *Hazards and Hazardous Materials*, asks whether the project would result in any of the following conditions.

a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Checklist items *a, b,* and *c* are addressed under checklist item *c* below.

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?

Checklist items *a, b,* and *c* are addressed under checklist item *c* below.

c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Project implementation would require the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles. Construction contractors would be required to use, store, and transport hazardous materials in compliance with federal, state, and local regulations during project construction. However, fuels and lubricants could be accidentally released into the environment at the construction site and along haul routes, causing environmental or human exposure to these hazards. While not a primary haul route, it is possible that West Leven Street may be used as a haul route, so that project traffic may go by Grand Island Elementary School. However, it is unlikely that this risk would be elevated for Grand Island Elementary School because of the small amount of materials being used, the low likelihood of an accident, and the low volume of material likely to be released in such an accident. Additionally, standard best management practices (BMPs) would be implemented, such as a spill prevention, control, and countermeasure plan. This reduces the chance of a spill and ensures adequate materials are available and that employees know how to respond in the case of a spill.

Several utility poles would be relocated for the proposed project, and the poles may be disposed of or reused, depending on their condition. Utility poles are frequently made of treated wood, which has been treated with a chemical preservative. The chemical preservative often contains components such as chromium, arsenic, copper, pentachlorophenol, and creosote. Elevated levels of these components make treated wood waste potentially hazardous (DTSC 2022b). Improper disposal of treated wood waste can result in health and environmental impacts. As described in the project description, a Treated Wood Management Program would be implemented in accordance with California Health and Safety Code section 25143.1.5 and Pacific Gas and Electric Company (PG&E) utility procedure ENV-4000P-07. The program includes the implementation of BMPs and health and safety procedures for cutting, removing, storing, handling, and transporting treated wood and treated wood waste. The program also includes special handling procedures in the event that copper naphthenate paper is encountered at the base of the poles (i.e., stumps). All employees performing pole removal will be properly trained on hazards and handling procedures and provided with the appropriate level of personal protective equipment necessary for work performed. During pole cutting, visqueen plastic would be placed underneath the wood to capture cutting debris and a water mist would be used to minimize dust. Removed wood poles, cutting debris, and stumps would be collected in project-specific containers and transferred to a PG&E service center designated as a PG&E treated wood waste consolidation site. Poles would then be scheduled for transport to an appropriate licensed Class 1 or composite lined portion of a solid waste landfill.

Use of onsite and offsite borrow material and excavation in the levee could also result in an incidental release of hazardous materials during construction if there is currently unknown soil contamination. However, as described in Chapter 2, *Project Description*, Phase I Environmental Site Assessments would be conducted and any contaminated soils would be addressed consistent with regulatory and statutory requirements. Contaminated material, in the unlikely event that it is discovered, would be properly analyzed and remediated or taken to the appropriate disposal facility.

Demolition of structures as part of the proposed project could expose workers and nearby residents to asbestos and lead paint. Demolition of older buildings with asbestos can make asbestos fibers airborne, which can result in inhalation and increase risk of cancer and lung disease. Occupational Safety and Health Administration regulations (29 CFR 1910.1101) set standards to protect workers during demolition of areas with asbestos. For example, they establish permissible exposure limits, require respirator use in regulated areas, mandate an exposure assessment, and require monitoring. Adherence to applicable regulations would ensure minimization of risk from exposure to asbestos. Likewise, demolition of older structures with lead-based paint can put workers at risk of reproductive harm and damage to the central nervous system, primarily due to inhalation of dust, fumes, or mists containing lead. Occupational Safety and Health Administration regulations (29 CFR 1926.62) set standards to protect workers who are occupationally exposed to lead. For example, regulations set exposure limits, require an exposure assessment, and outline a regime for monitoring. Adherence to applicable regulations would ensure minimization of risk from exposure to lead.

During operations, the levee would continue to be maintained as it is currently maintained. Therefore, there would be no new hazardous materials impacts during operation and maintenance. Impacts would be less than significant.

d. Be located on a site that 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?

The project area is not located on any known hazardous materials sites. The offsite borrow site is located close to the Thayer Aviation Airport site, where the concern is related to water used to clean aviation equipment flowing to an agricultural drain. It is southwest and across SR 45 from the potential landside borrow area, and the potential that this contamination may have traveled to the offsite borrow site is very low due to topography and the flow of water moving to the south and west in this area. However, the soils at the offsite borrow area would be addressed as previously described for checklist items a, b, and c, including a Phase I Environmental Site Assessment.

During operations, the levee would continue to be maintained as it is currently maintained. Therefore, there would be no new hazardous materials impacts during operation and maintenance. Impacts would be less than significant.

e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard or excessive noise for people residing or working in the project area?

Only private airstrips are located near the project area. They appear to serve largely agricultural uses. The project would not create or exacerbate safety or noise hazards related to these airstrips. There would be no impact.

f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The project would mainly involve construction activities on the existing levee and outside of roadways that could be used for emergency response and evacuation. Some construction activities would require controlled traffic and temporary closure of roads for safety purposes. However, closures would be temporary. Additionally, the existing roadway network provides some alternative access. For example, if SR 45 is temporarily closed at the Grimes Boat Landing, Grimes can be accessed from the east via Tule Road and Poundstone Road. Any full closures would last no longer than 30 minutes, and one-way closures would be controlled with flaggers. After construction activities are completed, the roadway network would be the same as it is currently. The project would not impair an adopted emergency response plan or emergency evacuation plan.

During operations, the levee would continue to be maintained as it is currently maintained. Therefore, there would be no new emergency response plan or emergency evacuation plan impacts during operation and maintenance. There would be no impact.

g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

During construction, use of power tools and construction equipment could increase risk of wildfire. However, much of the slurry cutoff wall construction would involve wetted soil and material that would reduce wildfire risk. The risk of wildfire is also low in the project area. Additionally, fire suppression equipment would be stored in construction equipment and vehicles. As a result, construction would not pose a substantial wildfire risk.

During operations, the levee would continue to be maintained as it is currently maintained. The restored habitat area would not increase wildfire risk. Therefore, operation and maintenance of the project would not increase wildland fire risk. Impacts would be less than significant.

3.10 Cultural Resources

3.10.1 Introduction

This section analyzes the proposed project's potential impacts related to cultural resources. It describes existing conditions in the project area, summarizes the overall regulatory framework for cultural resources, and analyzes the potential for the proposed project to affect these resources. Cultural resources-related environmental impacts are also discussed, and applicable mitigation is proposed. Cultural resources are defined in CEQA as *historical resources* (including buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance) and *archaeological resources*. A more detailed definition of these terms is provided in Section 3.10.3, *Regulatory Setting*.

3.10.2 Existing Conditions

This existing conditions section for cultural resources provides an overview of the efforts made to identify cultural resources in the project area. The first part of the section discusses background research, field methodology, and consultation efforts conducted for the proposed project. The second part of the section provides a brief contextual summary outlining potential areas of sensitivity for archaeological resources and known historic era resources in the project area. The project area is defined in Chapter 2.

3.10.2.1 Background Information

Records Search

On January 19, 2019, John (Jay) Lloyd of HDR Engineering, Inc. received the results of a records search for the project from the Northwest Information Center of the California Historical Information System at Sonoma State University in Rohnert Park, California. The records search area included all areas within the project area as well as a 0.25-mile buffer.

Records Search Results

The records search indicates that five cultural resources studies have been conducted within the project area, and two additional studies were conducted within 0.25 mile of the project area. No previously recorded resources were identified within the project area; however, two previously recorded prehistoric archaeological resources were identified within 0.25 mile of the project area.

Additional Background Research

Additional sources of information, including historic maps from the U.S. Geological Survey and General Land Office, were selectively reviewed to determine areas that have a high potential for the presence of historic and prehistoric sites. The following resources were also reviewed.

- National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR).

- California Office of Historic Preservation Historic Property Directory, later replaced by the Built Environment Resource Directory (2022).
- California Points of Historical Interest (1992).

Although not located in the project area, another segment of the Sacramento River West Levee located 21 miles north of the project area in Colusa County was recorded and evaluated as eligible for the NRHP and listed in the CRHR.

Field Methodology

ICF cultural resource specialists Stephen Pappas, Erik Allen, and McKenna Crowe conducted intensive (10-meter transect spacing) pedestrian surveys of the entire project area on January 14, 2021; March 23, 2021; and April 28, 2022. Surface visibility was generally good across the project area as most of the project area consisted of either tilled row crops or the top and slope of the levee. Several riparian areas on the margins of the northern borrow area were surveyed as a part of this work. These areas were located along the banks of the Sacramento River and were heavily vegetated. Visibility in these areas was extremely poor due to dense vegetation and brambles. A majority of these areas were surveyed intuitively due to vegetation overgrowth.

Additionally, ICF historic preservation specialist Nicole Felicetti conducted a pedestrian survey of four historic-aged properties in the project area on March 4, 2022. Ms. Felicetti meets the Secretary of the Interior's standards for professional qualifications as an architectural historian. Visual inspection of the built resources supplemented intensive research to prepare a Department of Parks and Recreation (DPR) 523 Form Set to determine NRHR eligibility.

The residential properties, levee structure, and associated features were visually examined and recorded with written notes and photographs during the field surveys. No other resources were identified in the project area during the survey.

Consultation with Native Americans and Other Interested Parties

Native American Coordination

On April 20, 2021, ICF sent a letter to the Native American Heritage Commission (NAHC) requesting a search of its Sacred Lands File and a list of individuals and organizations that may have knowledge of properties of cultural or religious importance to Native Americans in the project area vicinity. On May 5, 2021, ICF received a response letter from the NAHC stating that a search of the Sacred Lands File had identified Sacred Lands in the project area. The NAHC also provided a list of 10 Native American contacts that may provide information on Sacred Lands in the project area and/or on additional Native American cultural resources in the area. Additional Tribal coordination efforts for AB 52 are discussed in Section 3.11, *Tribal Cultural Resources*.

Other Interested Party Consultation

On April 27, 2021, ICF architectural historian, Joshua Severn, sent contact letters to the Sacramento Valley Museum, Grimes Library, and the Colusa County Historical Society. The letters briefly described the proposed project and requested information about cultural resources near the project area. ICF initiated follow-up contact with the Colusa County Historical Society on May 10, 2021. This included outreach to Charles Yerxa, Colusa County Historical Society President. ICF found contact information for Susan M. Rawlins, Director of the Grimes Branch Library, and Julie Stone, Director of the Sacramento Valley Museum, and sent follow-up correspondence on May 10, 2021. The above contacts sent no further questions or comments on the project.

3.10.2.2 Cultural Resources Contextual Summary

Prehistory

The taxonomic framework of the Sacramento Valley is described in the following sections in terms of archaeological patterns, following Fredrickson's (1973) system. A pattern is a general mode of life characterized archaeologically by technology, particular artifacts, economic systems, trade, burial practices, and other aspects of culture. Fredrickson's (1973) periods are also employed in the discussion below: Paleoindian (12,000–8000 BP), Lower Archaic (8000–5000 BP), Middle Archaic (5000–2500 BP), Upper Archaic (2500–950 BP), Lower Emergent (950–450 BP), and Upper Emergent (450–150 BP) (White et al. 2002:Figure 15). In Fredrickson's use, periods served as arbitrary intervals that could be used to compare patterns over space and time. Only with the clear identification of pervasive temporal patterns would periods acquire specific archaeological meaning.

Terminal Pleistocene and Early Holocene: 13,500–7000 BP

At the end of the Pleistocene (roughly the beginning of the Paleoindian Period), circa 13,500 to 10,500 BP, parts of the Sierra Nevada adjacent to the Central Valley were covered with large glaciers (West et al. 2007:27), and the valley provided a major transportation route for animals and people. This transportation corridor, perhaps rivaled only by maritime coastal travel (Erlandson et al. 2007), was undoubtedly used heavily by early Californians. Evidence for human occupation during this period, however, is scarce, the hypothesized result of being buried by deep alluvial sediments that accumulated rapidly during the late Holocene (Westwood 2005:17). Although rare, archaeological remains of this early period were reported in and around the Central Valley (Johnson 1967; Treganza and Heizer 1953). Johnson (1967:283–284) presents evidence for some use of the Mokelumne River area, under what is now Camanche Reservoir, during the late Pleistocene.

The economy of the Central Valley residents during the late Pleistocene is thought to have been based on the hunting of large Pleistocene mammals. Although no direct evidence of this exists in the Central Valley, the similarity of the artifact assemblages with those of other locations in western North America lends some support the notion of a large-game economic focus. Much of the Pleistocene megafauna became extinct at the Pleistocene/Holocene transition. These extinctions were caused by warming temperatures, rising sea levels, and changing precipitation patterns. As the Central Valley gradually became both warmer and dryer, pine forests were replaced with vegetation similar to that found today. The rising sea level filled San Francisco Bay and created the Delta marshes. To survive without large game, people had to change their food procurement strategies to make use of a more diverse range of smaller plants and animals.

Middle to Late Holocene: 7000–1200 BP

Using a wider range of smaller resources meant people had to have access to larger areas of land to hunt and collect the food and other resources they needed. Small groups of people probably moved through the valley, foothills, and Sierra Nevada to take advantage of seasonally available resources and resources limited to particular ecozones. This mobile foraging strategy was essential to their survival.

Reliance on a diverse number of smaller plants and animals had several consequences. First, people had to move around from one area to another to take advantage of the seasonal availability of particular resources. Second, larger areas of land were needed to ensure that enough resources were available during all times of the year. Third, more specialized tools were necessary to procure and process the wider range of plants and animals that were being used. This generalized subsistence strategy worked well for the inhabitants of the Central Valley for many millennia.

During the Lower Archaic Period, beginning approximately 6000 BP, a shift to a more specialized subsistence strategy began to take place. The more specialized strategy focused on ways of increasing the amount of food that could be produced from smaller portions of land. This change can be at least partially explained by the increasing numbers of people living in the Central Valley. An increased population is indicated by a much more abundant archaeological record and by dietary stress, as indicated by dental pathologies (Moratto 1984:203–204). As the population slowly increased, it became more difficult for people to obtain seasonally available resources across large areas of land. The beginnings of this intensification can be seen in the Middle-Archaic Windmiller Pattern (4500–2800 BP) and is based on the assemblage at the Windmiller site (CA-SAC-107).

A restricted land base, coupled with a more specialized resource base, meant that people had to develop economic relationships with other groups of people with different specialized resources living in other areas. Although resources and commodities were being exchanged throughout the region before this period, more extensive and more frequently used economic networks developed during this time. Transported resources likely included foods (trans-Sierra acorn movement is known from later periods [d'Azevedo 1986]) and commodities more visible in the archaeological record, such as shell and lithic materials (Rosenthal et al. 2007:155).

Late Horizon: 1200 BP to Historic Period

The trends toward specialization, exchange, and spatial circumscription that characterized prior periods continued in the Late horizon. Population continued to increase, and group territories continued to become smaller and more defined. The Delta region of the Central Valley reached population density figures higher than almost any other area of North America (Chartkoff and Chartkoff 1984). Patterns in the activities, social relationships, belief systems, and material culture continued to develop during this period and took forms similar to those described by the first Europeans that entered the area.

The predominant generalized subsistence pattern during this period is called the Augustine Pattern (1200 BP) and shows a high degree of technological specialization (Fredrickson 1973). Development of the Augustine Pattern was apparently stimulated by the southward expansion of Wintuan populations into the Sacramento Valley (Moratto 1984). The Augustine Pattern reflects a change in subsistence and land use patterns to those of the ethnographically known people of the historic era. This pattern exhibits a great elaboration of ceremonial and social organization, including the development of social stratification. Exchange became well developed, and an even more intensive emphasis was placed on the use of the acorn, as evidenced by the presence of shaped mortars and pestles and numerous hopper mortars in the archaeological record.

3.10.2.3 Ethnography

The action area is in the apparent historic territory of the Patwin (Johnson 1978:350; Kroeber 1925: Plate 34). The approximate maximum extent of Patwin territory in the late eighteenth and early nineteenth centuries was from the town of Princeton in Colusa County south to Suisun Bay and from the Sacramento River west across the eastern slope of the Coast Ranges (Johnson 1978).

The tribelet was the broadest apparent unit of political organization among the Patwin. Kroeber (1932:258–259) developed the term to describe what appears to have been the prevailing form of Native American political organization in central California from approximately the late eighteenth through the late nineteenth centuries. A tribelet is small in size, on the order of 100 to 300 people, with a discrete territory. The territory typically includes a permanent principal settlement or village and a number of subordinate villages that may or may not have been permanently occupied. Principal Patwin villages with dance houses appear to have been the residences of tribelet head chiefs (Kroeber 1932:259). The nearest triblets to the project were the villages of *P'alo,* located directly south of Grimes, and *Nawidihu*, located approximately 2 miles to the west (Johnson 1978:350). The village of *Nawidihu* was occupied both historically and prehistorically and was known in the ethnographic period as the *Nowi Rancheria* (U.S. Department of Interior 1972:37).

The Patwin economy was principally based on the utilization of natural resources from the riverine corridor, the wetlands, and the grasslands of the lower Sacramento River Valley, and from the open woodlands on the eastern foothills of the Coast Ranges (Johnson 1978; Kroeber 1925, 1932). The family was the basic subsistence unit within the tribelet that engaged in the exploitation of this resource mosaic (Johnson 1978:354). Tribelets with territory primarily on the floor of the Sacramento River Valley were more reliant on riverine and wetland resources. Fish, shellfish, and waterfowl were important sources of protein in the diet of these groups (Johnson 1978:355; Kroeber 1932:277–280). Salmon, sturgeon, perch, chub, sucker, pike, trout, and steelhead were variously caught with nets, weirs, lines and fishhooks, and harpoons. Mussels were taken from the gravels along the Sacramento River stream channel. Geese, ducks, and mudhens were taken with the use of decoys and various types of nets. Tribelets with territory on the western margin of the Sacramento River Valley were less reliant on riverine and wetland animal resources and more reliant on terrestrial game (Kroeber 1932:294–295). Deer, tule elk, antelope, bear, mountain lion, fox, and wolf were variously driven, caught with nets, or shot.

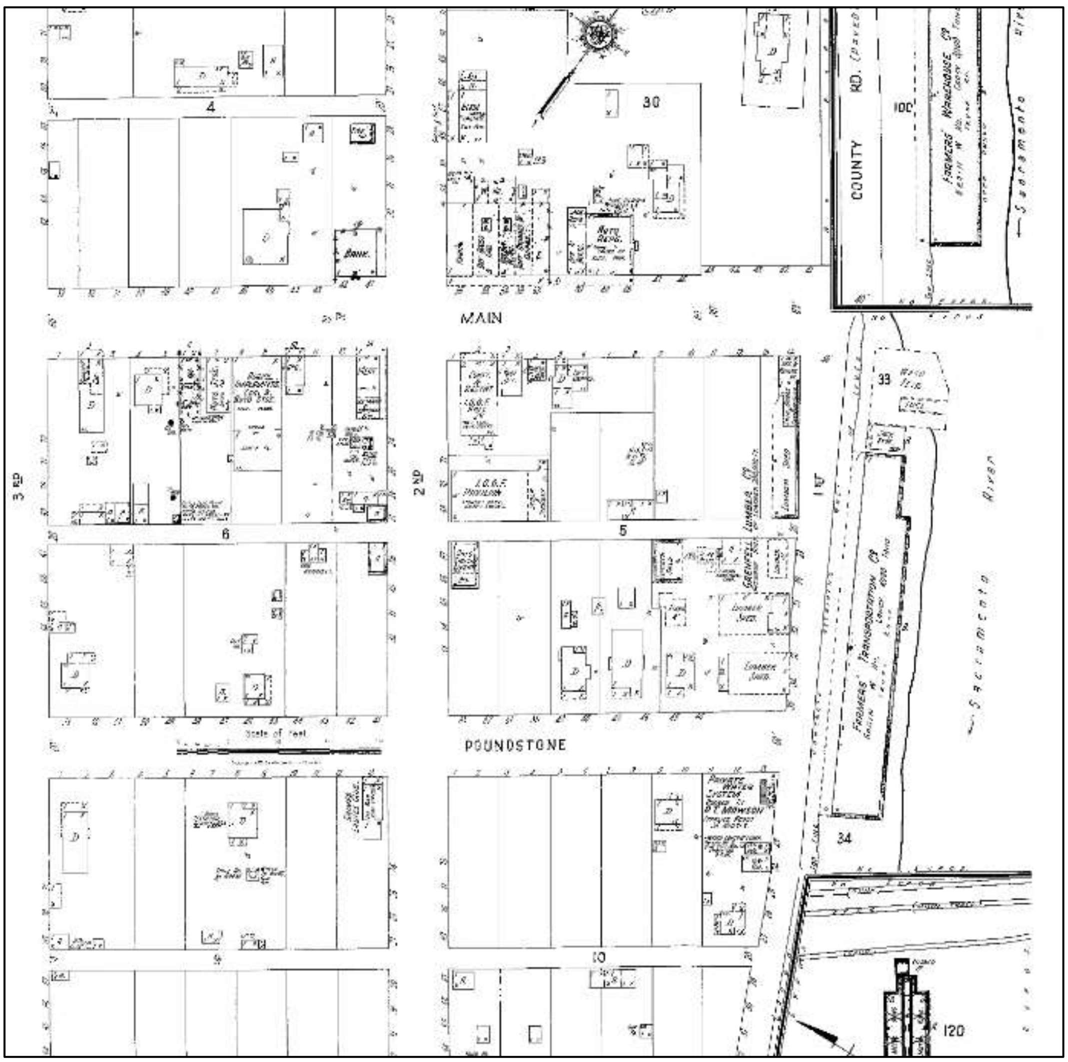
The majority of the plant resources that were important factors in the Patwin diet came from the grasslands of the lower Sacramento River Valley and the woodlands of the Coast Ranges foothills (Johnson 1978:355; Kroeber 1932:275–276 and 295–296). Acorns were a staple amongst all of the Patwin tribelets. Two types of valley oak acorns and a variety of hill and mountain oak were the primary sources of this foodstuff. As in many other native California cultures, the acorns were pulverized into meal and leached with water in a sand basin. The processed meal was then used to make a gruel or bread. A number of seed plants were important secondary food sources. These plants include sunflower, wild oat, alfilaria, clover, and bunchgrass (Johnson 1978:355). The seeds from these plants were typically parched or dried and then ground into meal for consumption. Manzanita and juniper berries were also typically dried and ground. Blackberries, elderberries, and wild grapes could be eaten raw, dried and ground into meal, or boiled. On the western margin of the Patwin culture area, sugar pine and foothill pine nuts were roasted and eaten whole (Kroeber 1932:296).

3.10.2.4 History

Community of Grimes

The project area is located along the northeastern edge of Colusa County, bordering Sutter County to the east, in the small community of Grimes. The project area includes a segment of the west levee of the Sacramento River, extending south from a point north of Grimes near Girdner Bend to a point near Faxon Road's intersection with 2nd Street.

Colusa County is one of 19 counties that make up the area known as the Sacramento Valley. Although the Spanish explored this region's waterways in the early 1800s, it was not until the 1830s that Euro American exploration into this expanse increased with trappers, such as the Hudson's Bay Company. By 1840, the *New Helvetia Rancho*, held by John Sutter, was the largest land holding in the Sacramento Valley. From 1842 to 1846, the period California was under Mexican rule, 10 land grants were authorized by Mexican authorities within the boundaries of what is currently Colusa County (Hoover et al. 2002: 566–567).



Source: San Francisco Public Library.

Figure 3.10-1. 1928 Sanborn Fire Insurance Map of Grimes, CA.

Grimes sits in the Grand Island tract, a 6-mile-wide region encompassing agricultural properties spanning Sycamore Slough on the west to the Sacramento River to the east. The Grand Island tract sat within the Colusa Grant, awarded to John Bidwell in the mid-1840s. By the late 1840s, three small communities grew in concert as local and regional transportation hubs: Sycamore, Grimes, and Eddy's Landing. These transportation centers supplied connections to markets for agricultural interests via the Sacramento River to Sacramento and the Bay Area. Grimes (Figure 3.10-1) came to be the most substantial of these communities into the early 1900s (Historic Environment Consultants 2003).

The town of Grimes dates to 1851–52, with the first residential construction by Cleaton Grimes and his brother. By 1918, Grimes' economy centered on its ample agricultural production, particularly sugar-beets, and utilized rail and river transportation to facilitate produce shipments. Grimes also had a local bank, telephone connection, two warehouse companies, a church, schools, and two community organization lodges. Commercial establishments throughout the small town included a hardware store, drug store, harness store, butcher shop, cigar and candy shop, creamery, bakery, two blacksmith shops, and garages. The town experienced only modest growth in population numbers over time, with a reported population of 250 in 1918 and a census-reported population of 391 people as of the 2010 census (Figure 3.10-2) (McCormish et al. 1918:174–175; CensusViewer 2021).

Trade on the Sacramento River played a significant role in the agricultural industry of Colusa County in the late nineteenth century, specifically in the construction and development of ranches. Ranches controlled a massive amount of land in Colusa County and participated in the exchange of a variety of produce and goods. Situated on the Sacramento River, Grimes was primed to receive and shop agricultural products through steamboat service, increasing the growth of local farms and ranches. Cecil Ranch and its dock on the banks of the Sacramento River, known as Cecil Landing, were a critical collection point for farms in the local area to await the shipment of wheat and other goods downriver to Sacramento or the Bay Area for wider distribution (Boghosian and Cox 2003:11–13).

By 1928, additional commercial and agricultural ventures in Grimes included a lumberyard, grain storage facilities, and automobile depots. General goods and hardware stores, a post office, and a bank were located along Main Street. Scattered residential development took place in the vicinity of Main Street; a privately-owned water system supplied about 50 local houses. Throughout the twentieth century, the residential community generally remained small.

Cleaton Grimes

Born in Mason County, Kentucky, in May 1815, Cleaton Grimes was the eldest child of Henry and Nancy (Bane) Grimes, learning the tannery business out of his father's business in Aberdeen, Ohio. Grimes ran a tannery of his own in Concord, Kentucky, before trading it for a store in Vanceburg, Kentucky. Grimes sold his Kentucky business interests and moved to California in 1849 after his wife, Martha, passed away. Grimes began in mining in the Dry Creek area, eventually moving with the company to Oregon Canyon and then to the Middle Fork area of the American River. In partnership with Captain Daniels, Grimes bought and ran a successful transportation barge moving timber and general goods along the Sacramento River between Marysville to Sacramento. By March 1852, Grimes visited Grand Island in Colusa County, and after a lengthy litigation process, he bought a 1,000 acres of land grant land. He set up Grimes Ferry on the Sacramento River, a wood yard at Grimes Landing, and founded the town of Grimes. Grimes built a two-room home by 1852 and laid the foundation for a new town. Grimes also contributed to early commercial development in the town, donating land for promoters to establish a store and warehouse, and starting the first livery stable. Grimes sold off most of his business and land interests as he approached retirement, reserving a part for his home just before his 90th birthday. Grimes was a member of the earliest board of supervisors of Colusa County and lived in the area until he died in January 1913 (McCormish et al. 1918:281–282).

Figure 3.10-2. 2021 Aerial Image of Grimes, CA.

Early Reclamation/Water Management in California

Historically, much of the Sacramento Valley was marsh and swampland, with seasonal flooding and periodic inundation of normally dry areas. Beginning in the nineteenth century, flood management and land reclamation projects were undertaken to make the area habitable for larger populations, expand agriculture, improve navigable waters, and offer flood protection. The history associated with water resources in California is as vast and complex as the systems themselves. A large majority of the systems of levees, canals, channels, and drainages that provide flood protection today were originally built in the mid- to late 1800s to enhance shipping, mining, and agricultural lands. Much like the evolution of state roadways and the national highway system, construction efforts to manage water through reclaiming land and controlling water were first undertaken in bits and pieces by individual property owners and organizations, and then ultimately upgraded and connected with the aid of the state and federal governments (O'Neill 2006:Preface).

The earliest reclamation legislative act was passed by the U.S. Congress in 1850. Called the Arkansas Act, this legislation was enacted with the intent to grant swamp and overflow land to states under the prerequisite that the land could be "reclaimed" and used for agricultural purposes (Hundley 2001:80). The act helped private property owners of swamp and overflowed lands obtain funds to reclaim their land by ensuring that "the proceeds from the sale of these lands be applied to the purpose of reclaiming said lands by means of levees and drains" (Bonte 1930:109). This act assisted in funding the initial construction of levees and drainage in California by individual property owners along the Sacramento, American, and Feather Rivers. Five years later, the State of California began encouraging the purchase of swamp and overflowed lands at $1 per acre. Initially purchasers were limited to 320 acres of land; however, over the next several years legislative amendments increased the limit to 640 acres (Bonte 1930:109).

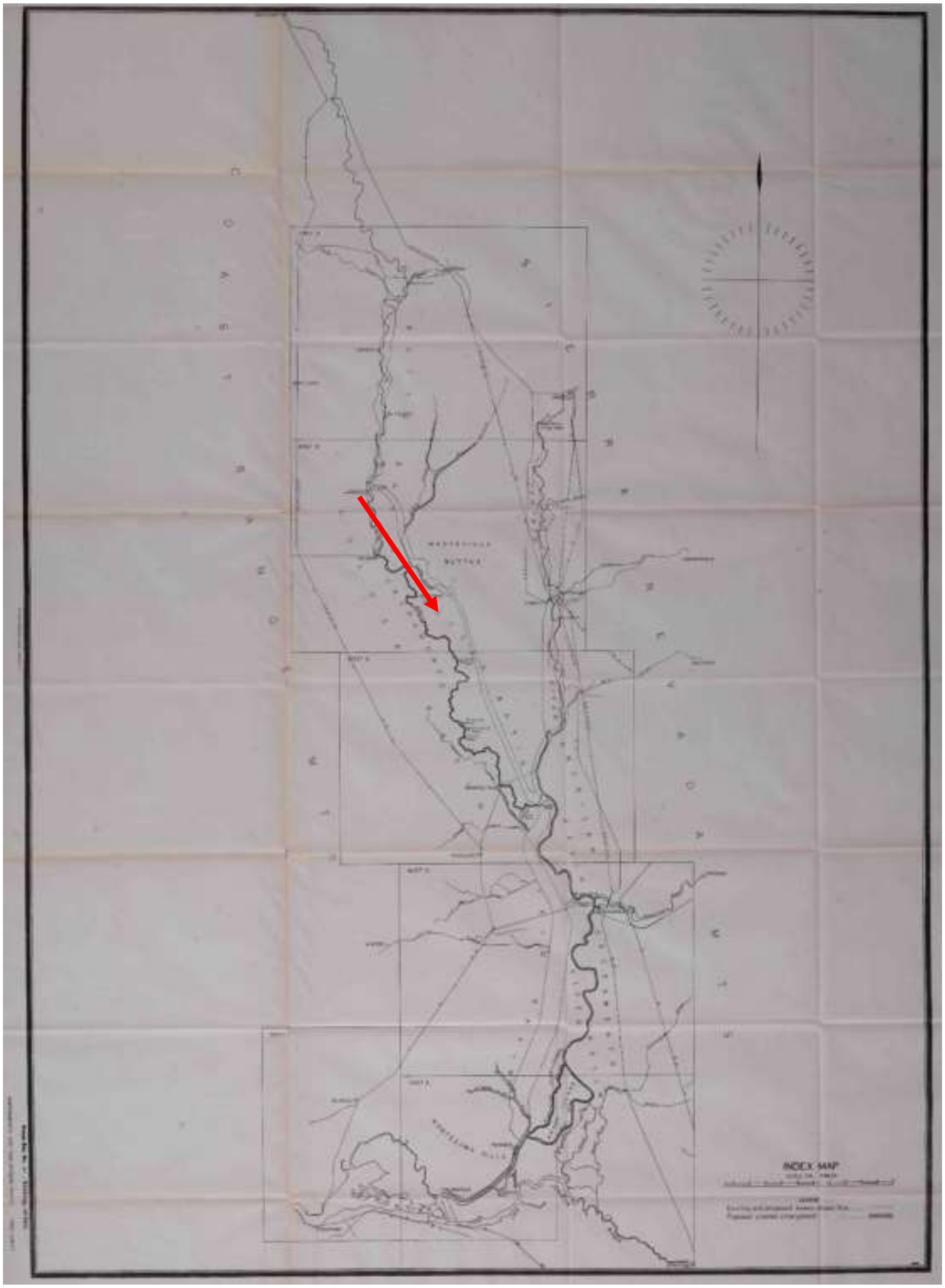
By 1861, the state legislature had enacted the Swamp and Overflowed Land Act, authorized the Swamp Land Commissioners, and initiated the formation of reclamation districts (RDs). The Swamp and Overflowed Land Act appropriated $200,000 from the previously established Swamp Land Fund for use at the discretion of the Commission and called for the taxation of land to fund reclamation projects (Bonte 1930:109). The years from 1861 to 1866 mark the first period of formal organization of reclamation in California (Bonte 1930:115). Following a devastating flood in 1862, by 1863, the Swamp and Overflowed Land Act was amended; new commissioners were appointed with reduced salaries, and provisions were made to employ engineers to study and formally design levees and drainage (Bonte 1930:110). By 1866, 54 RDs had petitioned for establishment. Of these, only 45 were formally organized and active in building levees and drainage structures. These initial RDs were limited to 11 of California's 58 counties: Marin, Napa, Sacramento, San Joaquin, San Mateo, Solano, Sonoma, Sutter, Tulare, Placer, and Colusa. The first RD in California, No. 1, encompassed the American Basin, extending from the American River north to the Bear River (Bonte 1930:116). Improvements of lands to protect from flooding and to allow reclamation of agricultural lands formally began in 1863. By 1865, 26 miles of levees and 20 miles of drainage canals had been constructed in RD No. 1 (currently RDs 1000 and 1001).

Between the 1860s and early 1900s, efforts were made to standardize the RDs as regulating bodies. In 1866, the Swamp and Overflowed Land Act was amended yet again, abolishing the Swamp Land Commissioners, discharging their engineers, and transferring the funds allocated through this legislation to the various counties to construct levees and drainage. The county surveyors were then designated as the engineers for RDs in their respective counties. This solidified the formation of reclamation districts by establishing county boards of supervisors for the districts (Bonte 1930:110–111).

In 1868 the California State Legislature passed the Green Act, which would guide the state flood control policy into the early 1900s. The Green Act enabled purchasers of swamp or overflow land to create a district and construct any type of levee or drainage system on their land. The act also removed restrictions on the amount of acreage individuals or groups could purchase, which led to land monopolies instead of promoting small, irrigated farms. Ultimately, the Green Act resulted in the creation of a "laissez-faire" system of developing flood control structures that failed to reduce flood damage (Hundley 2001:82–84). In summary, up to this period, individual property owners or RDs built levees. However, these levees were not standardized in design. They were also somewhat sporadically built along rivers; therefore, in some places they might not be linked together. If they were linked together, the levees could be of different heights and overall dimensions. If a flood came, the property with the least stable levee would be flooded.

By 1880, William Hammond Hall, California's first state engineer, submitted a report on irrigation and flood control to the state legislature. The report outlined the impact hydraulic mining was having on the natural environment and called for the creation of centralized water policy and management (Kelley 1989:191,201–203). During the late 1800s, other individuals and legislators also made efforts to promote the idea of a consolidated statewide water management plan at the state and federal level. However, this idea would not gain any real momentum until the early 1900s. By the early part of the twentieth century, over 700 RDs had been organized, often with overlapping boundaries. Many of these RDs lacked clear policies and feasible projects (Kelley 1989:112, 119).

In 1911, the U.S. Army Corps of Engineers (USACE) California Debris Commission presented its plan to Congress to unify Northern California's levees and drainages. The plan, which was prepared between 1909 and 1910, came to be known as the Sacramento River Flood Control Project (SRFCP). It is commonly referred to as "the Jackson Report,"—named for the main author. Overall, the Jackson Report presented the SRFCP and suggested standardizing and raising the existing levee system, as well as adding new levees, weirs, and bypass structures to assist in flood control and help to regulate hydraulic mining (Figure 3.10-3). In addition, the report emphasized enhancing navigation opportunities along the Sacramento and Feather Rivers, specifically, to enhance the Sacramento and San Joaquin River systems, "to protect from same damage due to mining debris, and to deepen their channels, and protect their banks"(United States Congress 1911: 2; Kelley 1989: 275, 282).



Source: ICF Cultural Resources Library.

Figure 3.10-3. Index Map from "The Jackson Report." Map of the Valley of Sacramento River, South of Tehama, and of San Joaquin River below Stockton. Complied for the California Debris Commission, 1910. Arrow Points to the Community of Grimes.

The Jackson Report projected that the levee and overall water system upgrades proposed in the report would be funded by the state or local landowners. Although no federal legislation resulted from the Jackson Report presentation to Congress, California's Governor Hiram Johnson called a special session of the state legislature to pass the California State Flood Control Act, approving the SRFCP. As part of this legislation, "the State Reclamation Board was established to coordinate reclamation, flood control, and navigation projects with the federal government" (O'Neill 2006:115). Accordingly, the passage of the California State Flood Control Act in 1911 marks the origin of a consolidated statewide water management plan and an organized effort towards standardizing and enhancing the existing levee system that was built between 1850 and 1911 (Bonte 1930:115).

Up until the early half of the twentieth century, the federal government had been reluctant to provide states aid for flood control. Six years after the Jackson Report was presented to Congress, and the State of California had begun implementation of the SRFCP, the 1917 Flood Control Act was enacted. The federal legislation provided some funding for SRFCP tasks; however, they were largely for navigation-related undertakings. This federal legislation also helped fund levee improvements along the Mississippi River (O'Neill 2006:125). The 1917 Flood Control Act established the "federal government responsibility to protect lands adjacent to navigable rivers, and it further institutionalized relations between the federal government, contractors, and state and local governments" (O'Neill 2006:126). This legislation marked a shift in national water management, authorizing the federal government to provide states aid for flood control projects. In the decades following, California was able to make strides in enhancing the state's flood control and water management systems, initiated by this federal legislation and subsequent aid. By the 1930s, all of the SRFCP weirs were constructed (Russo 2010). SRFCP system upgrades and improvements were ongoing throughout the twentieth century.

The SRFCP was completed between 1911 and 1961 and allowed for the Sacramento Valley to change from a seasonal floodplain into a center for urban and agricultural development. The SRFCP directs floodwater away from population centers towards purpose-built overflow areas. Levees along the Sacramento, American, Bear, Yuba, and Feather Rivers protect neighboring communities while overflows go to the Butte Basin, Sutter Bypass, and Yolo Bypass to its final release in Suisun Bay. The system's innovative organization of bypasses and levees, including the levee segment contained within the project area, improved upon the 1900s standard of single-channel levee systems that routed waters through a single bypass. The SRFCP system successfully engineered controllable waterflows that mirrored the naturally occurring channels and floodplains within the Central Valley. The USACE gained increasing authority in managing floodwaters through the Flood Control Act of 1936, which also expanded the SRFCP throughout the valley. By 1944 90 percent of the SRFCP was built. By 1961, the USACE deemed the SRFCP "completed" and the USACE shifted its focus from new construction to assisting the system's non-federal sponsors with managing existing systems (U.S. Army Corps of Engineers 2021:8-11).

California's earliest reclamation and water system management efforts were established between 1850 (Arkansas Act enacted) and 1911 (State Flood Control Act enacted). Levees, canals, channels, and drainages built within this timeframe are associated with early advances in water management in California that resulted in making settlement and expansion of infrastructure in the region possible. Several of these water system management structures still maintain their original alignment, continue to function as mechanisms of flood control, and serve as part of the existing statewide water management system. As such, these structures are a physical example of the evolution of reclamation in California, including the earliest efforts to build levees, protect navigable waters, form reclamation districts, and develop water management public policy. They are the physical representation of all water management construction activities that followed throughout the state after 1911.

Sacramento River West Side Levee District and Reclamation District 108

The levee in the project area is under the authority of the SRWSLD, which works in coordination with RD 108. Originally, the levees in the project area were created by local farmers and ranchers residing in the area; however, maintenance and construction were carried out by RD 108.

RD 108 was originally organized as the Sacramento Valley Reclamation Company in 1869 by Charles Frederick Reed, a former state legislator who served an instrumental role in the development of reclamation and irrigation in California (Russell and Coil 1940: 145; Walters and Anderson 1992:24). Reed, along with investors including W. C. Ralston, William Blanding, Louis A. Garnett, and A. H. Rose, formally organized as RD 108 on September 28, 1870. The district included 40,805.35 acres in Colusa County (Russell and Coil 1940:146–147). By the early 1870s, the RD had 25 miles of levees along the Sacramento River between Knights Landing and Colusa (Walters and Anderson 1992:24). Other smaller RDs were also established during this period in the Colusa Basin, including RD 730 (4,497 acres) and RD 787 (9,258 acres). However, the levees constructed by the smaller RDs were not high enough to withstand the powerful floods in the region during the early twentieth century (Walters and Anderson 1992:30).

As stated in the context above, although studies and plans to address the flooding in the Sacramento Valley at the state and federal level had been initiated as early as 1907, momentum in the form of legislation did not emerge until December of 1911, when the California State Legislature adopted a flood control plan for the Sacramento Valley (Haviland & Tibbets 1912:19; Water Code Sections 12645–12670.23). Proposed by the federal California Debris Commission, this legislation resulted in the creation of the Reclamation Board to regulate levees and other encroachments, and to review and approve flood control plans for the Sacramento River and its tributaries (Walters and Anderson 1992: 30, Water Code Sections 12645–12670.23).

In an effort to relieve RD 108 from rising costs and responsibility for maintaining levees outside of the RD 108 boundaries, the California State Legislature created SRWSLD in 1915. Since then, maintenance of the Sacramento River West Levee between Colusa and Knights Landing has been the responsibility of SRWSLD; however, equipment, personnel, and management are shared with RD 108, who are then reimbursed by SRWSLD (Reclamation District 108 2017).

The Sacramento River West Levee has experienced a variety of maintenance and upgrades over its functional life, including the installation of a stability and seepage berm and toe drain on the right bank of the Sacramento River one-quarter mile upstream of the confluence with the Tisdale Bypass in December 2002. Ongoing routine maintenance along the levee includes bank sloping, stone protection, and selective clearing of the banks. This activity has occurred at sporadic intervals from the levee's construction to the late 1980s. A levee setback was completed by H. Earl Parker, Inc. in 1949 and 1950, with emergency levee repairs at Mile 125.3 R done from October 1957 to November 1957 by Claude L. Youngs, Inc. (U.S. Army Corps of Engineers 2016:2-3).

3.10.3 Regulatory Setting

California Environmental Quality Act

Two categories of cultural resources are specifically called out in the State CEQA Guidelines. The categories are *historical resources* (State CEQA Guidelines Section 15064.5[b]) and *unique archaeological sites* (State CEQA Guidelines 15064.5[c]; California Public Resources Code [PRC] Section 21083.2). Different legal rules apply to the two different categories of cultural resources. However, the two categories sometimes overlap where "an archaeological historical resource" also qualifies as a "unique archaeological resource." In such an instance, the more stringent rules for unique archaeological resources apply, as explained below. In most situations, resources that meet the definition of a *unique archaeological resource* also meet the definition of a *historical resource*. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the CRHR.

Historical resources are those meeting the following requirements.

- Resources listed in or determined eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[a][1]).
- Resources included in a local register as defined in PRC Section 5020.1(k), "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant" (State CEQA Guidelines Section 15064.5[a][2]).
- Resources that are identified as significant in surveys that meet the standards provided in PRC Section 5024.1[g] (State CEQA Guidelines Section 15064.5[a][3]).
- Resources that the lead agency determines are significant, based on substantial evidence (State CEQA Guidelines Section 15064.5[a][3]).

Unique archaeological resources, on the other hand, are defined in PRC Section 21083.2 as a resource that meets at least one of the following criteria.

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person. (PRC Section 21083.2[g])

The process for identifying historical resources is typically accomplished by applying the criteria for listing in the CRHR (14 CCR Section 4852). This section states that a historical resource must be significant at the local, state, or national level under one or more of the following four criteria.

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. It is associated with the lives of persons important in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important in prehistory or history.

To be considered a historical resource for the purpose of CEQA, the resource must also have *integrity*. Integrity is the authenticity of a resource's physical identity, evidenced by the survival of characteristics that existed during the resource's period of significance.

Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It must also be judged with reference to the particular criteria under which a resource is eligible for listing in the CRHR (14 CCR 14 Section 4852[c]). Integrity assessments made for CEQA purposes typically follow the National Park Service guidance used for integrity assessments for NRHP purposes.

Even if a resource is not listed or eligible for listing in the CRHR, in a local register of historical resources, or identified in an historical resource survey, a lead agency may still determine that the resource is an historical resource as defined in PRC Section 5020.1j or 5024.1 (State CEQA Guidelines Section 15064.5[a][4]).

Resources that meet the significance criteria and integrity considerations must be considered in the impacts analysis under CEQA. Notably, a project that causes a substantial adverse change in the significance of a historical resource is a project that may have significant impact under CEQA (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 a historical resource would be materially impaired. The significance of a historical resource is materially impaired if the project demolishes or materially alters any qualities as follows.

- Qualities that justify the inclusion or eligibility for inclusion of a resource on the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
- Qualities that justify the inclusion of the resource on a local register (State CEQA Guidelines Section 15064.5[b][2][B]).

State Law Governing Human Remains

California law sets forth special rules that apply where human remains are encountered during project construction. As set forth in State CEQA Guidelines Section 15064.5[e], in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, no further excavation or disturbance of the site or any nearby area suspected of overlying adjacent human remains should take place until the following measures are implemented.

1. The coroner of the county in which the remains are discovered is contacted to determine that no investigation of the cause of death is required (as required under California Health and Safety Code [CHSC] Section 7050.5).
2. If the coroner determines the remains to be Native American:
   a. The coroner will contact the NAHC within 24 hours.
   b. The NAHC will identify the person or persons it believes to be the most likely descended from the deceased Native American.
   c. The most likely descendant may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate

dignity, the human remains and any associated grave goods (as provided in PRC Section 5097.98).

d. Where the following conditions occur, the landowner or his authorized representative will rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.

   1) The NAHC is unable to identify a most likely descendant or the most likely descendant failed to make a recommendation within 24 hours after being notified by the commission.

   2) The descendant identified fails to make a recommendation.

   3) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the NAHC.

3.10.3.2 Local

The following regulatory setting context for local conditions is summarized from the Colusa County 2030 General Plan (Colusa County 2012).

Colusa County 2030 General Plan Conservation Element

Background Information

The Conservation Element addresses the conservation, development, and utilization of natural resources, including forests, soils, rivers and other waters, fisheries, wildlife, minerals, water, and hydrology. It also addresses topics such as energy conservation, air quality, and the preservation of cultural and historical resources. Colusa County is home to a wide array of natural resources, waterways, wildlife habitat and historical resources.

Policy Framework

<u>Goal CON-3: Conserve and protect cultural and historical resources</u>

Objective CON-3A: Conserve Important Cultural Resources and the County's Heritage

Policy CON 3-1: Require a cultural and archaeological survey prior to approval of any project which would require excavation in an area that is sensitive for cultural or archaeological resources. If significant cultural or archaeological resources, including historic and prehistoric resources, are identified, appropriate measures shall be implemented, such as documentation and conservation, to reduce adverse impacts to the resource.

Policy CON 3-2: Require all development, infrastructure, and other ground-disturbing projects to comply with the following conditions in the event of an inadvertent discovery of cultural resources or human remains:

a. If construction or grading activities result in the discovery of significant historic or prehistoric archaeological artifacts or unique paleontological resources, all work within 100 feet of the discovery shall cease, the County Department of Planning and Building shall be notified, the resources shall be examined by a qualified archaeologist, paleontologist, or historian for appropriate protection and preservation measures; and work may only resume when appropriate protections are in place and have been approved by the County Department of Planning and Building.

b. If human remains are discovered during any ground disturbing activity, work shall stop until the County Coroner and County Department of Planning and Building have been contacted; if the human remains are determined to be of Native American origin, the Native American Heritage Commission (NAHC) and the most likely descendants have been consulted; and work may only resume when appropriate measures have been taken and approved by the County Department of Planning and Building.

Policy CON 3-3: Encourage and cooperate with cities, special districts, State and Federal agencies in acknowledging and preserving the County's cultural heritage, historical and archaeological structures, sites and landmarks.

Policy CON 3-4: Encourage voluntary landowner efforts to protect cultural resources consistent with applicable State law.

Policy CON 3-5: Work with Native American representatives to identify and appropriately address, through avoidance or mitigation, impacts to Native American cultural resources and sacred sites during the development review process.

Policy CON 3-6: Encourage Native American tribes to consult with the County prior to approval and development of new projects that may impact County resources, facilities, and the environment.

Policy CON 3-7: Consistent with State local and tribal intergovernmental consultation requirements such as SB18, the County shall consult with Native American tribes that may be interested in proposed new development and land use policy changes.

Objective CON-3B: Protect Important Historic Resources and Use these Resources to Promote a Sense of Place and History in Colusa County

Policy CON 3-8: Encourage the voluntary identification, conservation, and re-use of historical structures, properties, and sites with special and recognized historic, architectural, or aesthetic value.

Policy CON 3-9: Encourage historic resources to remain in their original use whenever possible. The adaptive use of historic resources is preferred, particularly as museums, educational facilities, or visitor-serving uses, when the original use can no longer be sustained. Older residences may be converted to office/retail use in commercial areas and to tourist or business use in agricultural areas, so long as their historical authenticity is maintained or enhanced.

Policy CON 3-10: Leverage the County's strong agricultural and historic heritage to support and encourage historically-oriented visitor programs and heritage tourism through cooperation with local, regional, and state marketing efforts.

Implementation

Action CON 3-A: Develop a Historic Colusa County program to identify historic resources, encourage landowners to voluntarily preserve and rehabilitate historical structures, and to provide a coordinated approach to draw visitors and tourists to these areas. The program may include:

a. Coordinated signage and identifying placards of historic areas, including downtowns, specific buildings, and businesses.

b. Maps available on-line, at the Chamber of Commerce, and key locations of the County that direct visitors and history aficionados to key historic and cultural resources in the County.

c. Establishment of local historic districts with standards to conserve historical resources and promote the highest and best use of such resources.

d. Property owner incentives such as reduced building permit fees for historic renovations, streamlined application processing, a brochure that identifies resources to purchase materials and fixtures that are historically accurate in appearance but offer modern benefits (e.g., energy-efficient lighting, windows, building materials that correlate to specific architectural or historic periods that are often seen in the County).

3.10.4 Findings for Cultural Resources

3.10.4.1 Archaeological Resources in the Project Area

As a result of identification efforts, no archaeological resources were identified in the project area.

3.10.4.2 Built-Environment Historical Resources in the Project Area

Five potential built-environment resources were located in the project area, a segment of the Sacramento River West Levee, and four additional properties.

- 125 Main Street: Assessor Parcel Number (APN): 019-083-008-000.
- 150 Main Street: APN: 019-055-004-000.
- 110 Poundstone Street: APN: 019-083-012-000.
- 150 Second Street: APN(s): 019-086-007-000, 019-086-001-000, 019-086-002-000.

The four properties do not appear to be eligible for listing in the NRHP or CRHR and are not considered historical resources for the purposes of CEQA.

The segment of the Sacramento River West Levee is individually eligible for listing in the NRHP and the CRHR under Criterion A/1 for its association with early advances in water management in California that resulted in making settlement and expansion of infrastructure in the region possible. This levee segment is a physical example of California's evolution of reclamation—including the earliest efforts to build levees, formation of reclamation districts, and development of water management public policy —which took place between 1850 (Arkansas Act enacted) and 1911 (State Flood Control Act enacted). Levee segments such as this one form the foundation for all reclamation activities that followed throughout the state after 1911 (ICF 2017). This resource is considered a historical resource for the purposes of CEQA.

3.10.5 Environmental Effects

Potential impacts of the proposed project related to cultural resources are discussed in the context of State CEQA Guidelines Appendix G checklist. A determination of impacts is necessary for resources considered a historical resource for the purposes of CEQA; the segment of the Sacramento

River West Levee is thus discussed below. An analysis of impacts on the four residential properties is not required as they are not considered historical resources for the purposes of CEQA.

Checklist Section V, *Cultural Resources*, asks whether the project would result in any of the following conditions.

a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

As stated above, the Sacramento River West Levee is eligible for listing in the NRHP Criterion A and CRHR Criterion 1 and is considered a historical resource for the purposes of CEQA. The character-defining features associated with this segment of the Sacramento River West Levee are its setting, alignment and continued function as a flood control mechanism. The project would result in alterations of the resource, which are described below. Sections of the levee would be rebuilt, not damaged or destroyed.

The purpose of this project is to make improvements to the existing Sacramento River West Levee so it continues to function as flood protection infrastructure. The proposed project would achieve multiple objectives, including improved flood protection for the town of Grimes and habitat improvements for salmonids. The construction activities will maintain, repair, and stabilize the levee and appear to be consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines. The primary feature of the project is installation of a 3-foot-wide, approximately 30-foot-deep, and approximately 1.8-mile-long slurry cutoff wall within the existing levee. Project construction would begin with clearing and grubbing of the upper slopes of the levee and removal of certain structures and levee penetrations that encroach into the levee. Borrow material needed for the project will be excavated from two locations within the project footprint, and rock slope protection will be installed along a short segment of the waterside levee slope. The seepage cutoff wall, consisting of a relatively impermeable material placed through the center of the levee, will require the existing levee to be degraded and widened. This will provide a working platform for a long-reach excavator to excavate a continuous trench along the center of the levee alignment. The trench is filled with the mixed backfill material, thereby creating the low-permeability barrier. Following placement of the backfill material, the top half of the levee would be reconstructed to its pre-construction or authorized dimensions utilizing the borrow material. The borrow areas would be recontoured, and the waterside borrow area would be planted with riparian vegetation.

The levee would be constructed in the same right-of-way, with only minor alterations in geometry; the levee's historic location would remain intact. Minor modifications to the slope may be made to ensure that the slope geometry achieves flood risk-reduction goals, but the overall dimensions and proportions of the levee would remain similar to the existing condition. Furthermore, the slope angle of the levee prism is not character-defining.

The levee would remain an earthen-filled structure, although some of the existing materials would be replaced. Earthen fill is a ubiquitous material and not character-defining. However, the materials would be substantially similar in appearance to the existing levee.

The resource would maintain its current use and no changes to the existing setting of the levee are proposed under this project.

The resource's historic integrity would not be diminished by the introduction of visual, atmospheric, or audible elements.

Following construction, the resource would still maintain the character-defining features associated with this segment of the Sacramento River West Levee which are its setting, alignment, and continued function as a flood control mechanism. Overall, the project would not cause an impact on the Sacramento River West Levee. This impact would be less than significant. No mitigation is required.

b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?

Impact CUL-1: Change in the significance of an archaeological resource

There are no known archaeological resources located within the project area. If any buried resources were encountered and damaged during construction, the destruction of buried archaeological resources would be a potentially significant impact. Implementation of Mitigation Measure CUL-MM-1 would reduce this impact to a less-than-significant level. This impact is considered less than significant with mitigation incorporated.

Mitigation Measure CUL-MM-1: Implement measures to protect previously unidentified cultural resources

Construction will stop if potential cultural resources are encountered. It is possible that previous activities have obscured surface evidence of cultural resources. If signs of an archaeological site, such as any unusual amounts of bone, stone, or shell, are uncovered during grading or other construction activities, work will be halted within 100 feet of the find and Sacramento River West Side Levee District (SRWSLD) will be notified. A qualified archaeologist will be consulted for an onsite evaluation. If the site is or appears to be eligible for listing on the CRHR or NRHP, additional mitigation (e.g., further testing for evaluation or data recovery) may be necessary.

In the event that resources are discovered, SRWSLD will retain a qualified archaeologist to assess the find and to determine whether the resource requires further study. Any previously undiscovered resources found during construction will be recorded on appropriate California Department of Parks and Recreation 523 forms and evaluated for significance under all applicable regulatory criteria.

All work will stop in the immediate vicinity of the find. If the find is determined to be an important cultural resource, SRWSLD will make available contingency funding and a time allotment sufficient to allow recovery of an archaeological sample or to implement an avoidance measure. Construction work can continue on other parts of the project while archaeological mitigation takes place.

c. Disturb any human remains, including those interred outside of formal cemeteries?

Impact CUL-2: Potential to disturb human remains from ground-disturbing construction activities

There are no known formal cemeteries within the project area, and neither the results of the records search nor the pedestrian surveys indicated that human remains are present in the project area. However, there is always the possibility that ground-disturbing activities during construction may uncover previously unknown buried human remains; such disturbance would be considered a potentially significant impact. Implementation of Mitigation Measure CUL-MM-2 would reduce this impact to a less-than-significant level. This impact is considered less than significant with mitigation incorporated.

Mitigation Measure CUL-MM-2: Implement measures if construction activities inadvertently discover or disturb human remains

If human remains are discovered during any stage of construction, including disarticulated or cremated remains, the construction contractor will immediately cease all ground-disturbing activities within 100 feet of the remains and notify SRWSLD.

In accordance with CHSC Section 7050.5, no further disturbance will occur until the following steps have been completed.

- The Colusa County Coroner has made the necessary findings as to the origin and disposition pursuant to PRC Section 5097.98
- If the remains are determined by the County Coroner to be Native American, the Coroner shall notify NAHC within 24 hours.

A professional archaeologist with Native American burial experience will conduct a field investigation of the specific site and consult with the most likely descendant, if any, identified by the NAHC. As necessary and appropriate, a professional archaeologist may provide technical assistance to the most likely descendant, including the excavation and removal of the human remains.

3.11 Tribal Cultural Resources

3.11.1 Introduction

This section analyzes the proposed project's potential impacts related to tribal cultural resources (TCRs). It describes existing conditions in the project area, summarizes the overall regulatory framework for TCRs, and analyzes the potential for the proposed project to affect these resources.

3.11.2 Existing Conditions

This existing conditions section for TCRs provides an overview of the efforts made to identify TCRs in the project area. This section documents consultation efforts with interested Native American groups to identify potential TCRs within the project area as defined in Chapter 2.

3.11.3 Regulatory Setting

3.11.3.1 State

CEQA was amended in 2014 by Assembly Bill (AB) 52, which created a new category of CEQA historical resources, *tribal cultural resources* (TCRs). AB 52 requires that state lead agencies consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if requested by the tribe. The bill, chaptered in State CEQA Guidelines Section 21084.2, also specifies that a project with an effect 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. As defined in Section 21074 (a, b, and c) of the Public Resources Code (PCR), TCRs are as follows.

(A.1) Sites, features, places, cultural landscapes, sacred places and objects with cultural value to a California Native American tribe that are either of the following:

a. Included or determined to be eligible for inclusion in the California Register of Historical Resources (CRHR); or

b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(A.2) 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

(B) A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and

(C) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms to the criteria of subdivision (a).

3.11.4 Assembly Bill 52 Consultation

On January 27, 2021, Meegan Nagy of the Sacramento River West Side Levee District (SRWSLD) reached out by letter to representatives of the Yoche Dehe Wintun Nation (YDWN) and the United Auburn Indian Community (UAIC), interested Native American groups who had requested consultation under AB 52.

Anna Cheng of UAIC responded in an email dated March 3, 2021, that UAIC had determined the area was outside of their ethnographic territory and that they would not be consulting on this project.

James Kinter, Tribal Historic Preservation Officer for the YDWN, responded in a letter dated February 18, 2021, indicating an interest in consulting on the project and in being present during geotechnical testing work for the project. A follow-up letter was transmitted to Mr. Kinter on April 28, 2022~~1~~, informing the tribe of SRWSLD’s intention to schedule geotechnical testing and inviting representatives of YDWN to be present during the testing. Consultation with the tribe is ongoing as of May 23, 2022. As of submittal of this report, no tribes have identified any TCRs in the project area.

3.11.5 Environmental Effects

Potential impacts of the proposed project related to TCRs are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XVIII, *Tribal Cultural Resources*, asks whether the project would result in any of the following conditions.

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: 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)?

Impact TCR-1: Potential to cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources

As a result of consultation efforts, no TCRs listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PCR Section 5020.1(k) have been identified in the project area; however, there is the potential to encounter buried TCRs in the project area during ground disturbing activities.

If any buried TCRs were encountered and damaged during construction, the destruction of buried TCRs would be a potentially significant impact. Implementation of Mitigation Measure TCR-1 would reduce this impact to a less-than-significant level. This impact is considered less than significant with mitigation incorporated.

Mitigation Measure TCR-MM-1: Implement measures to protect previously unidentified tribal cultural resources

If any suspected TCRs are discovered during ground disturbing construction activities, all work will cease within 100 feet of the find or within an agreed upon distance based on the project area and nature of the find. A Tribal representative from a California Native American tribe that is traditionally and culturally affiliated with the geographic area will be immediately notified and will determine if the find is a TCR (PCR Section 21074). The Tribal Representative will make recommendations for further evaluation and treatment as necessary.

When avoidance is infeasible, preservation in place is the preferred option for mitigation of TCRs under CEQA, and every effort will be made to preserve the resources in place, including through project redesign, if feasible. Culturally appropriate treatment may include processing materials for reburial, minimizing handling of cultural objects, leaving objects in place within the landscape, or returning objects to a location within the project area where they will not be subject to future impacts. Permanent curation of TCRs will not take place unless approved in writing by the California Native American tribe that is traditionally and culturally affiliated with the project area.

The contractor will implement any measures deemed by the CEQA lead agency to be necessary and feasible to preserve in place, avoid, or minimize impacts on the resource, including facilitating the appropriate tribal treatment of the find, as necessary. Treatment that preserves or restores the cultural character and integrity of a TCR may include Tribal monitoring, culturally appropriate recovery of cultural objects, and reburial of cultural objects or cultural soil.

Work at the discovery location cannot resume until all necessary investigation and evaluation of the discovery under the requirements of the CEQA, including AB 52, have been satisfied.

b. 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: 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?

Impact TCR-2: Potential to cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency to be significant

As a result of consultation efforts, no TCRs 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 PCR Section 5024.1 were identified in the project area; however, there is the potential to encounter buried TCRs in the project area during ground disturbing activities.

If any buried TCRs were encountered and damaged during construction, the destruction of buried TCRs would be a potentially significant impact. Implementation of Mitigation Measure TCR-1 would reduce this impact to a less-than-significant level. This impact is considered less than significant with mitigation incorporated.

Mitigation Measure TCR-1: Implement measures to protect previously unidentified tribal cultural resources

The full text of this measure is provided under checklist item “a” above.

3.12 Transportation

3.12.1 Introduction

This section analyzes the proposed project's potential impacts related to transportation. It describes existing conditions in the project area and summarizes the overall regulatory framework for transportation, and it analyzes the potential for the proposed project to affect these resources.

3.12.2 Existing Conditions

This section discusses the existing conditions related to transportation in the vicinity of the project area.

3.12.2.1 Roadway System

Access to the project area is provided from the north and the south by SR 45, and surface streets within Grimes (2nd Street, Main Street, Poundstone Street, and Leven Street). SR 45 is a conventional, two-lane rural state highway, which is considered by the County of Colusa as a primary link between state and national highway networks and runs through primarily rural areas without many traffic controls. SR 45 in this area serves as a major collector and provides access to SR 113 to the south and SR 20 to the north.

There is a three-way stop where SR 45 intersects with 2nd Street and Main Street. Access to the north end of the project area from SR 45 is from 2nd Street, which is part of the local traffic grid within Grimes. This street is a two-lane surface street for approximately 450 feet that transitions to a single-lane road for the remaining approximately 300 feet before reaching its terminus within the project area. Main Street, Poundstone Street, and Leven Street are also part of the local traffic grid within Grimes and are two-lane surface streets providing access to the levee at different points along the project footprint. Main Street, Poundstone Street, and Leven Street terminate at the toe of the levee.

The segment of SR 45 in the project area, defined as extending from the Yolo/Colusa County line north to its junction with SR 20 west of Meridian, currently operates at level of service (LOS) B with an average daily traffic (ADT) volume of 2,750 vehicles. By 2024, the ADT is forecast to be 3,470 vehicles per day with LOS C (Colusa County 2019). Recent traffic counts indicate somewhat lower ADT volumes in the proximity of Grimes, ranging from 1,050 to 1,400 vehicles (California Department of Transportation 2020).

Table 3.12.1 shows the peak hour traffic volumes for the SR 45 segments that would be most affected by project-related traffic in Colusa County. Peak hour traffic volume is a measure of the hourly volume during the maximum-volume hour of the day and is provided for context beyond the ADT volumes. No traffic volumes are available for 2nd Street, Main Street, Poundstone Street, and Leven Street.

Table 3.12.1. Peak Hour Traffic Volumes for Access Roadways

Highway	Location	2020 Peak Hour Traffic (vehicles trips)
SR 45	Tule Road	150
SR 45	Grimes-Arbuckle Road	180

SR = State Route
Source: California Department of Transportation 2020.

3.12.2.2 Transit

Public transportation within Colusa County is provided by the Colusa County Transit Agency through a public paratransit service. The service is offered on a dial-a-ride basis with fixed timed routes to eight locations that consist of Arbuckle, Colusa, Grimes, Maxwell, Princeton, Sites, Stonyford, and Williams, operating Monday through Friday between the hours of 7:00 a.m. and 5:00 p.m. Grimes is within the service area and SR 45 and some local roadways are utilized periodically by the service.

3.12.3 Regulatory Setting

3.12.3.1 Federal

No federal regulations apply to transportation in the project area.

3.12.3.2 State

Caltrans Planning and Policy Documents

The California Department of Transportation (Caltrans) has primary authority for the state highway systems in California, including freeways and highways in the project region (e.g., Interstate 5, SR 45, SR 113, and SR 20). As such, Caltrans (District 3) planning and policy documents provide guidance on expectations for these routes related to traffic operations relevant to this analysis and potential effects of the project.

3.12.3.3 Local

Colusa County General Plan

The Circulation Element of the Colusa County General Plan (Colusa County 2012) contains a framework that outlines specific goals and policies to provide guidance and regulation on the countywide transportation system's various modes of transportation, such as roadway transit, bike, pedestrian, rail, and aviation. The Colusa County General Plan also establishes the LOS standards for state highways and local county roadways. For SR 45 in the project area, LOS C is acceptable. There is no prescribed LOS standard for 2nd Street, Main Street, Poundstone Street, and Leven Street. (Colusa County 2012). The following objectives and policies are relevant to the project:

Objective CIRC-1A: Maintain Safe and Efficient Operating Conditions on All County Roadways

Policy CIRC 1-4: Define LOS consistent with the latest edition of the Highway Capacity Manual and calculate using the methodologies contained in that manual. At a minimum, weekday AM and PM peak hour traffic volumes will be used in determining compliance with the level of service standard. The analysis of other periods may be appropriate and will depend on type of use.

Policy CIRC 1-5: Maintain LOS C or better for County roadways and intersections in the unincorporated County.

Policy CIRC 1-6: Maintain levels of service on state highways consistent with Caltrans standards, to the extent feasible.

In addition to the goals and policies of the general plan, the County of Colusa has the discretionary authority to issue permits for vehicles and loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. An application for a transportation permit may be required for borrow material hauling on County Roads.

2018 Colusa County Regional Transportation Plan Update

The Policy Element of the 2018 Colusa County Regional Transportation Plan Update (2018 RTP) (Colusa County 2019) contains the regional vision and goals, supported by long-range objectives and course of action. The Policy Element includes the addition of specific policies and objectives that are linked to program-level performance measures in the Action Element and identifies feasible solutions.

LOS is a scale used to determine the operating quality of a roadway segment or intersection based on volume-to-capacity ratios or average delay experienced by vehicles on the facility. The levels range from A to F with LOS A representing free-flow traffic and LOS F representing severe traffic congestion. Agencies adopt LOS standards that define the levels of operations that are acceptable within their jurisdictions. Peak hour traffic volume criteria for determining LOS for Class I two-lane highways (i.e., SR 45) are defined in the Colusa County General Plan and 2018 RTP and are shown in Table 3.12.2. There are no relevant standards for the county roads that provide access in the project area.

Table 3.12.2. Level of Service Criteria for Roadway Segments

		Daily Level of Service Capacity Threshold				
Facility Type	No. of Lanes	A	B	C	D	E
Two-Lane, Class I Highway	2	1,200	3,700	7,600	13,600	21,000

Source: Colusa County 2019

3.12.4 Methods of Analysis

The CEQA statute now provides: "[A]utomobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion, shall not be considered a significant impact on the environment pursuant to [CEQA] …." Cal. Pub. Res. Code Section 21099(b)(2). However, the current guidelines still require an analysis of "conflicts with a program, plan, ordinance or policy addressing the circulation system…." Based on a review of local policies and the most current programs, plans, ordinances, or policies addressing the circulation systems identified in the project area, LOS is still used to identify system performance (Colusa County 2012; Tables 2-13 and 2-14 in Colusa County 2019). In light of the continued relevance of LOS metrics to local planning, an analysis of LOS metrics is included in this initial study to be transparent and informative.

The LOS analysis under Impact TRANS-1 discusses whether the project would create greater congestion that could reduce LOS or require roadway improvements. Specifically, since the proposed project's effects on the identified transportation elements in the local plans and programs are dependent on the effects of temporary and permanent increases of traffic, the roadway capacities and LOS evaluations were conducted to determine impacts. Roadway capacity evaluations focused on determining whether temporary or permanent increases of traffic would increase traffic to a level that would degrade the roadways to levels unacceptable based on the county thresholds and, in turn, have impacts on affected roadways.

Roadway traffic flow characteristics, as described in the 2018 RTP (Colusa County 2019) for different LOS, are shown in Table 3.12.2. Colusa County uses LOS to assess the performance of their street and highway systems and the capacity of roadways. The definitions and maximum daily volumes from the Colusa County General Plan and 2018 RTP are the best methodology to determine significance thresholds for impacts in the local study area.

The assessment of effects compares construction traffic volumes to roadway capacity. A Vehicle Miles Traveled (VMT) analysis was not conducted for construction traffic, because a qualitative assessment indicated that there would not be construction VMT impacts. While construction workers and associated trips would add VMT, they are effectively replacing other trips. In other words, the construction workers and businesses serving the proposed project would otherwise be making trips to other projects, which could be even longer (i.e., more VMT). Additionally, operation of the proposed project is not expected to increase traffic volumes, as operations and maintenance activities would be the same as existing conditions.

3.12.5 Environmental Effects

Potential impacts of the proposed project related to transportation are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XVII, *Transportation*, asks whether the project would result in any of the following conditions.

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

For the purposes of this analysis, it is assumed that worker vehicle trips during construction would occur during the a.m. or p.m. peak hour, and haul truck trips would be spread throughout the day. Operation of the proposed project is not expected to increase traffic volumes, as operations and maintenance activities would be the same as existing conditions. Approximately 15 personal vehicle trips per day are anticipated for construction personnel; however, half of these trips would occur in the morning and the other half would occur in the afternoon. Construction of the proposed project would require approximately 95 haul truck roundtrips per day for on-road material importation. Additional haul truck trips would occur within the project footprint but not on SR 45 or paved county roads. Due to their slow acceleration from a stop, haul trucks are considered to be equivalent to 1.5 passenger vehicles when determining effects of construction traffic on LOS, meaning that for the purposes of this analysis there would be a worst-case of approximately 158 total vehicle trips per day during construction of the proposed project. SR 45 would be the primary roadway affected by construction traffic. The addition of the 158 vehicle trips needed per day during construction would increase the daily traffic volume to 2,915 vehicle trips, which would maintain the LOS at B. LOS C is considered acceptable by the County of Colusa, and therefore this impact would be less than significant.

b. Conflict or be inconsistent with State CEQA Guidelines section 15064.3, subdivision (b)?

The proposed project would not conflict with section 15064.3, subdivision (b), that addresses the use of VMT as a measurement of transportation impacts. As previously described, a VMT analysis was not conducted for construction traffic, because a qualitative assessment indicated that there would not be construction VMT impacts. While construction workers and associated trips would add VMT, they are effectively replacing other trips. In other words, the construction workers and businesses serving the project would otherwise be making trips to other projects, which could be even longer (i.e., more VMT) depending on location. Additionally, the number of daily on-road trips associated with the proposed project is expected to typically be less than the screening threshold of 110 trips per day. The focus of VMT is on long-term changes and the resulting effects on GHG emissions, land use diversity, and multimodal transportation systems. GHG emissions and land use are analyzed in Sections 3.7 and 3.17, respectively. The operation of the proposed project would not increase long-term traffic volumes, as operations and maintenance activities would be the same as existing conditions. As a result, a VMT analysis of project operations was not conducted. There would be no impact.

c. Substantially increase hazards because of a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Construction of the proposed project would not include the alteration of any public roadway design features and would not include any incompatible uses. There would be no impact.

d. Result in inadequate emergency access?

Emergency access would be maintained throughout construction and operation of the proposed project. There would be no impact.

3.13 Energy

3.13.1 Introduction

This section analyzes the proposed project's potential impacts related to energy. It describes existing conditions in the project area and summarizes the overall regulatory framework for energy to the extent needed to understand the impact analysis, and it analyzes the potential for the proposed project to affect these resources.

3.13.2 Existing Conditions

3.13.2.1 Energy Consumption

Non-residential electric and gas consumption constituted the majority of energy consumption in Colusa County in 2020. Non-residential electric consumption accounted for 77 percent of electric consumption in the County, while non-residential natural gas consumption accounted for 92 percent of natural gas consumption (CEC 2020a, CEC 2020b).

3.13.2.2 Renewables Portfolio Standards

Senate Bills 1078 (2002), 107 (2006), 2 (2011), and 100 (2015) govern California's Renewables Portfolio Standards under which investor-owned utilities, energy service providers, and Community Choice Aggregators must procure additional retail sales per year from eligible renewable sources. The current goals for renewable sources are 33 percent by 2020 (achieved), 40 percent by 2024, 50 percent by 2026, 60 percent by 2030, and 100 percent by 2045.

3.13.3 Environmental Effects

Potential impacts of the proposed project related to energy are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section VI, *Energy*, asks whether the project would result in any of the following conditions.

a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Construction activities would consume fuel during use of power tools, equipment, and vehicles (e.g., haul trucks. This energy consumption would be permanent and irreversible. These activities, however, would be temporary and would ultimately improve the levee adjacent to Grimes. This would increase safety in the area. The project would not require additional energy capacity or increase peak or base period demands for electricity or other types of energy. As a result, use of energy for the project would not be considered wasteful or unnecessary. Standard practices would reduce unnecessary idling consistent with Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling (California Code of Regulations Title 13, Section 2485) and use of improperly maintained equipment. Energy use therefore would not be inefficient.

Operation of the project would be the same as current operations and maintenance. Therefore, operation would not result in wasteful, inefficient, or unnecessary consumption of energy. Impacts would be less than significant.

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The proposed project would modify existing infrastructure and would not change or inhibit the use of renewable energy. It also would not implement any new policies or goals or construct infrastructure that would affect energy efficiency. The project would therefore not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There would be no impact.

3.14 Population and Housing

3.14.1 Introduction

This section analyzes the proposed project's potential impacts related to population and housing. It describes existing conditions in the project area and summarizes the overall regulatory framework for population and housing to the extent needed to understand impacts, and it analyzes the potential for the proposed project to affect these resources.

3.14.2 Existing Conditions

In 2020, Grimes had a population of 296 people, while Colusa County had a population of 21,839 people (U.S. Census 2020).

In 2020, there were 123 housing units in Grimes, with 11 vacancies. In Colusa County, there were 8,099 housing units and 872 vacancies. The Grimes vacancy rate was 9 percent, while the countywide vacancy rate was 11 percent. With the statewide vacancy rate of 6 percent, Colusa had relatively more housing availability (U.S. Census 2020).

Local governments, including Counties, are required to identify future housing needs to meet demand within their jurisdictions through the preparation of a Regional Housing Needs Allocation and the preparation of a Regional Housing Needs Assessment. Colusa County's Housing Element addresses housing in the unincorporated part of the county. For the Housing Element cycle from 2019–2028, the allocated housing units to unincorporated Colusa County totaled 526 and were distributed among income levels (Colusa County 2020).

3.14.3 Environmental Effects

Potential impacts of the proposed project related to population and housing are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XIV, *Population and Housing*, asks whether the project would result in any of the following conditions.

a. Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?

Construction activities would require a small temporary workforce, with an average of 15 people on site on any given day. Because construction would occur over less than 1 year and because it is probable that different crew members would be needed for different phases of the project, it is unlikely any construction crew members would relocate to the area during construction.

The goal of the proposed project is to provide a 100-year level of flood protection to the town of Grimes in a manner consistent with the 2012 Central Valley Flood Protection Plan and its 2017 update, including investments in multi-benefit flood projects, and to ensure Grimes is not placed within a FEMA special flood hazard area. The project would therefore improve existing infrastructure to protect existing homes and other assets. The project would not induce unplanned development or population growth in Grimes, as the area is not currently subject to development restrictions. Additionally, operation of the proposed project would continue to occur as it does currently. Therefore, there would be no population growth and no impact related to substantial unplanned population growth.

b. Displace a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere?

To facilitate construction and to remediate structure encroachment on the levee, up to three houses and three clusters of outbuildings in Grimes would be removed, and up to nine mobile homes would be relocated or removed. As demonstrated by the 2020 vacancy rates in Grimes and Colusa County, there would be sufficient space for relocation of people living in these homes without requiring the construction of new homes. The nine mobile homes could be relocated to other areas and would not require construction of new homes. Removal of homes would therefore not displace a substantial number of people or housing, necessitating the construction of replacement housing elsewhere. There would be no impact under CEQA.

3.15 Utilities and Service Systems

3.15.1 Introduction

This section analyzes the proposed project's potential impacts related to utilities and service systems. It describes existing conditions in the project area and summarizes the overall regulatory framework to the extent necessary to understand impacts on utilities and service systems, and it analyzes the potential for the proposed project to affect these resources.

3.15.2 Existing Conditions

3.15.2.1 Water Supply

Colusa County relies on groundwater and surface water, with all domestic water systems using groundwater, and most irrigation systems using surface water. Grimes is served by Colusa County Waterworks District #1, and private groundwater wells are located throughout the county to serve individual parcels. The Colusa County Waterworks District #1 is served by a primary well and a backup well. At the time the Colusa County General Plan was prepared, these wells were projected to have sufficient supply to meet residential growth consistent with Colusa County General Plan land use designations and growth projections (Colusa County 2010).

3.15.2.2 Wastewater

Grimes is served by individual on-site septic systems and is not served by a centralized wastewater disposal and treatment system. Arbuckle, Colusa, Maxwell, Princeton, and Williams have community systems for wastewater treatment and disposal (Colusa County 2010).

3.15.2.3 Solid Waste

The County of Colusa owns and operates the Stonyford Disposal Site on Lodoga-Stonyford Road in Stonyford. The landfill is a 47-acre, Class III facility that is permitted for up to 10 tons per day of nonhazardous waste, including construction and demolition waste. The landfill's maximum permitted capacity is 149,219 cubic yards, and the total estimated remaining capacity was 55,683 cubic yards as of April 30, 2001. As of 2001, the landfill's life expectancy was 63 years (closure date January 1, 2064) (California Department of Resources Recycling and Recovery 2019).

3.15.2.4 Natural Gas

Pacific Gas and Electric Company (PG&E) provides natural gas services to Grimes, and some homes appear to be served by propane. PG&E also operates a steel, 20-inch-diameter high-pressure gas pipeline that passes through the levee and crosses the Sacramento River at station 57+60 of the project alignment. Based on the Flood Control Project Maintenance Levee Inspections Levee Log Report (California Department of Water Resources Division of Flood Management 2021), the pipe is buried 3 feet below the levee crown.

3.15.2.5 Electricity

PG&E provides electrical service to Grimes. A PG&E 12-kilovolt overhead distribution line parallels SR 45 in the project area along the landside levee toe.

3.15.3 Environmental Effects

Potential impacts of the proposed project related to utilities and service systems are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XIX, *Utilities and Service Systems*, asks whether the project would result in any of the following conditions.

a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The proposed project would not require construction of new or expanded, water, wastewater treatment, stormwater drainage, natural gas, or telecommunications facilities. The project would require relocation of an existing PG&E distribution line from one side of SR 45 to the other. Some utility encroachments on the levee would need to be reconstructed. For example, a 24-inch corrugated metal pipe at station 70+38 would be reconstructed, as would a power pole line extension across the levee at the same location. Potential impacts from temporary outages are addressed under this criterion, while the other environmental impacts of this work are discussed by resource throughout this initial study.

Minor planned outages would occur for relocation of the 12-kilovolt distribution line, such as during conductor and cable stringing. These outages would be short term and temporary. Any critical services have backup electricity for outage situations, and PG&E notifies customers in advance of planned outages (PG&E 2022). The high-pressure PG&E natural gas pipeline would be kept in service during construction. This impact would be less than significant.

b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

Construction activities would require the use of water for mixing slurry, dust suppression in the construction area and unpaved construction routes, compaction of material during levee construction, and minimizing dust during cutting of treated wood utility poles. Water use is estimated as shown in Table 3.15.1

Table 3.15.1. Estimated Construction Water Use

Activity (Days)	Water Use Per Day (Acre-Feet)	Total Water Use (Acre-Feet)
Mixing slurry (42)	1.5	64.4
Dust suppression (28)	0.1	2.8
Compaction (49)	0.9	4.9
	Total	**72.1**

If treated wooden utility poles are cut, the associated water use would be negligible. As shown in Table 3.15.1, construction activities would use about 72.1 acre-feet of water. The ultimate water source is the responsibility of the contractor, which has not yet been selected. For similar projects, the contractor typically obtains water from a nearby landowner or water district subject to an agreement with that entity. As a result, water would not be available if the landowner or district does not have capacity to provide it. There would be no new ongoing demand for water. Operational activities would be similar to existing operation and maintenance. Therefore, there would be no new ongoing commitment of water supply as a result of the project. There would be no impact.

c. Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Construction would generate minimal amounts of sanitary wastewater that would be disposed of by the provider of portable restroom services. Operation of the project would not generate additional permanent demand for wastewater treatment. There would not be a determination that there is inadequate wastewater treatment capacity. There would be no impact.

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?

Construction and demolition activities would generate waste material such as concrete, wood, metals, utility poles, utility conductors, and trash. The project would adhere to state mandates for solid waste disposal. For example, the project would comply with section 5.408.3 of the California Green Building Standards Code, which requires that all trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing be reused or recycled. The project would also comply with section 5.408.1, which requires recycling or salvaging for reuse at least 65 percent of nonhazardous construction or demolition waste. The waste generated would also be a one-time source of solid waste rather than an additional ongoing demand for solid waste disposal capacity. With an anticipated closure date of January 1, 2064, the Stonyford Disposal Site has sufficient capacity for this one-time generation of solid waste. Operational activities would be similar to existing operation and maintenance and would not create any new sources of solid waste. There would be no impact.

e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Construction and demolition activities would generate waste material, such as concrete, wood, metals, utility poles, utility conductor, and trash. The project would adhere to state mandates for solid waste diversion. For example, the project would comply with section 5.408.3 of the California Green Building Standards code, which requires that all trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing be reused or recycled. The project would also comply with section 5.408.1, which requires recycling or salvaging for reuse at least 65 percent of nonhazardous construction or demolition waste. As described in Section 3.9, *Hazards and Hazardous Materials*, hazardous treated wood waste would be disposed of in accordance with applicable laws and regulations. Operational activities would be similar to existing operation and maintenance and would continue to comply with applicable statutes and regulations. There would be no impact related to compliance with federal, state, and local management and reduction statutes related to solid waste.

3.16 Public Services

3.16.1 Introduction

This section analyzes the proposed project's potential impacts related to public services. It describes existing conditions in the project area and analyzes the potential for the proposed project to affect these resources.

3.16.2 Existing Conditions

The Colusa County Sheriff's Department is responsible for law enforcement in the unincorporated areas of Colusa County (i.e., the entire county except for the cities of Williams and Colusa). The Colusa County Boating Safety Unit, which is a division of the county sheriff's department, is responsible for promoting safe boating on the county's waterways. The Sacramento River Fire Protection District has a fire station in Grimes. Grand Island Elementary School is located in Grimes. There are no public parks in Grimes. The Colusa County Library has a branch in Grimes.

3.16.3 Environmental Effects

Potential impacts of the proposed project related to public services are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XV, *Public Services*, asks whether the project would result in the following condition.

Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a 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, police protection, schools, parks, or other public facilities?

The need for additional public services is generally tied to increases in population. Construction activities and operation of the proposed project would not result in population growth in the project area. Therefore, there would be no increase in demand for public services such as fire protection, police protection, schools, parks, and other public facilities. As a result, there would be no new or modified facilities required for these public services. There would be no impact.

3.17 Land Use and Planning

3.17.1 Introduction

This section analyzes the proposed project's potential impacts related to land use and planning. It describes existing conditions in the project area and summarizes the overall regulatory framework for land use and planning, and it analyzes the potential for the proposed project to affect these resources.

3.17.2 Existing Conditions

3.17.2.1 Communities

The proposed project is located in unincorporated Colusa County. Part of the proposed project is located in the town of Grimes, which is not incorporated.

3.17.2.2 Land Use and Zoning

Outside of Grimes, the project area is designated as Agricultural General in the Colusa County General Plan. Within Grimes, the project area is designated as Parks & Recreation, Urban Residential, Rural Residential, and Commercial. The levee itself is designated as Parks & Recreation and Agricultural General. Agricultural General is used for areas to be retained for agriculture and/or uses that are complementary to existing or nearby agricultural uses. Parks & Recreation is used for areas that are suitable for recreational and tourist activities (Colusa County 2012).

Outside of Grimes, the project area is zoned as E-A (Exclusive Agriculture) and R-F (River Frontage). Within Grimes, the project area is zoned as RR-2 (Rural Residential, 2-acre minimum lot), R-1-8 (Residential Single-Family, 8,000-square foot minimum lot), and C-2 (Community Commercial) (Colusa County 2022). The levee itself is zoned as R-F, where appropriate uses are agricultural and recreational uses and do not include permanent structures (Colusa County Zoning Code section 44-2.60.10(a)).

3.17.3 Environmental Effects

Potential impacts of the proposed project related to land use and planning are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XI, *Land Use and Planning*, asks whether the project would result in any of the following conditions.

a. Physically divide an established community?

The proposed project would require demolition of structures and relocation of residents in Grimes. However, these residences are on the edge of the community, so the project would not physically divide the community of Grimes (see Chapter 3.14, *Population and Housing*, for additional information regarding displacement). There would be no impact.

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?

According to CEQA, policy conflicts do not, in and of themselves, constitute a significant environmental impact. A policy inconsistency is considered a significant adverse environmental impact when it is related to a policy adopted for the purpose of avoiding or mitigating an environmental effect and it is anticipated that the inconsistency would result in a significant adverse physical impact. Any such physical impacts associated with resources (e.g., noise, air quality, and transportation) are discussed by resource in this initial study.

The project would maintain land uses other than where residences would be removed. The slurry cutoff wall, habitat restoration, and borrow would not result in any permanent land use changes. Encroachment remediation would require some structure removal. However, structure removal would not conflict with zoning or general plan designations because nothing would be constructed in its place. While encroachment remediation would preclude the use of the land as zoned and designated, economic impacts are not considered environmental impacts under CEQA (CEQA Guidelines section 15131). Therefore, there would be no impact.

3.18 Agriculture and Forestry Resources

3.18.1 Introduction

This section analyzes the proposed project's potential impacts related to agriculture and forestry resources. It describes existing conditions in the project area and summarizes the overall regulatory framework for agriculture and forestry resources to the extent needed to understand impacts, and it analyzes the potential for the proposed project to affect these resources.

3.18.2 Existing Conditions

3.18.2.1 Agricultural Land

The Farmland Mapping and Monitoring Program (FMMP) is a non-regulatory program intended to aid in assessing the location, quality, and quantity of agricultural lands and conversion of such lands over time. The FMMP provides consistent and impartial data for the analysis of agricultural land uses and land use changes in California. FMMP rates agricultural land according to soil quality and irrigation status and updates maps every 2 years. Farmland designations include Prime Farmland, Unique Farmland, and Farmland of Statewide Importance. The only kind of Farmland present in the project area is Prime Farmland. There are about 3.3 acres of Prime Farmland in the project area, and it primarily consists of land north of the riparian restoration habitat area, across a road and agricultural ditch. The remainder of Prime Farmland is scattered on the east side of the project area alignment, such as in areas west of State Route (SR) 45 that are in active agricultural use.

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agriculture or related open space use. Colusa County maintains a Williamson Act program.

Outside of Grimes, the project area is designated as Agricultural General in the *Colusa County General Plan*. Within Grimes, there are no agricultural land use designations. Some of the levee itself is designated as Agriculture General. Agriculture General is used for areas to be retained for agriculture and/or uses that are complementary to existing or nearby agricultural uses (Colusa County 2012). Outside of Grimes, some of the project area is zoned as E-A (Exclusive Agriculture) and R-F (River Frontage). Within Grimes, there is no agricultural zoning (Colusa County 2022). The levee itself is zoned as R-F, where appropriate uses are agricultural and recreational uses and do not include permanent structures (Colusa County Zoning Code Section 44-2.60.10(a)).

3.18.2.2 Forest Land

There are no areas designated as Forest Land or zoned as Forest Management or Forest Residential in Grimes. While some parcels have trees, these trees are orchards and would not qualify as forest land.

3.18.3 Environmental Effects

Potential impacts of the proposed project related to agriculture and forestry resources are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section II, *Agriculture and Forestry Resources*, asks whether the project would result in any of the following conditions.

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?

There are 3.3 acres of Prime Farmland in the project area, which primarily consists of land north of the riparian restoration habitat area, across a road and agricultural ditch. The remainder of Prime Farmland is scattered on the east side of the alignment, such as areas west of SR 45 that are in active agricultural use. It is unlikely that substantial areas of Prime Farmland would need to be used to facilitate construction because of their locations across roadways and other infrastructure from the levee, although they were included in the project area to evaluate a conservative project construction scenario. There is a chance that small areas of Prime Farmland could be used, for example, to relocate power poles across SR 45 and to accommodate adjustments to the levee easements in the northern portion of the project area. These potential uses could require small, temporary work areas as well as even smaller permanent impacts on Prime Farmland. However, Prime Farmland is mapped in units of a minimum of 10 acres, with smaller areas of land incorporated into adjacent classifications (California Department of Conservation 2019). Any work areas needed for levee easement adjustments or created for power poles would be substantially smaller than 10 acres, and permanent disturbance would affect an even smaller area. Any of these minimal permanently disturbed areas would be incorporated into the Prime Farmland classification. As a result, potential temporary and permanent impacts would not convert Prime Farmland to non-agricultural uses. Impacts would be less than significant.

b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?

The project would maintain current land uses except where residences and other structures would be demolished or removed. Encroachment remediation would require some structure removal. However, structure removal would not conflict with zoning or general plan designations because nothing would be constructed in its place. Therefore, while encroachment remediation would preclude the use of the land as zoned and designated, it would not conflict with existing zoning and land use designations. Encroachment remediation related to agriculture-supporting infrastructure is addressed under criterion (e). While power poles may be relocated to agricultural parcels, the permanent area occupied by the power poles would be negligible as described under criterion (a), and it would not preclude agricultural uses on other areas of the parcel. There would be no impact related to conflicts with zoning for agricultural use.

Regarding Williamson Act land, California Government Code Section 51238.1 states that uses on contracted lands must be consistent with the following principles:

- The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on other contracted lands in agricultural preserves.
- The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in agricultural preserves. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production

of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.

- The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use.

As described above, current land uses in agricultural areas would be maintained except for the small footprints associated with adjustments to the levee easement in the northern portion of the project area and relocated power poles. The levee easement and power pole modifications would not compromise the long-term productive agriculture in the area, displace or impair agricultural operations, or result in removal of adjacent land from agricultural use. Therefore, there would be no impact to Williamson Act contracted land.

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))?

There is no land zoned as forest land or timberland in the project area. There would be no impact related to forest land or timberland zoning conflicts or rezoning.

d. Result in the loss of forest land or conversion of forest land to non-forest use?

There is no forest land or timberland in the project area. There would be no impact related to conversion of forest land or timberland.

e. Involve other changes in the existing environment that, 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?

Some project elements and encroachment remediation would affect agriculture-supporting infrastructure. For example, the pumping plant and the pipe through the levee at station 54+28 would be reconstructed. During work on pump systems, the contractor may be required to implement a temporary bypass pumping system utilizing temporary pumps and diesel generators. Once the permanent system is online, the temporary bypass would be removed. This temporary bypass would maintain water supply during construction activities. For irrigation pipes, facilities not meeting guidelines would be raised or relocated by the owner or the construction contractor depending on the language in the permit allowing for the pipeline. Additionally, the current landowner is expected to relocate the irrigation ditch running from stations 0+00 to 22+00. This will allow the proposed project to acquire a very small portion of land to accommodate the required levee easement. Irrigation of the adjacent farmland will not be affected. The proposed project would require substantial ground disturbance throughout the project area, which could also inadvertently damage agricultural facilities such as irrigation infrastructure. Such damage might interfere with agricultural operations and affect nearby Prime Farmland. If inadvertent damage occurs, then the contractor would likewise work with the landowner regarding repair. Prime Farmland is designated based on soil characteristics and whether the land has been used for irrigated agricultural production at some point in the 4 years prior to mapping. Damage to infrastructure would not affect any soil qualities related to Prime Farmland and would be reparable in a shorter period. Therefore, there would be no other changes that would result in conversion of Farmland to non-agricultural use.

There is no forest land or timberland in the project area. There would be no impact related to conversion of forest land or Farmland.

3.19 Aesthetics

3.19.1 Introduction

This section analyzes the proposed project's potential impacts related to aesthetics. It describes existing conditions in the project area and summarizes the overall regulatory framework for aesthetics, and it analyzes the potential for the proposed project to affect these resources.

3.19.2 Existing Conditions

The proposed project is located in unincorporated Colusa County. Part of the proposed project is located in the town of Grimes, which is not incorporated. The Sacramento River is a primary feature in the project area but is highly confined by levees on both sides of the river as it meanders through a patchwork of agricultural fields and orchards. Vegetation along the river corridor and surrounding levees varies from a dense yet narrow band of riparian and upland vegetation to grassy slopes, as further discussed in Section 3.5, *Biological Resources*. Some segments of the Sacramento River have a somewhat wider, more vegetated floodplain area while others are limited to a narrower strip of land and less dense vegetation.

The west side of the river, including State Route (SR) 45 and the town of Grimes, is separated from the river by the existing flood control levee, which also limits available views of the river. Scenic vista views are available from local roadways that consist of mid- to long-range views out and over agricultural fields that sometimes extend to the Blue and Rocky Ridges and the Coast Ranges, west of Interstate 5. These scenic vista views are available toward the west from SR 45 and local county roads in areas not blocked by trees or structures.

The east side of the river, in Sutter County, affords similar views looking eastward across a primarily agricultural landscape. A portion of South Meridian Road is on top of the east Sacramento River levee, providing limited views of the Sacramento River. Substantial mature vegetation limits views of the river for roadway travelers. Roadways and the river corridor provide the majority of scenic views in the area.

3.19.3 Regulatory Setting

3.19.3.1 Federal

There are no National Park Service lands or National Scenic Byways located within or near the project area. Therefore, there are no federal laws governing visual resources for the proposed project.

3.19.3.2 State

No roadways within or near the project area are designated in state plans as a scenic highway or route worthy of protection for maintaining and enhancing scenic viewsheds (California Department of Transportation 2019).

3.19.3.3 Local

The *Colusa County General Plan* contains the following policies addressing visual resources that are applicable to the proposed project (Colusa County 2012).

- Policy CC 1-1: Protect the rural atmosphere and historic character of Colusa County's towns and Unincorporated communities.
- Policy CC 1-15: Preserve and enhance the rural landscape as an important scenic feature of the County.
- Policy CON 1-7: Conserve and enhance those biological communities that contribute to the County's rich biodiversity including, but not limited to, blue oak woodlands, annual grasslands, mixed chaparral, pine woodlands, wetlands, riparian areas, aquatic habitat, and agricultural lands.
- Policy CON 1-8: Conserve existing native vegetation where possible and integrate existing native vegetation into new development if appropriate.
- Policy CON 1-9: Avoid oak tree removal within oak woodland habitat to the greatest extent feasible through appropriate project design and building siting. If full avoidance is not possible, prioritize planting replacement trees on-site over off-site locations.
- Policy CON 1-22: Maintain lakes, rivers, streams, creeks, and waterways in a natural state whenever possible. These water features may be actively managed and/or improved or modified in order to function as natural flood protection and storm water management features during storms and flooding events.
- Policy CON 1-23: Protect and enhance streams, channels, seasonal and permanent marshland, wetlands, sloughs, riparian habitat and vernal pools through sound land use planning, community design, and site planning.
- Policy OSR 1-10: To the maximum extent feasible, maintain and protect views of the County's scenic resources, including water bodies, the Sutter Buttes, Snow Mountain, St. John Mountain, Goat Mountain, unique geologic features, and wildlife habitat areas.
- Policy OSR-1-16: Protect and preserve the following features along rural character corridors and in scenic areas to the extent appropriate and feasible:
    - Trees, wildflowers, and other natural or unique vegetation
    - Landforms and natural or unique features
    - Views and vistas, including expansive views of open space and agricultural lands
    - Historic structures (where feasible), including buildings, bridges, and signs
- Policy OSR 2-13: Encourage recreational uses that emphasize use of the waterways in locations directly on the Sacramento River, East Park Reservoir, and the proposed Sites Reservoir. Examples include fishing, canoeing, boating, and nature observation. With the exception of boat launches and docks, more active uses, such as parking, restrooms, and picnic areas, shall be located in areas away from the river and sensitive riparian habitat.

3.19.4 Methods of Analysis

A visual impact is the creation of an intrusion or perceptible contrast that affects the scenic quality of a viewscape. A visual impact can be perceived by an individual or group as either positive or negative, depending on a variety of factors or conditions (e.g., personal experience, time of day, weather, seasonal conditions).

The following affected viewer groups and associated sensitivities, identified in parenthesis, have been identified for the proposed project:

- **Residential Viewers (High Sensitivity):** Rural residents in the project area have potential longer-term exposure to views that would be affected by the proposed project. Residential viewers tend to have an invested interest and sense of ownership over nearby visual resources.
- **Recreational Viewers (High Sensitivity):** Recreational viewers using the Sacramento River, roadways, trails, and Sacramento River levees are likely to seek out natural areas and scenic views that could be affected by the proposed project for both shorter and longer durations. Recreationists are more likely to value the natural environment, appreciate the visual experience, and have a strong sense of ownership over the regional landscape and waterways and corridors they use for recreation and that are highly valued throughout the greater Sacramento Valley area.
- **Road Travelers (Moderate to High Sensitivity):** Travelers on local roadways pass areas that would be affected by the proposed project. These travelers use roadways in the study area at varying speeds; normal highway and roadway speeds differ based on the traveler's familiarity with the route and roadway conditions (e.g., rain, curvature and slope of the road). Single views are typically of short duration, except on straighter stretches where views last slightly longer. The passing landscape becomes familiar to viewers who travel routes frequently, and their attention typically is not focused on the passing views but on the roadway, roadway signs, and surrounding traffic. Viewers who travel local routes for the routes' scenic quality generally possess a higher visual sensitivity to their surroundings because they are likely to respond to the natural environment with high regard and as a holistic visual experience. Similarly, viewers on private dirt track routes (e.g., agricultural dirt roads) are likely to possess a higher visual sensitivity to their surroundings because they are likely to respond to the natural environment with a greater sense of ownership and have a high regard for the natural setting.
- **Agricultural Workers (Moderate Sensitivity):** Agricultural workers come into direct visual contact with areas that would be affected by the proposed project on an intermittent basis. Workers in the project area are likely to have moderate sensitivity to changes in the landscape because they are generally focused on tasks at hand, and views tend to be somewhat homogeneous.
- **Industrial & Commercial Viewers (Moderate Sensitivity):** Viewers from industrial and commercial facilities situated in the project area have semi-permanent views of areas that would be affected by the proposed project. Employees and patrons are likely to have moderate sensitivity to changes in the landscape because they are generally focused on tasks at hand (i.e., working or shopping).

3.19.4.1 Construction

Construction impacts for visual resources include impacts associated with the act of construction and the presence of visible project elements and built features immediately following the completion of construction.

3.19.4.2 Operation

Operational impacts for visual resources include impacts associated with daily operations and maintenance of facilities that would be visible to the general public and occur after the proposed project is built and functioning. These operational impacts would include, but are not limited to, inspecting the levee and maintaining vegetation.

3.19.5 Environmental Effects

Potential impacts of the proposed project related to aesthetics are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section I, *Aesthetics*, asks whether the project would result in any of the following conditions.

a. Have a substantial adverse effect on a scenic vista?

Construction of the proposed project would create temporary and permanent changes in views of and from the project area. Construction activities would require staging and the use of considerable heavy equipment and associated vehicles, including dozers, graders, cranes, scrapers, and trucks, adversely affecting views of adjacent residents, recreational users, motorists, agricultural workers, and businesses. The equipment would be visible throughout the construction season. Presence of the equipment would temporarily degrade the visual quality of the project area. However, because this effect is temporary, would last no longer than the construction duration of less than 1 year, and is limited to small portions of the larger river corridor and the town of Grimes, it would not substantially degrade the visual quality of the project area.

Residential viewer groups in the project area and vicinity are somewhat accustomed to seeing heavy equipment associated with agricultural activities, and sensitivity to such effects would be moderate. Recreational users would have scenic views disrupted during construction while visiting areas that are often appreciated for their high scenic qualities, including activities along the Sacramento River. Effects on roadway users would be moderate because SR 45 is located adjacent to the construction footprint, but scenic vistas to the west will substantially be unaffected.

In addition to the presence of construction equipment, construction of the slurry cutoff wall, installation of the rock slope protection (RSP), and grading of the floodplain area would require the removal of a substantial amount of vegetation within the construction footprint. However, a majority of the mature vegetation in the project footprint would be retained. The removal of mature landscape and native trees, and installation of RSP in a limited section of the project footprint, will result in a moderate change in the aesthetic qualities of the area. The areas will be replanted with, at a minimum, grasses to reestablish some vegetative cover. Trees will be planted where feasible, in particular in the area of the restored floodplain at the north end of the project footprint. There will be no change in vegetation on the east bank of the river, and there is very limited mature vegetation along the landside slope of the west levee that is visible from SR 45. River users will experience a change in scenic views, but much of the riparian vegetation along the river will remain intact. Operation of the project will be substantially the same as under existing conditions and will not affect the visual character of the project area. This effect would be less than significant, and no mitigation is required.

b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?

The proposed project is not in the vicinity of a scenic highway. There would be no impact.

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?

As described above under checklist question *a*, the project area is predominantly rural and there will be temporary changes to the existing visual character during the construction phase of the project. Additionally, there will be some permanent changes as a result of vegetation removal and the placement of RSP along a short segment of the river. However, substantial amounts of vegetation, including mature trees, will remain and sustain a majority of the existing visual character and scenic vistas in the general area. Areas where vegetation is removed will be replanted, at a minimum with grasses that will reduce any long-term impact. This effect would be less than significant, and no mitigation is required.

d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

The proposed project will not add any new sources of permanent light and will add only minimal temporary construction lighting associated with up to six nights of nighttime construction proposed for the project. Removal of trees and shrubs and replacement with rock and grass for the approximately 400 feet of RSP would be visible to river users on the waterside of the levee. Additionally, removal of vegetation and trees in other parts of the project footprint would occur, resulting in increased glare by removing trees that are green in spring and summer, when grass is brown, and by removing shade that helps decrease glare on levee, roadway, and water surfaces. The change would affect glare in the winter months to a slightly lesser degree because, while surfaces are not shaded as much when trees have lost their leaves, the sun is generally less intense and at a lower angle during this time of year, and daylight hours are shorter. Given the moderate amount of vegetation removal and the substantial amount of vegetation that would remain, this effect would be less than significant to all viewer groups in direct contact (i.e., travelers on roadways, adjacent residents and businesses, and recreational users of waterways and levees) with locations affected by the proposed project. No mitigation is required.

3.20 Recreation

3.20.1 Introduction

This section analyzes the proposed project's potential impacts related to recreation. It describes existing conditions in the project area and analyzes the potential for the proposed project to affect these resources.

3.20.2 Existing Conditions

There are no public recreational facilities, such as public parks, in or near the project area. The Sutter National Wildlife Refuge is located approximately 6 miles east of the project area. The privately owned Grimes Boat Landing is located in the project area off of SR 45. It has boat slips, recreational vehicle spaces, and a café.

3.20.3 Environmental Effects

Potential impacts of the proposed project related to recreation are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section XVI, *Recreation*, asks whether the project would result in any of the following conditions.

a. 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 proposed project would increase flood protection for the community of Grimes and would improve salmonid habitat. The project is not creating any additional attraction to the area, and therefore it would not induce population growth or attract more recreational users to the area. There would be no impact related to physical deterioration of recreational facilities.

b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

The proposed project does not include new or expanded recreational facilities. There would be no impact.

3.21 Wildfire

3.21.1 Introduction

This section analyzes the proposed project's potential impacts related to wildfire. It describes existing conditions in the project area and summarizes the overall regulatory framework for wildfire to the extent needed to understand impacts, and it analyzes the potential for the proposed project to affect these resources.

3.21.2 Existing Conditions

A wildland fire, or wildfire, is a nonstructure fire that happens in the wildland. Wildland fires do not include prescribed fires. The wildland-urban interface is the zone where urban areas and human activity intermix with an undeveloped area (National Parks Service n.d.).

The areas where the state has financial responsibility for wildland fire protection are designated as State Responsibility Areas (SRAs), while areas where the state and federal governments are not responsible are Local Responsibility Areas (LRAs). California Department of Forestry and Fire Protection (CAL FIRE) has recommended fire hazard severity zones (FHSZ) in LRAs. The project area is in an unzoned area, which means it does not justify an FHSZ designated (CAL FIRE 2007, Colusa County 2010). Documented wildfires have been concentrated in the eastern part of the county, away from the project area, and fire size has increased from east to west (Colusa County 2010). The project area is generally surrounded by active agricultural uses. Therefore, the risk of wildfire in the project area is low.

Colusa County's General Plan Objective SA 1-G is to minimize risks to human life and property from fire in developed and undeveloped areas of the county. These generally focus on areas zoned as very high, high, or moderate fire hazard severity zones. The Colusa County General Plan addresses emergency access in the Circulation Element but does not delineate emergency access routes (Colusa County 2012).

3.21.3 Environmental Effects

Potential impacts of the proposed project related to wildfire are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section 20, *Wildfire*, asks whether the project would result in any of the following conditions.

a. Substantially impair an adopted emergency response plan or emergency evacuation plan?

The project would mainly involve construction activities on the existing levee and outside of roadways that could be used for emergency response and evacuation. Some construction activities would require temporary closure of roads for safety purposes. However, closures would be temporary. Additionally, the roadway network provides some alternative access. For example, if SR 45 is temporarily closed at the Grimes Boat Landing, Grimes can be accessed from the east via Tule Road and Poundstone Road. Any full closures would last no longer than 30 minutes, and one-way closures would be controlled with flaggers. After construction activities are completed, the roadway network would be the same as it is currently. The project would not impair an adopted emergency response plan or emergency evacuation plan. There would be no impact.

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks of, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The project would not change slope or other factors in a way that would worsen wildfire risks in the project area. The levee and borrow areas would maintain their same geometry after implementation of the project, and habitat restoration and placement of rock slope protection would not increase wildfire risk. There would be no impact.

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 on the environment?

There would be no new infrastructure installed as part of the proposed project. The proposed project includes modification to existing infrastructure, but it would not increase wildfire risk. For example, PG&E distribution lines would be relocated to the opposite side of SR 45, which would not increase fire risk. There would be no impact.

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?

The project would strengthen the existing levee near Grimes. The project would also result in habitat restoration along the Sacramento River just north of Grimes that would increase the frequency of inundation in this area. However, this work would still be within the existing leveed river channel. As a result, the project would not increase risks of downstream flooding or landslides. There would be no impact.

Chapter 4
Cumulative Impacts

4.1 Cumulative Projects

The State CEQA Guidelines define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (Section 15355). Pursuant to Section 15130(b)(1)(A), the following projects have been identified as those past, present, and probable future projects producing related or cumulative impacts, including those projects outside the control of the lead agency. These projects (cumulative projects) include flood control, development, and other infrastructure projects that could have effects similar to those of the proposed project.

- **Sacramento River Bank Protection Project**. The U.S. Army Corps of Engineers (USACE) is responsible for implementation of the Sacramento River Bank Protection Project (SRBPP) in conjunction with its non-federal partner, CVFPB. The SRBPP is a continuing construction project authorized by Section 203 of the Flood Control Act of 1960. The purpose of the project is to provide erosion protection to the existing levee and flood management facilities of the Sacramento River Flood Control Project (SRFCP). To date, project work has been carried out in two phases, and a total of approximately 840,000 feet of riverbank has been stabilized. Phase I consisted of 435,000 feet, and Phase II's original authorization was for 405,000 feet. An additional 80,000 feet (a supplement to Phase II) has been authorized under the Water Resources Development Act of 2007 and is being supported by a Post Authorization Change Report, Engineering Documentation Report, and EIS/EIR (recently completed). The authorization would be applied by USACE to the Sacramento River and other sites within the SRFCP that are identified as critical levee erosion sites. There are no projects under the SRBPP that are presently under construction immediately adjacent to, or upstream of, the proposed project.
- **Central Valley Project Biological Opinions**. Biological Opinions issued by USFWS and NMFS for the Central Valley Project (CVP) and State Water Project (SWP) determined that the existing fish passage structure at Fremont Weir was inadequate to allow normal fish passage at most operational levels of the Sacramento River. As a result, the Biological Opinions required the USBR and/or DWR to increase inundation of suitable acreage for fish habitat within the Yolo Bypass and to modify operations of the Sacramento Weir or Fremont Weir to increase juvenile rearing habitat. The Biological Opinions also require restoration of 8,000 acres of tidal marsh habitat in the Delta to benefit delta smelt and up to 20,000 acres of salmonid habitat restoration. The operations of the SWP and CVP are currently subject to the terms and conditions of these Biological Opinions. Multiple efforts are underway to comply with the Biological Opinions, including modifications to Fremont Weir and portions of the Yolo Bypass to improve fish passage.
- **Central Valley Flood Protection Plan.** The Central Valley Flood Management Planning (CVFMP) Program is one of several programs managed by DWR under FloodSAFE California, a multifaceted initiative launched in 2006 to improve integrated flood management in the Central Valley, including the Sacramento River and Yolo Bypass. The CVFMP Program addresses State flood management planning activities in the Central Valley. The Central Valley Flood Protection

Plan (CVFPP) is one of several documents adopted by CVFPB to meet the requirements of flood legislation passed in 2007 and, specifically, the Central Valley Flood Protection Act of 2008. The 2012 CVFPP was updated and adopted by CVFPB in August 2017, with a focus on Sacramento and San Joaquin Watershed Basinwide Feasibility Studies, Regional Flood Management Planning, and the Central Valley Flood System Conservation Strategy. A goal of the proposed project is to increase flood resiliency to a 100-year level of flood protection for the town of Grimes in a manner consistent with the 2012 Central Valley Flood Protection Plan (2012 CVFPP) and its 2017 update (2017 CVFPP Update), including investments in multi-benefit flood projects. A 2022 CVFPP Update is underway and focuses on climate resilience, performance tracking, and alignment with other state efforts. Results of these efforts support implementation of future CVFPP actions. The CVFPP contains a broad plan for flood management system improvements, and ongoing planning studies, engineering, feasibility studies, designs, funding, and partnering are required to better define, and incrementally fund and implement, these elements over the next 20 to 25 years.

- **Small Communities Flood Risk Reduction Program.** The Small Communities Flood Risk Reduction (SCFRR) Program was created as a result of the adoption of the 2012 Central Valley Flood Protection Plan (CVFPP) to reduce flood risks to the small communities located in the areas protected by the State Plan of Flood Control facilities. The SCFRR Program assists the local public agencies with implementing flood risk reduction projects for the small communities in the Central Valley, consistent with the State Systemwide Investment Approach, incorporating CVFPP principles and contribute to the integrated water management plan objectives described in the CVFPP. Under the State Systemwide Investment Approach, several small communities within the State Plan of Flood Control planning area could achieve the Federal Emergency Management Agency benchmark of 100-year (1% annual chance) flood protection through structural or nonstructural methods. The Program is intended to fund feasibility studies and, ultimately, design and implementation of some projects. Implementation of the SCFRR Program provided funding for the feasibility study of the proposed project.
- **Storm Damage DWR Emergency Rehabilitation Project.** DWR has implemented the Storm Damage DWR Emergency Rehabilitation Project (SDDER) in response to multiple levee performance problems that have arisen following flooding in the Central Valley and the Delta, which was due to heavy storms that occurred during the 2016–2017 rainy season. The storms during this period were severe and of long duration, resulting in extensive damage to the State Plan of Flood Control (SPFC) and non-project system that compromise the more than 2,000 miles of levee in the Central Valley that provide flood protection for populations and facilities. As described in the Central Valley Flood Protection Plan, local maintaining agencies and the Department of Water Resources (DWR), along with the U.S. Army Corps of Engineers (USACE), are responsible for maintaining the integrity of the SPFC levees, bypasses, and other facilities to continue to protect California's Central Valley. DWR and USACE assessed over 400 damaged levee sites that required either immediate repair or other remedial action. Additionally, in the spring of 2019, a major event caused damages to some areas of the SPFC, leading USACE to accept requests for rehabilitation assistance. In response, DWR created the SDDER program and USACE utilized the PL84-99 rehabilitation program to address the damaged sites. Since 2017, DWR and USACE have repaired 69 damaged levee segments and plan to repair 49 additional sites by 2023. The remaining levee sites requiring action will be monitored over the next flood seasons and reassessed as necessary.

- **Sites Reservoir Project.** The Sites Project Authority and USBR have prepared a Revised Draft EIR/Supplemental Draft EIS to evaluate impacts associated with construction and operation of the Sites Reservoir Project (SRP), located in Glenn and Colusa Counties. The purpose of the SRP is to increase water management flexibility in the Sacramento Valley, increase water supply reliability, and provide storage and operational benefits for programs that benefit Delta water quality and improve ecosystems. The SRP would also allow for flexible hydropower generation, provide new recreation facilities, and deliver incremental flood risk reduction. The SRP would include construction of an offstream surface water storage reservoir, two main dams, up to seven saddle dams and two saddle dikes, and two primary recreation areas. It would also necessitate the construction of a bridge or bypass road to connect Maxwell with the community of Lodoga. The reservoir would be filled by diverting available Sacramento River flows through existing infrastructure at Red Bluff and Hamilton City, and would also construct a new outlet structure and pipeline to discharge water back into the Sacramento River through the Colusa Basin Drain when needed. The Revised Draft EIR/Supplemental Draft EIS for the SRP was released for public review and comment in December 2021.

4.2 Cumulative Impacts by Resource

The following analysis focuses on considering the potential for impacts identified in Chapter 3 to make a considerable contribution to significant cumulative impacts. The proposed project would not cause long-term significant impacts on the resources discussed in Chapter 3, *Existing Conditions and Environmental Effects*. However, some of the resources have the potential to incur temporary, short-term impacts during the construction period. An initial assessment of potential cumulative impacts indicated that impacts on hydrology and water quality, geology and soils, biological, air quality, greenhouse gas emissions, noise, transportation, agriculture and forestry, and aesthetic resources have the potential to contribute to cumulative impacts. The potential cumulatively considerable impacts on these resources, in combination with potential impacts from the local projects described above, are discussed below.

4.2.1 Hydrology and Water Quality

The cumulative geographic scope for hydrology is the location of all construction and operation of project facilities in the town of Grimes and nearby surrounding areas of Colusa County, and inclusive of the Sacramento River and the Colusa groundwater basin. Regional flood control projects were identified and evaluated, including the DWR Small Communities Flood Risk Reduction Program (California Department of Water Resources 2021); Sacramento River Bank Protection Project (U.S. Army Corps of Engineers 2021); and the Sacramento River Flood Control System Evaluation, Phase III Mid-Valley sites (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2013). Additionally, projects identified by Colusa County in its *General Plan Annual Progress Report* (Colusa County 2021) were also considered.

A review of the current status and construction footprint of these projects was conducted to determine if there was a potential for cumulative impacts during construction, and none were identified. All the projects that were determined to be in current construction or in a planned construction phase are located away from any potential conflicts or cumulative effects of the proposed project as it relates to construction. Some elements of the identified projects or programs have not yet been funded to proceed in the foreseeable future. Therefore, construction activities for the proposed project are unlikely to coincide with similar activities for other projects in the cumulative geographic scope because of the distance from these other projects and the limited number of projects in proximity. Specific to hydrology on the Sacramento River, all flood control projects must be reviewed by the CVFPB and USACE and determined to not have cumulative hydrologic/hydraulic impacts. This regulatory process ensures that cumulative hydrologic impacts do not occur. Specific to water quality, the impacts and mitigation measures identified will ensure that there are minimal effects on water quality, including surface water and groundwater, as a result of this project. The proposed project would not result in an incremental contribution to hydrology and water quality effects. Therefore, the proposed project would not cause an incremental impact that would be significant when added to the impacts on hydrology and water quality from other past, present, and reasonably foreseeable future actions.

4.2.2 Geology and Soils

While the proposed project would result in a less-than-significant impact related to soil erosion associated with project construction, it is a localized impact that would be controlled by a SWPPP. No associated cumulative impact has been identified. Therefore, the proposed project would not contribute to any related cumulative impact. Additionally, the proposed project would have no impact related to earthquake faults, seismic ground shaking, ground failure, landslides, wastewater, and unique paleontological resources or geologic features, and therefore would not contribute to related cumulative impacts.

4.2.3 Biological Resources

The geographic scope of the cumulative analysis for biological resources is the biological study area and the surrounding regional area. A list of projects and programs in the region was evaluated to determine if activities associated with these projects may have cumulative impacts on biological resources that are known to occur within the study area. Regional flood control projects that are also part of California Department of Water Resources Small Communities Flood Risk Reduction Program (California Department of Water Resources 2021) were considered in the analysis in addition to the Sacramento River Bank Protection Project (U.S. Army Corps of Engineers 2021), the Sacramento River Flood Control System Evaluation, Phase III Mid-Valley sites (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2013), and projects identified by Colusa County in its *General Plan Annual Progress Report* (Colusa County 2021).

The various projects and programs listed above would have impacts on biological resources. However, these projects are either not located near the study area or have not yet been funded to proceed in the foreseeable future. Therefore, construction activities for the proposed project are unlikely to coincide with similar activities for other projects in the region because of the distance from these other projects and the uncertainty of these projects being constructed in the foreseeable future. In addition, these projects and programs would be required to comply with state and federal regulations to minimize and mitigate for impacts on biological resources. Therefore, the proposed project, when added to the impacts on biological resources from other past, present, and reasonably foreseeable future actions, would create less-than-significant cumulative impacts on biological resources

4.2.4 Air Quality

The evaluation of air quality impacts is an inherently cumulative approach and does not consider individual planned projects in the vicinity of the project. Rather, it uses the same air district thresholds as the project-level analysis, which consider levels at which project emissions would be cumulatively considerable. The project-level thresholds were developed to prevent deterioration of ambient air quality, which is influenced by emissions generated by projects within a specific air basin. The thresholds therefore consider relevant past, present, and reasonably foreseeable future projects within the study area. Therefore, exceedances of the project-level thresholds, as identified in Section 3.6.4, *Environmental Effects*, would be cumulatively considerable.

Colusa County is nonattainment for the state PM10 standard (see Table 3.6-3). Sutter and Placer Counties, through which construction materials would be hauled, also do not attain one or more federal and state ambient air quality standard related for ozone and particulate matter. Therefore, a significant cumulative impact for air quality exists in the study area. Construction and operations of future projects, including the proposed project, could further contribute to nonattainment of the state and federal air quality standards in the air quality study area. However, as shown in Tables 3.6-5 and 3.6-6, neither construction activities nor inter-district material hauling would generate ozone precursors (ROG and NOx) or particulate matter emissions above air district thresholds. Accordingly, the proposed project's contribution to the existing cumulative impact would not be cumulatively considerable.

The combined effects of air pollution in the NSVPA from existing and future sources represent the emissions paradigm to which receptors would be exposed. The contribution of project-generated emissions to potential adverse health effects induced by exposure to regional criteria pollutant emissions (i.e., ozone precursors and particulate matter) depends on numerous interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). Moreover, emissions of ozone precursors (i.e., ROG and NO_X) generated in one area may not equate to an ozone concentration in that same area. Similarly, some types of particulate pollutants may be transported over long distances or formed through atmospheric reactions. As such, the magnitudes and locations of specific health effects from exposure to increased ozone or regional particulate matter concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project. Project-specific correlations of regional criteria pollutant emissions to specific health endpoints (e.g., increased cases of asthma) are not commonly performed because models that quantify changes in ambient pollution and resultant health effects were developed to support regional planning and policy analysis and generally have limited sensitivity to changes in criteria pollutant concentrations induced by individual projects. This is particularly pronounced for projects with relatively small contributions of emissions (i.e., emissions that would be below the regional air district thresholds), such as the proposed project.

In general, community health conditions near the proposed project, as measured by CalEnviroScreen indicators, are slightly poorer when compared to conditions across the state (refer to 3.6.2.3, *Existing Air Quality Conditions*). As shown in Table 3.6-3, Colusa County does not currently attain the state PM10 standard. Certain individuals residing in areas that do not meet the ambient air quality standards could be exposed to pollutant concentrations that cause or aggravate acute and/or chronic health conditions, regardless of implementation of the proposed project. Compliance with CCAPCD rules (200, 202, and 204) would minimize project-generated PM10 emissions by minimizing dusty conditions. Moreover, as shown in Table 3.6-5, the highest predicted daily PM10 emissions during construction would not contribute to the significant cumulative regional PM10 pollution impact.

Localized pollutants and odors generated by a project are deposited near the emissions source and can have the potential to affect the population near that emissions source. While construction of the proposed project would result in localized pollutant emissions (i.e., fugitive dust, DPM, and potentially asbestos) and minor odors from diesel fuel combustion and asphalt paving, construction activities would be short-term (less than 1 year) and spread over the 1.8-mile-long slurry cutoff wall and associated haul roads. Because localized pollutant concentrations and odor emissions regularly decline as a function of distance from the emission source, implementation of the proposed project, in combination with other existing and future projects, would not expose receptors to substantial cumulative localized pollutant concentrations or substantial odors.

4.2.5 Greenhouse Gas Emissions

Global GHG emissions due to population growth and economic growth continue to increase and are worsening the effects of global climate change. While there are myriad efforts at local, state, national, and international levels to promote the reduction of GHG emissions overall, current projections are that these emissions will still increase for the following decades and add to the current GHG concentrations in the atmosphere.

Environmental impacts associated with project-generated GHG emissions are exclusively cumulative in nature in accordance with the contemporary scientific knowledge of their effects on climate change. GHG emissions, once emitted, mix into the atmosphere and affect a larger area than any individual project site. Thus, the GHG analysis does not consider individual planned projects in the vicinity of the proposed project and project alternatives. Rather, it uses the same thresholds and conditions as the project-level analysis.

As discussed under Impact GHG-1, total emissions generated by construction of the proposed project are estimated to be 817 metric tons CO_2e. Postconstruction, observation and maintenance of the levee would not change operational activities or associated emissions relative to existing conditions. The 817 metric tons CO_2e expected during construction of the proposed project are well below the analysis threshold of 10,000 metric tons CO_2e. However, the proposed project would result in a permanent loss of stored carbon and sequestration capacity. The Sacramento River West Side Levee District would implement Mitigation Measure GHG-1 to replace removed trees at a 1:1 ratio. The measure also requires implementation of best management practices to further reduce construction generated GHGs. Mitigation Measure GHG-1 ensures emissions generated by the proposed project would not result in a significant cumulative contribution to impacts on global climate change.

4.2.6 Noise

Construction Noise

Construction noise is a relatively localized impact that reduces as distance from the noise source increases. In addition, intervening features between construction areas and nearby noise-sensitive land uses (e.g., buildings) result in additional noise attenuation by providing barriers that break the line of sight between noise-generating equipment and sensitive receptors. These barriers can block sound wave propagation to somewhat reduce noise levels at a given location and can reduce the likelihood of construction noise from two projects combining to substantially increase overall ambient noise levels. Construction activities for the proposed project could coincide with similar activities for other projects in the area. The simultaneous construction of nearby projects with the proposed project could, therefore, expose receptors located between the two projects to combined noise levels greater than would occur with a single construction project. It is, therefore, difficult to predict whether construction activities associated with nearby projects would overlap with those for the proposed project. However, as is the case with the proposed project, construction for other projects located in Colusa County or Sutter County would most likely take place during the daytime hours. People are generally less sensitive to noise during daytime hours than they are during nighttime hours, and there are no restrictions on construction noise levels during daytime hours in either Colusa or Sutter County. For these reasons, cumulative impacts related to construction would be less than significant.

Construction Vibration

With regard to the potential for cumulative vibration-related impacts, because vibration impacts are based on instantaneous peak particle velocity (PPV) levels, worst-case ground-borne vibration levels from construction are generally determined by whichever individual piece of equipment generates the highest vibration levels. Unlike the analysis for average noise levels, in which noise levels of multiple pieces of equipment can be combined to generate a maximum combined noise level, instantaneous peak vibration levels do not combine in this way. Vibration from multiple construction sites, even if they are located close to one another, would not be expected to combine to raise the maximum PPV. For this reason, cumulative vibration impacts would be less than significant.

4.2.7 Hazards and Hazardous Materials

While the proposed project would result in less than significant impacts related to the routine transport, use, or disposal of hazardous materials, hazardous materials sites, and wildfire ignition, no cumulative impact has been identified. Therefore, the proposed project would not contribute to any related cumulative impact. Additionally, the proposed project would have no impact related to airstrip noise or emergency response and evacuation and therefore would not contribute to related cumulative impacts.

4.2.8 Cultural Resources

No cumulative impacts associated with cultural resources have been identified. No other projects were identified in the surrounding area that could significantly impact the levee or other cultural resources in the project area. Project impacts to the one historic-built environment resource would be less than significant because it would not permanently modify the qualities that establish this resource as eligible and thus would not result in an incremental contribution to a cumulative effect. Therefore, when combined with other projects it would not result in a cumulatively considerable significant impact. Therefore, the proposed project would not contribute to any related cumulative impact.

4.2.9 Tribal Cultural Resources

No cumulative impacts associated with tribal cultural resources have been identified. No other projects were identified in the surrounding area that could significantly impact unknown tribal cultural resources in the project area and the proposed project would not result in impacts on tribal cultural resources. As such, it would not result in an incremental contribution to a cumulatively considerable impact. Therefore, when combined with other projects it would not result in a cumulatively considerable significant impact. Therefore, the proposed project would not contribute to any related cumulative impact.

4.2.10 Transportation

The cumulative geographic scope for transportation is the location of all construction and operation of project facilities in the town of Grimes and nearby surrounding areas of Colusa County. More specifically, the focus is on SR 45 as it is the main route for construction equipment and supplies to reach the project site. Regional flood control projects were identified and evaluated, including the California Department of Water Resources Small Communities Flood Risk Reduction Program (California Department of Water Resources 2021); Sacramento River Bank Protection Project (U.S. Army Corps of Engineers 2021); and the Sacramento River Flood Control System Evaluation, Phase III Mid-Valley Sites (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2013). Additionally, projects identified by Colusa County in its General Plan Annual Progress Report (Colusa County 2021) were also considered.

A review of the current status and construction footprint of these projects was conducted to determine if there was a potential for cumulative impacts on SR 45 during construction. All the projects that were determined to be in current construction or in a planned construction phase are located away from any potential conflicts or cumulative effects of the proposed project. Therefore, construction activities for the proposed project are unlikely to coincide with similar activities for other projects in the cumulative geographic scope because of the distance from these other projects and the limited number of projects in proximity. The proposed project would not result in an incremental contribution to transportation effects. Therefore, the proposed project would not cause an incremental impact that would be significant when added to the impacts on transportation from other past, present, and reasonably foreseeable future actions.

4.2.11 Energy

Although the importance of energy as a resource topic was initially related to concerns over rapid demand for energy and its impacts on California's environmental quality in the mid-1970s, the present-day concern is related to climate change (CNRA 2018). As explained in the Greenhouse Gas Emissions cumulative impacts discussion, cumulative greenhouse gas emissions impacts would be less than significant with mitigation. The project would have no impact related to implementation of a state or local plan for renewable energy or energy efficiency and therefore would not contribute to a related cumulative impact.

4.2.12 Population and Housing

The project would have no impact under CEQA related to population growth or displacement as a result of the removal of three houses and three clusters of outbuildings because there is adequate space in Grimes and Colusa County for the relocation of people living in these homes. Similarly, the nine mobile homes could be relocated. Therefore, the project would not contribute to any cumulative impact related to population growth or displacement.

4.2.13 Utilities and Service Systems

The proposed project would not result in environmental impacts related to utilities and service systems. As a result, the project would not contribute to any related cumulative impact.

4.2.14 Public Services

The proposed project would not result in impacts on public services and therefore would not contribute to any cumulative impact related to public services.

4.2.15 Land Use and Planning

The proposed project would not physically divide an established community or cause an impact related to a conflict with a land use policy and therefore would not contribute to any related cumulative impact.

4.2.16 Agriculture and Forestry Resources

The proposed project would result in no impact related to conflicts with zoning, land use designations, Williamson Act Contracts, forest land, or indirect conversion of Farmland or forest land. Therefore, the project would not contribute to any related impact.

The Environmental Impact Report for the Colusa County General Plan identified Farmland conversion in the county as a significant and unavoidable impact (Colusa County 2011). The 1998–2018 Land Use Summary reports a net loss of 4,677 acres of Prime Farmland during that period, which is a loss of 2.3 percent of Prime Farmland (California Department of Conservation 2018). This finding indicates that a significant cumulative impact related to conversion of Prime Farmland exists in Colusa County. The loss of Farmland referred to in the General Plan is located in areas that would be designated for urbanization and non-agricultural use through expansion of existing communities. The proposed project's potential conversion of Prime Farmland, however, is unrelated to expansion of communities and instead involves minimal areas of Farmland conversion to facilitate increased safety for an existing community. Therefore, the project's contribution to the cumulative significant impact would not be cumulatively considerable.

4.2.17 Aesthetics

The cumulative geographic scope for aesthetics is the location of all construction and operation of project facilities in the town of Grimes, along the Sacramento River, and in nearby surrounding areas of Colusa County. More specifically, focus centers on the SR 45 corridor and along the Sacramento River, which are the areas where visual character would be affected and where users will view project activities. Considering other projects in the region that may also affect aesthetics, regional flood control projects were identified and evaluated, including California Department of Water Resources Small Communities Flood Risk Reduction Program (California Department of Water Resources 2021); Sacramento River Bank Protection Project (U.S. Army Corps of Engineers 2021); and the Sacramento River Flood Control System Evaluation, Phase III Mid-Valley sites (U.S. Army Corps of Engineers 2013). Additionally, projects identified by Colusa County in its *General Plan Annual Progress Report* (Colusa County 2021) were also considered.

A review of the current status and construction footprint of these projects was conducted to determine if there was a potential for cumulative impacts on the project area, including SR 45 and the Sacramento River and the views provided from those locations. All the projects that were determined to be in current construction or in a planned construction phase are located away from any potential conflicts or cumulative effects of the proposed project. Therefore, construction activities for the proposed project are unlikely to coincide with similar activities for other projects in the cumulative geographic scope because of the distance from these other projects and the limited number of projects in proximity. Given the small size of the proposed project, the temporary nature of the construction impacts, the retention of much of the mature riparian vegetation, and the planting of grasses throughout the project area and riparian vegetation on the restored floodplain, the proposed project would not result in a substantial incremental contribution to aesthetic effects. Therefore, the proposed project would not cause an incremental impact that would be significant when added to the impacts on aesthetics from other past, present, and reasonably foreseeable future actions.

4.2.18 Recreation

The proposed project would have no impact related to recreational facilities and therefore would not contribute to any cumulative impact on recreational facilities.

4.2.19 Wildfire

The project would have no impact related to wildfire and therefore would not contribute to any cumulative wildfire risk.

Chapter 5
Mandatory Findings of Significance

State CEQA Guidelines Section 15065 requires that a lead agency prepare an environmental impact report if any of the following conditions may result from a proposed project.

1. The project has 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 an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory.
2. The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
3. The project has possible environmental effects that are individually limited but cumulatively considerable.
4. The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

If the project proponent agrees to mitigation measures that would avoid any significant effects on the environment, or would mitigate significant effects to a point where clearly no significant effect on the environment would result from project implementation, an environmental impact report need not be prepared.

The proposed project would not result in any mandatory findings of significance. The proposed project would not result in significant effects on the environment; fish, wildlife, or plant species; endangered species; or cultural resources. Neither would the project cause long-term adverse environmental effects, cumulatively considerable effects, or adverse effects on humans. With the mitigation measures described in Chapter 3, *Existing Conditions and Environmental Effects*, all environmental impacts would be reduced to a less-than-significant level. Please refer to individual resource sections in Chapter 3 for a complete discussion of the environmental impacts and associated mitigation.

Chapter 6
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6.5 Chapter 5, Mandatory Findings of Significance

No references cited.

Chapter 7
List of Preparers

7.1 Sacramento River West Side Levee District

Name, Title	Education/Experience	Project Role
Meegan Nagy, P.E.	B.S., Civil and Environmental Engineering, 25 years' experience	Deputy Manager, SRWSLD

7.2 ICF

Name	Education/Experience	Project Role
Gregg Ellis	B.A., Geography; 26 years' experience	Project Director
Sara Martin	B.A., Anthropology; 21 years' experience	Project Coordinator
Erik Allen	M.A. candidate, Anthropology; B.A., Anthropology; 11 years' experience	Cultural Resources, Tribal Cultural Resources
Alex Angier	A.A., Computer-Aided Drafting and Design; 16 years' experience	GIS Technician
Kristi Black	J.D.; B.A. Earth Science; 11 years' experience	Hazards, Energy, Population & Housing, Utilities, Public Services, Land Use, Agriculture & Forestry, Recreation, Wildfire
Kate Carpenter	B.A., Plant Biology (minor in Soil Science); 20 years' experience	Biological Resources
Nicole Felicetti	M.S., Historic Preservation; B.A., Architecture; 3 years' experience	Cultural Resources
Rachel Gardiner	M.S., Biology, B.S.; Biology; 21 years' experience	Biological Resources
Jessica Hughes	M.S., Botany and Plant Pathology; B.S., Biology; 17 years' experience	Editor
Jeff Kozlowski	M.S., Ecology; B.S., Natural Resources Management; 36 years' experience	Biological Resources
Stephanie Monzon	M.A., English; B.A., English; 17 years' experience	Editor
Jenelle Mountain-Castro	HS Graduate; 18 years' experience	Publications Specialist
Jennifer Neuman	B.A., Communication Studies; 9 years' experience	Editor
Steve Pappas	M.A., Archaeology and Heritage; 20 years' experience	Cultural Resources, Tribal Cultural Resources
Jason Volk	B.S., Mechanical Engineering; 20 years' experience	Noise
Laura Yoon	M.S., Environmental Management; B.A., Environmental Studies; 13 years' experience	Air Quality and Greenhouse Gas Emissions

7.3 Other Contributors

Name	Education/Experience	Project Role
Nicole Hart, P.E.	M.S., B.S., Civil Engineering, 31 years' experience	Senior Engineer, Blackburn Consulting (consultant to SRWSLD)
Jim Lorenzen, P.E.	B.S., Civil Engineering; 35 years' experience	Senior Project Manager, KSN Inc., (consultant to SRWSLD)
Barry O'Regan, P.E.	M.S., B.S., Civil Engineering; 36 years' experience	Engineering Lead Designer, KSN Inc. (consultant to SRWSLD)
Wilson Zhu, P.E.	B.S., Civil Engineering; 7 years' experience	Civil Engineer, KSN Inc., (consultant to SRWSLD)

Appendix A
Environmental Checklist

Appendix A
Environmental Checklist

1.	**Project Title:**	Grimes Floodplain Restoration and Levee Resiliency Project
2.	**Lead Agency Name and Address:**	Sacramento River West Side Levee District 975 Wilson Bend Road P.O. Box 50 Grimes, CA 95950
3.	**Contact Person and Phone Number:**	Meegan Nagy, 530-812-6269
4.	**Project Location:**	Grimes, CA
5.	**Project Sponsor's Name and Address:**	Same as Lead Agency
6.	**General Plan Designation:**	Agricultural General, Parks & Recreation, Urban Residential, Rural Residential, and Commercial.
7.	**Zoning:**	Exclusive Agriculture, River Frontage, Rural Residential (2-acre minimum lot), Residential Single-Family (8,000-square foot minimum lot), and Community Commercial.

8. Description of Project:

The Sacramento River West Side Levee district (SRWSLD), with funding from the California Department of Water Resources (DWR), is proposing this project, which would consist of constructing a 1.8-mile-long slurry cutoff wall in the existing Sacramento River West Bank Levee System (SRWBLS), encroachment remediation, waterside hardening, establishment of an operations and maintenance area, and restoration of approximately 11 acres of floodplain for salmonids. DWR investigations have determined that the section of the SRWBLS south of, and directly adjacent to, the town of Grimes in Colusa County suffers from under-seepage deficiencies, while the section just north of Grimes suffers from both under-seepage and through-seepage deficiencies. Currently, Grimes is not mapped within a Federal Emergency Management Agency (FEMA) special flood hazard area; however, FEMA has initiated a remapping process for Colusa County. Initial results indicate that without remediation of the Sacramento River levees, much of Colusa County, including Grimes, may be placed within a FEMA special flood hazard area. The goal of the proposed project is to increase flood resiliency a 100-year level of flood protection to the town of Grimes in a manner consistent with the 2012 Central Valley Flood Protection Plan and its 2017 update, including investments in multi-benefit flood projects (e.g., improvement of salmonid habitat), and to ensure Grimes is not placed within a FEMA special flood hazard area.

9. Surrounding Land Uses and Setting:

The town of Grimes is an unincorporated community located along the west bank of the Sacramento River in Colusa County (Figure 1-2). Grimes sits at an approximate elevation of 46 feet and has a population of 296 people as of the 2020 census (U.S. Census Bureau 2022). The land surrounding the town is largely rural agriculture. State Route 45 and Grimes-Arbuckle Road are the main roads that run through the town. The town of Grimes' area of protection includes the community of Grimes and critical infrastructure such as Grand Island Elementary School, municipal wells that supply the community with potable water, domestic septic systems, and a grain mill operated by Western Milling.

10. Other Public Agencies Whose Approval is Required:

This initial study will be used by multiple responsible, trustee, and cooperating agencies, including the California Department of Water Resources, the California Department of Fish and Wildlife, the

Central Valley Regional Water Quality Control Board, the California Central Valley Flood Protection Board, and the State Lands Commission.

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, has consultation begun?

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code Section 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code Section 21082.3(c) contains provisions specific to confidentiality.

The Yocha Dehe Wintun Nation (YDWN) and the United Auburn Indian Community (UAIC) sent letters to the SRWSLD requested consultation under Assembly Bill 52. On January 27, 2021, Meegan Nagy of the SRWSLD reached out by letter to representatives of the YDWN and the UAIC.

Anna Cheng of UAIC responded in an email dated March 3, 2021, that UAIC had determined the area was outside of their ethnographic territory and that they would not be consulting on this project.

James Kintner, the Tribal Historic Preservation Officer for the YDWN, responded in a letter dated February 18, 2021, indicating an interest in consulting on the project, and in being present during geotechnical testing work for the project. A follow-up letter was transmitted to Mr. Kinter on April 28, 2021, informing the tribe of SRWSLD's intention to schedule geotechnical testing, and inviting representatives of YDWN to be present during the testing. Consultation with the tribe is ongoing as of May 23, 2022.

Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by this project (i.e., the project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

- ☐ Aesthetics
- ☐ Agricultural and Forestry Resources
- ☐ Air Quality
- ☐ Biological Resources
- ☐ Cultural Resources
- ☐ Energy
- ☐ Geology/Soils/ Paleontological Resources
- ☐ Greenhouse Gas Emissions
- ☐ Hazards and Hazardous Materials
- ☐ Hydrology/Water Quality
- ☐ Land Use/Planning
- ☐ Mineral Resources
- ☐ Noise
- ☐ Population/Housing
- ☐ Public Services
- ☐ Recreation
- ☐ Transportation
- ☐ Tribal Cultural Resources
- ☐ Utilities/Service Systems
- ☐ Wildfire
- ☐ Mandatory Findings of Significance

A.1 Aesthetics

I. Aesthetics	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 along a 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 that would adversely affect daytime or nighttime views in the area?	☐	☐	☒	☐

A.2 Agricultural and Forestry Resources

II. Agricultural and Forestry Resources	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
In determining whether impacts on 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 Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts on 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 the 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 conflict with 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 that, 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?	☐	☐	☐	☒

A.3 Air Quality

III. Air Quality	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 a nonattainment area for 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?	☐	☐	☒	☐

A.4 Biological Resources

IV. Biological Resources	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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, or 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, marshes, vernal pools, coastal wetlands, 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?	☐	☐	☐	☒

A.5 Cultural Resources

V. Cultural Resources	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

A.6 Energy

VI. Energy	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?	☐	☐	☐	☒

A.7 Geology, Soils, and Paleontological Resources

VII. Geology, Soils, and Paleontological Resources	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. 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.	☐	☐	☐	☒
2. Strong seismic ground shaking?	☐	☐	☐	☒
3. Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
4. 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 an onsite or offsite 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 wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

A.8 Greenhouse Gas Emissions

VIII. Greenhouse Gas Emissions		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?	☐	☒	☐	☐

A.9 Hazards and Hazardous Materials

IX. Hazards and Hazardous Materials	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d. Be located on a site that 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. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and 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?	☐	☐	☒	☐

A.10 Hydrology and Water Quality

X. Hydrology and Water Quality	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater 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 that would:				
1. Result in substantial erosion or siltation on or off site;	☐	☒	☐	☐
2. Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site;	☐	☐	☐	☒
3. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
4. 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?	☐	☐	☐	☒

A.11 Land Use and Planning

XI. Land Use and Planning	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?	☐	☐	☐	☒

A.12 Mineral Resources

XII. Mineral Resources	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?	☐	☐	☐	☒

A.13 Noise

XIII. Noise	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☐	☒	☐	☐
b. Generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. Be 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 and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

A.14 Population and Housing

XIV. Population and Housing	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

A.15 Public Services

XV. Public Services	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a 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:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

A.16 Recreation

XVI. Recreation	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. 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. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

A.17 Transportation

XVII. Transportation	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	☒	☐
b. Conflict or be inconsistent with State CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☐	☒
c. Substantially increase hazards because of a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d. Result in inadequate emergency access?	☐	☐	☐	☒

A.18 Tribal Cultural Resources

XVIII. Tribal Cultural Resources	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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:				
a. 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	☐	☒	☐	☐
b. 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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

A.19 Utilities and Service Systems

XIX. Utilities and Service Systems	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater 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 that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
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?	☐	☐	☐	☒

A.20 Wildfire

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 of, 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 on 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?	☐	☐	☐	☒

Appendix B
List of Plant Species Observed in the Study Area

Table B-1. List of Plant Species Observed in the Study Area

Scientific Name	Common Name	Wetland Indicator Status	Origin	Special Status
Trees				
Acer negundo	Boxelder	FACW	Native	None
Calocedrus decurrens	Incense cedar	No indicator	Native	None
Cupressus sp.	Cypress tree	No indicator	Introduced	None
Fraxinus latifolia	Oregon ash	FACW	Native	None
Juglans hindsii	Northern california black walnut	FAC	Native	None
Morus alba	Mulberry	FACU	Introduced	None
Platanus racemosa	California sycamore	FAC	Native	None
Populus fremontii	Fremont cottonwood	FAC	Native	None
Prunus sp.	Prune tree	No indicator	Introduced	None
Quercus lobata	Valley oak	FACU	Native	None
Robinia pseudoacacia	Black locust	FACU	Introduced	None
Salix gooddingii	Gooding's willow	FACW	Native	None
Shrubs				
Baccharis pilularis	Coyote brush	No indicator	Native	None
Phoradendron leucarpum	American mistletoe	No indicator	Native	None
Rubus armeniacus	Himalayan blackberry	FAC	Introduced	None
Salix exigua	Narrowleaf willow	FACW	Native	None
Sambucus nigra subsp. *caerulea*	Blue elderberry	FACU	Native	None
Toxicodendron diversilobum	Poison oak	FACU	Native	None
Vitis californica	California wild grape	FACU	Native	None
Herbs				
Amsinckia menziesii	Fiddleneck	No indicator	Native	None
Anthemis cotula	Dog fennel	FACU	Introduced	None
Artemisia douglasiana	California mugwort	FAC	Native	None
Avena barbata	Slim oat	No indicator	Introduced	None
Calandrinia menziesii	Red maids	No indicator	Native	None
Capsella bursa-pastoris	Shepherd's purse	FACU	Introduced	None
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	No indicator	Introduced	None
Centaurea solstitialis	Yellow starthistle	No indicator	Introduced	None
Centromadia pungens subsp. *pungens*	Common tarweed	FAC	Native	None
Conium maculatum	Poison hemlock	FACW	Introduced	None
Convolvulus arvensis	Field bindweed	No indicator	Introduced	None
Croton setiger	Turkey-mullein	No indicator	Native	None
Epilobium brachycarpum	Willow herb	FAC	Native	None
Erigeron canadensis	Canada horseweed	FACU	Native	None

Scientific Name	Common Name	Wetland Indicator Status	Origin	Special Status
Erodium botrys	Big heron bill	FACU	Introduced	None
Erodium cicutarium	Coastal heron's bill	No indicator	Introduced	None
Erodium moschatum	Whitestem filaree	No indicator	Introduced	None
Euthamia occidentalis	Western goldenrod	FACW	Native	None
Galium aparine	Cleavers	FACU	Native	None
Geranium dissectum	Wild geranium	No indicator	Introduced	None
Hirschfeldia incana	Mustard	No indicator	Introduced	None
Kickxia elatine	Sharp point fluellin	UPL	Introduced	None
Lactuca serriola	Prickly lettuce	FACU	Introduced	None
Lamium amplexicaule	Henbit	No indicator	Introduced	None
Lupinus bicolor	Lupine	No indicator	Native	None
Lysimachia arvensis	Scarlet pimpernel	FAC	Introduced	None
Lythrum hyssopifolia	Hyssop loosestrife	OBL	Introduced	None
Malva nicaeensis	Bull mallow	No indicator	Introduced	None
Malvella leprosa	Alkali mallow	FACU	Native	None
Matricaria discoidea	Pineapple weed	FACU	Native	None
Medicago polymorpha	California burclover	FACU	Introduced	None
Melilotus officinalis	Yellow sweetclover	FACU	Introduced	None
Persicaria sp.	Smartweed			None
Phyla nodiflora	Common lippia	FACW	Native	None
Polygonum aviculare	Prostrate knotweed	FAC	Introduced	None
Pseudognaphalium luteoalbum	Jersey cudweed	FAC	Introduced	None
Ranunculus muricatus	Buttercup	FACW	Introduced	None
Raphanus sativus	Jointed charlock	No indicator	Introduced	None
Rumex conglomeratus	Green dock	FACW	Introduced	None
Rumex crispus	Curly dock	FAC	Introduced	None
Senecio vulgaris	Common groundsel	FACU	Introduced	None
Silybum marianum	Milk thistle	No indicator	Introduced	None
Spergularia rubra	Purple sand spurry	FAC	Introduced	None
Torilis arvensis	Field hedge parsley	No indicator	Introduced	None
Verbascum blattaria	Moth mullein	UPL	Introduced	None
Verbascum thapsus	Woolly mullein	FACU	Introduced	None
Veronica peregrina subsp. *xalapensis*	Speedwell	FAC	Native	None
Vicia americana	American vetch	FAC	Native	None
Vicia sativa	Spring vetch	FACU	Introduced	None
Vicia villosa	Hairy vetch	No indicator	Introduced	None
Xanthium strumarium	Cocklebur	FAC	Native	None
Grasses and Grass like				
Bromus diandrus	Ripgut brome	No indicator	Introduced	None
Bromus hordeaceus	Soft chess	FACU	Introduced	None

Scientific Name	Common Name	Wetland Indicator Status	Origin	Special Status
Bromus madritensis	Foxtail chess	UPL	Introduced	None
Cynodon dactylon	Bermuda grass	FACU	Introduced	None
Festuca perennis	Italian rye grass	FAC	Introduced	None
Hordeum brachyantherum	Meadow barley	FACW	Native	None
Hordeum marinum	Seaside barley	FAC	Introduced	None
Hordeum murinum	Foxtail barley	FACU	Introduced	None
Juncus bufonius	Common toad rush	FACW	Native	None
Phalaris minor	Mediterranean canarygrass	No indicator	Introduced	None
Poa annua	Annual blue grass	FAC	Introduced	None
Polypogon monspeliensis	Annual beard grass	FACW	Introduced	None

Appendix C

Species Lists

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Grimes (3912118) OR Colusa (3912221) OR Meridian (3912128) OR Sutter Buttes (3912127) OR Tisdale Weir (3912117) OR Kirkville (3812187) OR Dunnigan (3812188) OR Wildwood School (3812281) OR Arbuckle (3912211))
 AND Taxonomic Group IS (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Astragalus tener var. ferrisiae Ferris' milk-vetch	PDFAB0F8R3	None	None	G2T1	S1	1B.1
Atriplex cordulata var. cordulata heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
Atriplex depressa brittlescale	PDCHE042L0	None	None	G2	S2	1B.2
Atriplex persistens vernal pool smallscale	PDCHE042P0	None	None	G2	S2	1B.2
Chloropyron palmatum palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1	S1	1B.1
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T3	S3	1B.2
Lasthenia glabrata ssp. coulteri Coulter's goldfields	PDAST5L0A1	None	None	G4T2	S2	1B.1
Layia septentrionalis Colusa layia	PDAST5N0F0	None	None	G2	S2	1B.2
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G3	S2	1B.2
Trichocoronis wrightii var. wrightii Wright's trichocoronis	PDAST9F031	None	None	G4T3	S1	2B.1

Record Count: 12

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Grimes (3912118) OR Colusa (3912221) OR Meridian (3912128) OR Sutter Buttes (3912127) OR Tisdale Weir (3912117) OR Kirkville (3812187) OR Dunnigan (3812188) OR Wildwood School (3812281) OR Arbuckle (3912211))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
Ambystoma californiense pop. 1 California tiger salamander - central California DPS	AAAAA01181	Threatened	Threatened	G2G3T3	S3	WL
Antigone canadensis tabida greater sandhill crane	ABNMK01014	None	Threatened	G5T5	S2	FP
Antrozous pallidus pallid bat	AMACC10010	None	None	G4	S3	SSC
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G2	S1S2	
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	ABNJB05035	Delisted	None	G5T3	S3	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Charadrius montanus mountain plover	ABNNB03100	None	None	G3	S2S3	SSC
Cicindela hirticollis abrupta Sacramento Valley tiger beetle	IICOL02106	None	None	G5TH	SH	
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2T3	S3	
Dipodomys californicus eximius Marysville California kangaroo rat	AMAFD03071	None	None	G4T1	S1	SSC
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Gonidea angulata western ridged mussel	IMBIV19010	None	None	G3	S1S2	
Lasiurus blossevillii western red bat	AMACC05060	None	None	G4	S3	SSC
Lasiurus cinereus hoary bat	AMACC05030	None	None	G3G4	S4	
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G4	S3S4	
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Melospiza melodia pop. 1 song sparrow ("Modesto" population)	ABPBXA3013	None	None	G5T3?Q	S3?	SSC
Myotis ciliolabrum western small-footed myotis	AMACC01140	None	None	G5	S3	
Myotis yumanensis Yuma myotis	AMACC01020	None	None	G5	S4	
Oncorhynchus mykiss irideus pop. 11 steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Perognathus inornatus San Joaquin pocket mouse	AMAFD01060	None	None	G2G3	S2S3	
Plegadis chihi white-faced ibis	ABNGE02020	None	None	G5	S3S4	WL
Rana boylii foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Spea hammondii western spadefoot	AAABF02020	None	None	G2G3	S3	SSC
Spinus lawrencei Lawrence's goldfinch	ABPBY06100	None	None	G3G4	S4	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Thamnophis gigas giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	

Record Count: 35

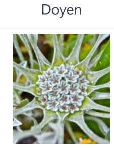
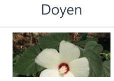
CNPS Rare Plant Inventory

CALIFORNIA NATIVE PLANT SOCIETY

Search Results

19 matches found. Click on scientific name for details

Search Criteria: 9-Quad include [**3912128:3912221:3912117:3812281:3912211:3912118:3912127:3812187:3812188**]

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	PHOTO
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	Fabaceae	annual herb	Apr-May	None	None	G2T1	S1	1B.1	No Photo Available
Atriplex cordulata var. *cordulata*	heartscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G3T2	S2	1B.2	 © 1994 Robert E. Preston, Ph.D.
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	 © 2009 Zoya Akulova
Atriplex persistens	vernal pool smallscale	Chenopodiaceae	annual herb	Jun-Oct	None	None	G2	S2	1B.2	No Photo Available
Centromadia parryi ssp. *rudis*	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	None	None	G3T3	S3	4.2	No Photo Available
Chloropyron palmatum	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	FE	CE	G1	S1	1B.1	No Photo Available
Cryptantha rostellata	red-stemmed cryptantha	Boraginaceae	annual herb	Apr-Jun	None	None	G4	S3	4.2	No Photo Available
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	No Photo Available
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	None	None	G3	S3	4.2	 © 2016 Aaron Schusteff
Hemizonia congesta ssp. *calyculata*	Mendocino tarplant	Asteraceae	annual herb	Jul-Nov	None	None	G5T4	S4	4.3	 © 2015 John Doyen
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	None	None	G3	S3	4.2	 © 2017 John Doyen
Hibiscus lasiocarpos	woolly rose-mallow	Malvaceae	perennial rhizomatous	Jun-Sep	None	None	G5T3	S3	1B.2	

var. occidentalis			herb (emergent)							 © 2020 Steven Perry
Lasthenia ferrisiae	Ferris' goldfields	Asteraceae	annual herb	Feb-May	None	None	G3	S3	4.2	 © 2009 Zoya Akulova
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	Feb-Jun	None	None	G4T2	S2	1B.1	 © 2013 Keir Morse
Lathyrus delnorticus	Del Norte pea	Fabaceae	perennial herb	Jun-Jul	None	None	G4	S3	4.3	 © 2016 Keir Morse
Layia septentrionalis	Colusa layia	Asteraceae	annual herb	Apr-May	None	None	G2	S2	1B.2	 © 2013 Jake Ruygt
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	None	None	G4T2	S2	1B.1	 © 2018 Barry Rice
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	None	None	G3	S2	1B.2	No Photo Available
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Asteraceae	annual herb	May-Sep	None	None	G4T3	S1	2B.1	No Photo Available

Showing 1 to 19 of 19 entries

Suggested Citation:
California Native Plant Society, Rare Plant Program. 2022. Rare Plant Inventory (online edition, v9-01 1.5). Website https://www.rareplants.cnps.org [accessed 29 March 2022].

CONTACT US

Send questions and comments to rareplants@cnps.org.

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Rincon Consultants, Inc.

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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

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: March 21, 2022
Project Code: 2022-0021979
Project Name: Grimes Levee Cut-Off Wall

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

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

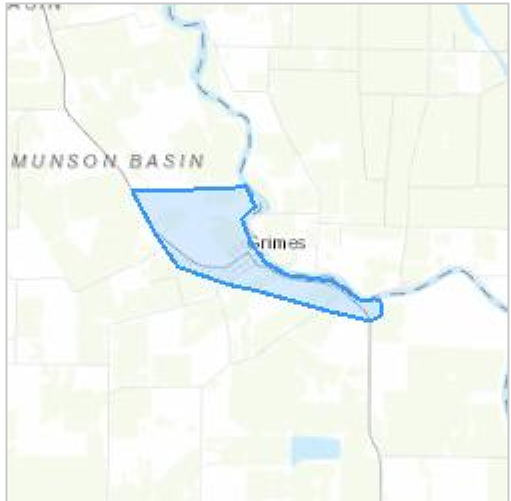
Project Code: 2022-0021979
Event Code: None
Project Name: Grimes Levee Cut-Off Wall
Project Type: Levee / Dike - Maintenance/Modification
Project Description: The proposed project includes the construction of a 3-foot wide, approximately 30-foot deep, and approximately 1.8 mile long slurry cutoff wall within the existing levee. A multi-benefit project objective includes restoring riparian habitat in an area adjacent to the levee by lowering the floodplain and enhancing habitat. The restored area would provide a more frequently wetted riverine habitat area for rearing salmonids, better support riparian vegetation, and expand shaded riverine aquatic habitat along the low-flow shoreline. The excavated material from the restoration work, if suitable, would be used to reconstruct the levee following installation of the slurry walls.

The proposed project includes repair of a waterside erosion site located between project stations 22+00 and 26+00. The approximately 400-foot long section is located along the right bank of the Sacramento River upstream of Grimes.

Project construction is anticipated to be completed within one construction season. Utility relocations would occur from January 1 to April 15 of the construction year, prior to construction activities, and any necessary tree-trimming, tree removal, and shrub removal would occur prior to January 31 of the construction year to limit disturbance of nesting birds. Major construction activities would be limited to a construction window between April 15 and November 1. Site cleanup, hydroseeding, and demobilization would occur after construction and is anticipated to be complete by November 30 of the construction year.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.07390995,-121.9006041521596,14z



Counties: Colusa County, California

Endangered Species Act Species

There is a total of 10 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
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. 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/3911	Threatened

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. The location of the critical habitat is not available. 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
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 ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency:	Colusa County
Name:	Rachel Gardiner
Address:	980 9th Street, Suite 1200
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State:	CA
Zip:	95814
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Lead Agency Contact Information

Lead Agency: Army Corps of Engineers

Appendix D
Special-Status Wildlife with Potential to Occur in the Vicinity of the Study Area and Species Accounts

Appendix D
Special-Status Wildlife with Potential to Occur in the Vicinity of the Study Area and Species Accounts

D.1 Special-Status Wildlife Table

To develop the special-status wildlife table, biologists used the results of the CNDDB search for the Project area and the area within 5 miles of the Project (California Department of Fish and Wildlife 2022a) and the IPaC species list (U.S. Fish and Wildlife Service 2022). The table also includes species that would be considered rare under CEQA based on being biologically rare, very restricted in distribution, or declining throughout their range, as determined by the scientific community (such as the Western Bat Working Group) and/or identified on the CDFW Special Animals List (California Department of Fish and Wildlife 2022b). The special-status wildlife table provides the status, range, habitat description, and likelihood of occurrence for the species identified as potentially present in the study area.

Table D-1.1. Special-Status Wildlife with Potential to Occur in the Vicinity of the Study Area

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
Vernal pool fairy shrimp	Branchinecta lynchi	T/–	Found in Central Valley and central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County. Common in vernal pools; also found in sandstone rock outcrop pools.	None. Vernal pools are not present in the study area. The seasonal wetland that was identified in the borrow area does not pool based on an analysis of aerial imagery and the borrow area undergoes regular agricultural disturbance, making it unsuitable for vernal pool fairy shrimp. No known occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Vernal pool tadpole shrimp	Lepidurus packardi	E/–	Shasta County, south to northwestern Tulare County, and the San Francisco Bay area. Vernal pools and other seasonal pools, ponded clay flats, roadside ditches, and stock ponds.	None. Vernal pools are not present in the study area. The seasonal wetland that was identified in the borrow area does not pool based on an analysis of aerial imagery and the borrow area undergoes regular agricultural disturbance, making it unsuitable for vernal pool tadpole shrimp. No known occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Valley elderberry longhorn beetle	Desmocerus californicus dimorphus	T/–	Central Valley from Tehama County south to Fresno County; most beetles have been	High. Suitable habitat (elderberry shrubs) present in the study area. Two occurrences within 5 miles of the study area (California

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			documented below 500 feet in elevation. Elderberry shrubs (Sambucus spp.) are the host plant and are found in riparian and non-riparian (valley oak and blue oak woodland and annual grassland) habitats.	Department of Fish and Wildlife 2022a).
Monarch butterfly	Danaus plexippus	C/–	Adults breed and migrate throughout California and overwinter along the California coast and in central Mexico. Open habitats including fields, meadows, weedy areas, marshes, and roadsides. Monarch butterflies roost in wind-protected tree groves (such as eucalyptus) with nectar and water sources nearby. Caterpillar host plants are native milkweeds.	Low to Moderate. Adults may migrate through study area but breeding habitat (milkweed) was not documented in the study area during surveys. Breeding has not been documented (Western Monarch Milkweed Mapper: https://www.monarchmilkweedmapper.org) and there are no known occurrences reported in the CNDDB within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Crotch bumble bee	Bombus crotchii	–/–	Pacific Coast, Western Desert, Great Valley, and adjacent foothills throughout most of southwestern California. Open grassland and scrub; nests underground. Food plants include members of the genera Asclepias, Chaenactis, Lupinus, Medicago, Phacelia, and Salvia.	Moderate. Suitable habitat in the ruderal grasslands in the study area; food plants Lupinus and Medicago documented in the study area. One occurrence within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
California tiger salamander	Ambystoma californiense	T/T	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County. Small ponds, lakes, or vernal pools in grasslands and oak woodlands for reproduction and larval development; rodent burrows, rock crevices, or fallen logs for cover for	None. The study area is outside of the species' known range. There are no known occurrences in Colusa County. No suitable aquatic or upland habitat is present in the study area.

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			adults and juveniles for summer dormancy.	
Western spadefoot	Spea hammondii	–/SSC	In winter, breeds in vernal pools and seasonal wetlands with a minimum 3-week inundation period. In summer, aestivates in grassland habitat, in soil crevices, and rodent burrows. Species is found throughout the Central Valley and coastal lowlands from Shasta County in Northern California to Baja California in Mexico, at elevations ranging from sea level to 4,500 feet.	None. No suitable habitat in the study area. records in the study area and there are no records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
California red-legged frog	Rana draytonii	T/SSC	Found along the coast and Coast Ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County; elevations from near sea level to about 4,900 feet. Permanent and semi-permanent aquatic habitats, such as slow-moving streams or creeks and cold-water ponds, with emergent and submergent vegetation (shrubby riparian). May aestivate in rodent burrows or cracks during dry periods.	None. The study area is outside of the species' known range. There are no records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). No suitable aquatic or upland habitat is present in the study area.
Foothill yellow-legged frog	Rana boylii	–/E, SSC	In most of Northern California west of Cascade crest and along western flank of Sierra south to Kern County. Isolated population in San Joaquin County. Absent from Monterey County and San Gabriel Mountains. Ranges up to approximately 6,000 feet. Inhabits moderate to high gradient streams in	None. No suitable habitat in the study area. records in the study area and there are no records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge; usually found near riffles with rocks and sunny banks nearby.	
Giant garter snake	Thamnophis gigas	T/T	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno and from Stanislaus County. Found at elevations from near sea level to 400 feet. Sloughs, canals, low gradient streams, and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields. Requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	Low to Moderate. Most ditches in the study area are earth-lined, primarily unvegetated, constructed channels used for irrigation or drainage of agricultural fields and roadside drainages along SR 45 and do not provide suitable aquatic habitat. One irrigation ditch at the west end of the offsite borrow area held water in April 2022 and part of this feature supported cattail (Typha sp.), which could provide some cover to giant garter snake. Land cover within 200 feet of the ditches in the study area are subject to regular disturbance and are not considered to provide suitable overwintering habitat for the species. There is a potential for snakes to disperse through the study area. No burrows or California ground squirrels observed along the existing levee or within 200 feet of ditches. Five records for occurrences within 5 miles of the study area, with one of the occurrences overlapping the study area, but located on the east side of the Sacramento River (California Department of Fish and Wildlife 2022a).
Western pond turtle	Actinemys marmorata	–/SSC	Forages in ponds, marshes, slow-moving streams, sloughs, and irrigation/drainage ditches; nests in nearby uplands with low, sparse vegetation. Species is found from the Pacific Coast inland to the Sierra Nevada foothills to	Moderate. Suitable aquatic and upland habitats are present in the study area. There are no CNDDB occurrences reported within 5 miles of the study area (California Department of Fish and Wildlife 2022a).

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			elevations as high as 6,700 ft above sea level.	
Northern harrier	Circus hudsonius	–/SSC	Occurs throughout lowland California. Recorded in fall at high elevations ranging from near sea level to at least 9,000 feet in Mono County; largely within coastal lowlands from Lake Earl in Del Norte County to Bodega Head in Sonoma County, but also inland at Lake Berryessa in Napa County. Grasslands, meadows, marshes, and seasonal and agricultural wetlands/fields; prefers open habitats with adequate vegetative cover.	Moderate. Suitable nesting and foraging habitats are present in the study area. There are no CNDDB occurrences reported within 5 miles of the study area (California Department of Fish and Wildlife 2022a), but there are eBird observations of northern harrier in the vicinity of the study area (Cornell Lab of Ornithology 2022a).
Swainson's hawk	Buteo swainsoni	–/E	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County. Requires large, open grasslands with suitable nest trees; nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, lightly grazed pastures, irrigated pastures, and grain fields.	High. Suitable nesting and foraging habitats are present in the study area. Numerous records for nest sites along the Sacramento River and within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
White-tailed kite	Elanus leucurus	–/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills, to western San Diego County at the Mexico border. Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands or cropland for foraging.	High. Suitable nesting and foraging habitats are present in the study area. There are no records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
Western yellow-billed cuckoo	Coccyzus americanus occidentalis	T/E	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers. Requires wide, dense riparian forests or woodlands with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley oak riparian habitats where scrub jays are abundant; utilizes orchards adjacent to streams.	Moderate. Riparian vegetation in the study area is limited to migratory habitat because the vegetation patches are not large enough or wide enough to support breeding cuckoos. There is a patch of potential breeding habitat on the east side of the Sacramento River across from the proposed floodplain restoration area. No records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Greater sandhill crane	Antigone canadensis tabida	–/T, FP	The winter range includes the Central Valley and Delta, Carrizo Plain, Southern California south of the Salton Sea, and Colorado River. The breeding range of the Central Valley Population of greater sandhill crane extends into northeastern California. The greater sandhill crane forages primarily in croplands with waste grain, such as corn, alfalfa fields and pastures, and in rice where available. Roosting habitat consists of wetlands or flooded croplands.	Low to Moderate. One historic CNDDB record (1924) for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Winter wheat planted outside of the study area could provide foraging habitat for the species but because the species is highly sensitive to disturbance, noise and visual disturbance of the farm vehicles and equipment in and adjacent to the study area would likely cause the birds to avoid the area. Several observations recorded within 5 miles of the study area in eBird within the last few years (Cornell Lab of Ornithology 2022).
Great blue heron	Ardea herodias	–/– (nesting colony)	Year-round range spans most of California except the eastern portion of the state and the highest elevations; winter range expands to include eastern California. Nests colonially in tall trees that often include nesting with other species. Forages in freshwater and saline marshes, shallow open water, and occasionally	High. Suitable nesting habitat in the study area. No CNDDB occurrences recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a); several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2022).

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			cropland or low, open upland habitats, such as pastures.	
Great egret	Ardea alba	–/– (nesting colony)	Year-round range spans the Central Valley, central coast, and portions of Southern California. Winter range expands to include the remainder of the coast. Typically nests in rookeries that often include nesting with other species. Forages in freshwater and saline marshes, shallow open water, and occasionally cropland or low, open upland habitats, such as pastures.	High. Suitable nesting habitat in the study area. No CNDDB occurrences recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a); several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2022).
White-faced ibis	Plegadis chihi	–/–	Year-round resident in scattered locations in the Central Valley and southern California; also nests in northeastern California. Forages in wetlands and irrigated or flooded croplands and pastures; breeds colonially in dense freshwater marsh.	Low to Moderate—suitable foraging habitat adjacent to the study area; no CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). No suitable breeding habitat in the study area.
Burrowing owl	Athene cunicularia	–/SSC	Lowlands throughout south, central, and east California, including the Central Valley, northeastern plateau, southeastern deserts, and some coastal areas; rare along the south coast. Level, open, dry, heavily grazed or low-stature grassland, or desert vegetation with available burrows; also found in coastal terrace prairies and sagebrush habitats.	Low to Moderate. Suitable nesting and foraging habitats are present in the study area. However, no burrows or California ground squirrels were observed in the study area. There are no records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Bank swallow	Riparia riparia	–/T	Occurs along the Sacramento River from Tehama County to Sacramento County; along the Feather and lower American Rivers; in the	Low. No suitable habitat in the study area. Numerous records for occurrences along the Sacramento River upstream and downstream of the study area (California

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			Owens Valley in Inyo and Mono Counties; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties. Small populations near the coast from San Francisco County to Monterey County. Altitudinal range extends from sea level to approximately 7,000 feet. Breeds primarily in lowland areas along ocean coasts, rivers, streams, lakes, reservoirs, and wetlands. Nests in vertical banks, cliffs, and bluffs in alluvial, friable soils. Also nests in artificial sites such as sand and gravel quarries and road cuts. Foraging habitats surrounding nesting colony include wetlands, open water, grasslands, riparian woodlands, agricultural areas, shrublands, and occasionally upland woodlands.	Department of Fish and Wildlife 2022a).
Tricolored blackbird	Agelaius tricolor	–/T	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties. Most extensively concentrated in and around the Delta and coastal areas, including Monterey and Marin Counties. Nests in dense colonies in emergent marsh vegetation, such as tules	Low. Limited suitable nesting habitat present in the study area. Foraging habitat present outside of the the study area in adjacent agricultural fields. Two historic (1935) occurrences have been recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a).

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; requires water at or near the nesting colony; colonies found in silage and grain fields near dairies in the San Joaquin Valley; winters in grasslands and agricultural fields with low-growing vegetation.	
Loggerhead shrike	Lanius ludovicianus	–/SSC	Occurs year-round throughout California, except for the northwest, heavily forested higher mountains, and higher areas of deserts. Breeding range spans much of lowland California, and winter range includes most lowland areas south of Glenn County. Nests in isolated shrubs and trees and woodland/scrub edges of open habitats; forages in grasslands, agricultural fields, and low scrub habitats.	High. Suitable nesting habitat in the study area. No CNDDB occurrences recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a); several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2022).
Yellow warbler	Setophaga petechia brewsteri	–/SSC	Breeds throughout California except the Central Valley, the Mojave Desert region, and high altitudes in the Sierra Nevada; winters along the Colorado River and in parts of Imperial and Riverside Counties. Nests in riparian areas with willows, cottonwoods, Oregon ash, or alders; also nests in montane shrubs in open ponderosa pine and mixed conifer forest, and in montane chaparral.	Low to Moderate. Suitable nesting habitat in the study area. No CNDDB occurrences recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a); several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2022).

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
Song sparrow (Modesto population)	Melospiza melodia mailliardi	–/SSC	Resides in the north-central portion of the Central Valley, with the highest densities in the Butte Sink area of the Sacramento Valley and in the Sacramento–San Joaquin River Delta Associated with freshwater marshes dominated by tules and cattails and riparian willow thickets. Also nests in riparian forests with blackberry understory and along vegetated irrigation canals and levees.	High. Suitable nesting habitat in the study area. Several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2022).
Mountain plover	Charadrius montanus	–/SSC	Does not breed in California. Winter range spans the western Central Valley, including areas of the Delta east of Suisun Marsh, and portions of southern California. Forages in short grasslands and plowed agricultural fields where vegetation is sparse and trees are absent.	Low to Moderate—suitable winter foraging habitat in and adjacent to the study area. No CNDDB occurrences recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Pallid bat	Antrozous pallidus	–/SSC	Occurs throughout California; associated with deserts, grasslands, shrublands, woodlands, and forests. Most common at elevations below 6,000 feet, although it has been observed at higher elevations. Occurs in open, dry habitats and is a year-round resident through most of the range; roosts in crevices in rocky outcrops and cliffs, caves, mines, trees, and various human-made structures; tends to day roost and night roost in alternate structures.	Moderate to high. Could roost in trees in the study area; most of study area provides suitable foraging habitat. No recorded CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Western red bat	Lasiurus blossevillii	–/SSC	Occurs throughout most of California; associated with forests and woodlands and	Moderate to high. Could roost in trees in the study area; most of study area provides suitable

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			appears to prefer open habitats or habitat mosaics. Roosts in tree foliage and prefers roost sites that are protected from above and open below and may choose roost sites based on higher foliage density. Associated with intact riparian habitat (particularly willows, cottonwoods, and sycamores) but also has been found in orchard trees.	foraging habitat. No recorded CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Hoary bat	Lasiurus cinereus	–/–	Occurs throughout California. Associated with woodlands and forests, thought to prefer open habitats or habitat mosaics, with access to trees for roosting and open areas or habitat edges for foraging. Roosts primarily in the foliage of medium to large deciduous or coniferous trees.	Moderate to high. Could roost in trees in the study area; most of study area provides suitable foraging habitat. No recorded CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Western small-footed myotis	Myotis ciliolabrum	–/–	Occurs in coastal California from Contra Costa County south to the Mexico border, the west and east side of the Sierra Nevada, and in Great Basin and desert habitats from Modoc to Kern and San Bernardino Counties. Particularly associated with coniferous forests and rocky xeric habitats. Typically roosts in rock crevices in mines, caves and occasionally in buildings, bridges and other human structures. Forages over a variety of habitats.	Moderate to high. Could roost in trees in the study area; most of study area provides suitable foraging habitat. No recorded CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Yuma myotis	Myoits yumanensis	–/–	Common and widespread throughout California from sea level to 11,000 feet excluding the Mojave and	Moderate to high. Could roost in trees in the study area; most of study area provides suitable foraging habitat. No recorded

Common Name	Scientific Name	Status Federal/State	Range and General Habitat Description	Potential for Occurrence
			Colorado Desert regions. Strongly associated with water sources. Roosts in a variety of structures including bridges, buildings, caves, mines, trees and rock crevices. Has been known to roost in cliff swallow nests. Typically forages low over water.	CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a).
Marysville kangaroo rat	Dipodomys californicus eximius	–/SSC	Range limited to a small area within Marysville, CA.	None. Study area outside of the species range.

Table Sources: California Department of Fish and Wildlife 2022b, U.S. Fish and Wildlife Service 2022, Cornell Lab of Ornithology 2022.
Status Explanations:
Federal:
– = not listed under the federal Endangered Species Act
E = listed as endangered under the federal Endangered Species Act
T = listed as threatened under the federal Endangered Species Act
C = candidate for listing under the federal Endangered Species Act
State:
– = not listed under the California Endangered Species Act
E = listed as endangered under the California Endangered Species Act
T = listed as threatened under the California Endangered Species Act
CE = candidate for listing as endangered under the California Endangered Species Act
FP = California fully protected species
SSC = California species of special concern

D.2 Wildlife Species Accounts

This section provides information about special-status wildlife species identified as having moderate to high potential to occur in the study area.

D.2.1 Valley Elderberry Longhorn Beetle

D.2.1.1 Status and Distribution

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is federally listed as threatened. The current range of valley elderberry longhorn beetle consists of the Central Valley from approximately Shasta County south to to Fresno County. It includes the valley floor and lower foothills, with most beetle observations recorded at elevations below 500 feet (U.S. Fish and Wildlife Service 2017a).

D.2.1.2 Habitat Requirements and Biology

Valley elderberry longhorn beetle is found only in association with its host plant, elderberry (*Sambucus* spp.), which is commonly present in riparian forests and adjacent grasslands in the Central Valley (Barr 1991:4–5). Elderberry shrubs can also be present in non-riparian valley oak (*Quercus lobata*) and blue oak woodland habitats (U.S. Fish and Wildlife Service 2017a:5). Adult valley elderberry longhorn beetles feed on elderberry foliage and are present from March through early June, during which time the adults mate and lay eggs (U.S. Fish and Wildlife Service 2006a:5). Females lay their eggs in bark crevices or at the junction of stem and trunk or leaf petiole and stem (Barr 1991:4). After hatching, the larva burrows into the stem where it develops for 1–2 years and feeds on the pith in the center of the stem (Talley et al. 2007:1480). Before pupation, the larva creates an exit hole, plugs the hole with wood shavings, and returns to the pith to pupate.

After transforming into an adult, valley elderberry longhorn beetle emerges through the previously created exit hole (U.S. Fish and Wildlife Service 2017a:4). Exit holes are 0.3–0.4 inch wide (Barr 1991:5). Adult emergence, mating, and egg laying takes place in the spring and summer (March to July) (U.S. Fish and Wildlife Service 2017a:4). Adults feed on elderberry leaves and flowers (Talley et al. 2007:1480). Valley elderberry longhorn beetle abundance is associated with higher levels of nitrogen available in the pith of stressed elderberries (Talley et al. 2007:1480).

D.2.1.3 Occurrence in and Near the Study Area

There are two records for occurrences of valley elderberry longhorn beetle within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable habitat for this species in the study area consists of elderberry shrubs (Figure 3.5-1).

D.2.2 Monarch Butterfly

D.2.2.1 Status and Distribution

Monarch butterfly (*Danaus plexippus*) is a candidate for listing under the Endangered Species Act. The number of overwintering monarchs in California is believed to have declined as much as 74% since the late 1990s (Western Association of Wildlife Agencies 2019:2). The geographic range for monarch butterfly in California is throughout the state and includes spring and summer breeding areas and overwintering areas; the overwintering areas are almost entirely along the coast. Coastal California is considered critical for overwintering populations, and the Central Valley is considered a critical breeding area for this species (Western Association of Wildlife Agencies 2019:34).

D.2.2.2 Habitat Requirements and Biology

Generally, the migratory and breeding habitat for this species consists of all areas with the required habitat, including milkweeds (*Asclepias* spp.), nectar sources, and roosting structures. Overwintering habitat consists of groves of trees that produce the necessary microclimate for survival. Most overwintering sites in California are within 1.5 miles of the Pacific Ocean or San Francisco Bay (Western Association of Wildlife Agencies 2019:8).

Monarch butterfly requires milkweed for breeding, as it lays eggs on the milkweed plant, and milkweed is an obligate species for the monarch caterpillar (Western Association of Wildlife Agencies 2019:8, U.S. Fish and Wildlife Service 2020:8). There are multiple native and nonnative milkweed species in that grow in California (Calflora 2021).

Monarch butterfly requires nectar-producing plants for foraging and roosting sites (particularly during fall migration) (Western Association of Wildlife Agencies 2019:8; U.S. Fish and Wildlife Service 2020:9–10). Native and nonnative deciduous and evergreen trees, and narrow-leaved trees such as willows (*Salix* spp.), Russian olive (*Elaeagnus angustifolia*), locusts (*Robinia* spp.), pines (*Pinus* spp.), and eucalyptus (*Eucalyptus* spp.) are used as roosting sites (U.S. Fish and Wildlife Service 2019).

Monarch butterfly goes through four life stages, including egg, larva (caterpillar), pupa (chrysalis), and adult, which are typically completed within a month during the breeding and migration season. During the spring and summer up to seven cycles of mating and breeding are completed as the butterflies migrate, then they typically reach overwintering areas in September or October. Most overwintering individuals are in reproductive diapause, and these individuals may live up to 9 months, but in some warmer areas such as southern coastal California, overwintering may not be needed (Western Association of Wildlife Agencies 2019:6).

D.2.2.3 Occurrence in the Study Area

There are no recorded CNDDB occurrences of monarch butterfly within 5 miles of the study area (California Department of Fish and Wildlife 2022a), but this species is considered present in most of California. Potentially suitable monarch butterfly habitat consists of ruderal annual grassland, oak woodland, landscaped, willow riparian scrub, and riparian forest land cover types.

D.2.3 Crotch Bumble Bee

D.2.3.1 Status and Distribution

Although not federally or state listed, The Xerces Society considers Crotch bumble bee (*Bombus crotchii*) endangered with extinction throughout their ranges. Recent studies have shown that the species has experienced significant reductions in both its range and relative abundance and are far less common than they were historically in areas where the species persist (The Xerces Society 2018:5). Crotch bumble bee now appears to be absent from much of its historical range in the southern two-thirds of California, including the Central Valley (The Xerces Society for Invertebrate Conservation 2018:17, 32–35, 43; Hatfield et al. 2015a).

D.2.3.2 Habitat Requirements and Biology

Crotch bumble bee forages and nests in open grasslands and scrub habitats in California (The Xerces Society for Invertebrate Conservation 2018:32). Crotch bumble bee is a generalist forager that feeds on a variety of widely distributed plant genera including *Antirrhinum*, *Asclepias*, *Phacelia*, *Chaenactis*, *Clarkia*, *Dendromecon*, *Eriogonum*, *Eschscholzia*, *Lupinus*, *Medicago*, and *Salvia* (Koch et al. 2012:82, Williams et al. 2014:132).

Bumble bee queens emerge from hibernation in the early spring and start foraging for pollen and nectar (The Xerces Society for Invertebrate Conservation 2018:30). The flight period for Crotch bumble bee queens in California is from late February to late October, peaking in early April, with a second pulse in July. The flight period for workers and males in California is from late March through September (The Xerces Society for Invertebrate Conservation 2018:33).

Crotch bumble bees are known to nest underground (The Xerces Society for Invertebrate Conservation 2018:32). Information is lacking for overwintering habitats of most bumble bee species, but generally bumble bees are thought to overwinter in soft, disturbed soil or under leaf litter or other debris (The Xerces Society for Invertebrate Conservation 2018:33,34).

D.2.3.3 Occurrence in the Study Area

There is one occurrence for Crotch bumble bee within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable Crotch bumble bee habitat consists of ruderal annual grassland.

D.2.4 Giant garter snake

D.2.4.1 Status and Distribution

Giant garter snake (*Thamnophis gigas*) is federally listed as threatened and state listed as threatened. Giant garter snake is endemic to the Sacramento and San Joaquin Valleys, where it is found in lowland areas (U.S. Fish and Wildlife Service 2015a:I-8). Historically, this species was found throughout the Central Valley from Butte County in the north to Kern County in the south. Giant garter snake is presently known to occur only in nine discrete populations in Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Kings, Madera, Merced, Placer, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Tulare, Yolo, and Yuba Counties (U.S. Fish and Wildlife Service 2015a:9, 11–12).

D.2.4.2 Habitat Requirements and Biology

Giant garter snake inhabits 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 (U.S. Fish and Wildlife Service 2006b:3).

Suitable giant garter snake aquatic habitat consists of slow-moving or static water that is present from March through November with a mud substrate and the presence of prey (amphibians or fish) (U.S. Fish and Wildlife Service 2017b:I-3). Emergent and bankside vegetation that provides cover from predators and for thermoregulation are also required. Other components of suitable aquatic habitat are basking sites with supportive vegetation (such as folded tule [*Schoenoplectus* spp.] clumps) adjacent to escape cover, upland refugia in locations that are not subject to recurrent flooding, and the absence of a continuous riparian canopy and large predatory fish (U.S. Fish and Wildlife Service 2017b:I-3).

Characteristics of suitable upland habitat are available bankside vegetation, such as cattail or tule; shelter that is more permanent in nature, such as bankside cracks and crevices, holes, or small mammal burrows; and banksides that are not subjected to overgrazing (U.S. Fish and Wildlife Service 2017b:I-3). Riparian woodland is generally considered unsuitable habitat because of the lack of basking sites, presence of excessive shade, and lack of prey (U.S. Fish and Wildlife Service 1999:22).

Small mammal burrows and other areas of cover above the flooding zone, such as riprap, are used for overwintering (generally October 1 through April 1). Overwintering snakes have been documented in burrows as far as 656 to 820 feet from the edge of summer aquatic habitat (U.S. Fish and Wildlife Service 2017b:I-3, I-5, I-6). Results of a U.S. Geological Survey (USGS) study indicate that giant garter snakes utilize burrows in upland areas during their active period more than previously assumed (Halstead et al. 2015). The USGS study found that at least one-half of giant garter snake activity during the active season occurs in terrestrial environments, although primarily within 33 feet of wetlands (Halstead et al. 2015). Nearly all (i.e., 90%) of the snakes were females that were in burrows within 66 feet of water during the active season (Halstead et al. 2015).

The breeding season extends from March through May. Females give birth to live young from summer to early fall. Giant garter snake feeds primarily on small fish and amphibians (U.S. Fish and Wildlife Service 2017b:I-5, I-6).

D.2.4.3 Occurrence in the Study Area

There are five records for occurrences of giant garter snake within 5 miles of the study area (California Department of Fish and Wildlife 2022a). One of these occurrences is within the study area, but it is located on the east side of the Sacramento River (California Department of Fish and Wildlife 2022a). Potentially suitable aquatic habitat for giant garter snake in the study area consists of one irrigation ditch at the west end of the offsite borrow area which held water in April 2022. Part of this feature supported cattail (Typha sp.), which could provide some cover to giant garter snake. Other ditches in the study area are earth-lined, primarily unvegetated, constructed channels used for irrigation or drainage of agricultural fields and roadside drainages along SR 45 and do not provide suitable aquatic habitat for the species. For the irrigation ditches at the north end of the study area adjacent to the existing levee, the water comes from a groundwater well and therefore it is only connected to irrigation ditches in the immediate vicinity. There is no connectivity to the larger district-wide network of irrigation canals and other waterways. For the irrigation ditches along SR 45, there is the potential for connectivity with downstream areas, however the distance is substantial, the local conditions are not suitable, the irrigation patterns do not produce a full canal throughout the irrigation season, and the flows move away from the site and not toward it based on topography. Land cover within 200 feet of the two irrigation ditches consists of ruderal residential areas, gravel and earthen farm roads, recently tilled fields prepared for planting, newly planted orchards, and the existing levee embankment and road. All of these land cover types are subject to regular disturbance and are not considered to provide suitable overwintering habitat for the species. No burrows or California ground squirrels observed along the existing levee or within 200 feet of ditches during the reconnaissance site visits on March 24th, 2021 or March 31, 2022.

D.2.5 Western Pond Turtle

D.2.5.1 Status and Distribution

Western pond turtle (*Actinemys marmorata*) is a California species of special concern (California Department of Fish and Wildlife 2021b). In California, the species' range is discontinuously distributed through the state west of the Cascade–Sierra Nevada crest (Jennings and Hayes 1994:99).

D.2.5.2 Habitat Requirements and Biology

Aquatic habitats used by western pond turtle include ponds, lakes, marshes, rivers, streams, and irrigation ditches with a muddy or rocky bottom in grassland, woodland, and open forest areas (Stebbins 2003:250). Western pond turtle spends a relatively large amount of time basking on rocks, logs, emergent vegetation, mud or sand banks, or human-generated debris (Jennings et al. 1992:11). Western pond turtles move to upland areas adjacent to watercourses to deposit eggs and overwinter (Jennings and Hayes 1994:98). The distance between the nest site and to aquatic habitat depends on the availability of suitable nesting habitat adjacent to the occupied aquatic habitat (Jennings and Hayes 1994:101). Females usually select nest sites within 328 feet of aquatic habitat, although nests have been found 1,640 feet from a water body (Thomson et al. 2016:299). Lovich and Meyer (2002:540) reported nesting sites up to 1,919 feet from aquatic habitats, and Holland (1994:2-10) reported nesting sites up to 1,312 feet away from aquatic habitats. Nests may be much farther than typical nesting sites in flatter areas where appropriate soil moisture gradients and soil types extend further from the aquatic habitat (Jennings and Hayes 1994:101).

In the southern portion of the range and along the central coast, western pond turtle is active year-round. In the remainder of its range, western pond turtle typically becomes active in March and returns to overwintering sites by October or November (Jennings et al. 1992:11).

D.2.5.3 Occurrence in the Study Area

There are no recorded western pond turtle occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable western pond turtle aquatic habitat in the study area consists of the perennial stream land cover type. Potentially suitable western pond turtle upland habitat consists of annual grassland, oak woodland, forested riparian, and willow riparian scrub that is within 1,640 feet of suitable aquatic habitat.

D.2.6 Northern Harrier

D.2.6.1 Status and Distribution

Northern harrier (*Circus hudsonius*) is a California species of special concern (California Department of Fish and Wildlife 2021b). Northern harrier occurs throughout lowland California, including the Central Valley, coastal areas, and the northeastern corner of the state. The species is present year-round within its breeding range in California and at least portions of breeding populations may be resident. Northern harrier is more wide-ranging and in much greater numbers in California during migration and winter than during the breeding season (Shuford and Gardali 2008:149–150).

D.2.6.2 Habitat Requirements and Biology

Suitable habitat for northern harrier consists of open wetlands (e.g., marshy meadows, lightly grazed pastures, old fields, freshwater and brackish marshes, and tundra) and dry uplands (e.g., upland prairies, mesic grasslands, drained marshlands, croplands, and cold desert shrub-steppe). Populations breed predominantly in dry habitats in the United States and the densest populations are typically associated with large tracts of undisturbed habitats with thick ground vegetation. Northern harrier constructs nests on the ground in treeless but vegetated habitats (e.g., drained and nondrained wetlands, dry uplands). Nests are frequently built within patches of dense, often tall, vegetation in undisturbed areas and are often adjacent to stock ponds, creeks, and other wet areas. (Smith et al. 2020).

Northern harrier nests from April to September, with peak activity in June and July. Females have one brood per season, with clutches averaging five eggs, but ranging from three to 12 eggs (Zeiner et al. 1990a:124). The incubation period ranges from 28 to 36 days, and the nestlings fledge in approximately 14 days (Cornell Lab of Ornithology 2019).

Northern harriers forage over open habitats such as prairies, shrub-steppe uplands, and marshes. Northern harriers tend to forage over idle and abandoned (often wet) fields with vegetative cover more often than areas with short vegetation (e.g., heavily grazed pastures, harvested fields) (Smith et al. 2020). Northern harrier feeds on a broad variety of small- to medium-sized vertebrates, primarily rodents and passerines, which can be in a variety of natural and managed areas. Wet habitats, including irrigated agriculture, tend to support large numbers of voles, which is a key prey species for northern harrier in California (Shuford and Gardali 2008:152).

D.2.6.3 Occurrence in the Study Area

There are no CNDDB records for occurrences of northern harrier within 5 miles of the study area (California Department of Fish and Wildlife 2022a), but there have been numerous observations of this species within the last several years by individuals recorded in eBird within the study area (Cornell Lab of Ornithology 2022). Potentially suitable northern harrier habitat in the study area consists of consists of ruderal annual grassland, disturbed, and agricultural row crop land cover types.

D.2.7 Swainson's Hawk

D.2.7.1 Status and Distribution

Swainson's hawk (*Buteo swainsoni*) is state listed as threatened. The breeding range for Swainson's hawk in California consists of the extreme northeast portion of the state, the Sacramento and San Joaquin Valleys, valleys of the Sierra Nevada Range in Inyo and Mono Counties, and occasionally elsewhere in the state (Bechard et al. 2020). Swainson's hawks primarily winter in South America but some individuals winter in the Delta (Bechard et al. 2020).

D.2.7.2 Habitat Requirements and Biology

Swainson's hawks arrive in the Central Valley in March or April to establish nesting territories and breed (California Department of Fish and Wildlife 2016:5). They usually nest in large, mature trees. Most nest sites (87%) in the Central Valley are found in riparian habitats (Estep 1989:35), primarily because trees are more available there. Swainson's hawk also nests in mature roadside trees and in isolated trees in agricultural fields or pastures. The breeding season is from March through August (Estep 1989:12, 35). Nest sites are generally adjacent to, or within flying distance of, suitable foraging habitat and near large tracts of agricultural lands (California Department of Fish and Wildlife 2016:8).

Swainson's hawk forages in grasslands, grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Vineyards, orchards, rice, and cotton crops are generally unsuitable for foraging because of the density of the vegetation (California Department of Fish and Game 1992:41). Important land cover types for foraging are alfalfa and other irrigated hay crops, grain and row crops, fallow fields, dryland pasture, grassy ruderal lots, and annual grasslands (Swolgaard et al. 2008:192, 194; California Department of Fish and Wildlife 2016:7). In California, voles make up a large portion of Swainson's hawk's diet, but it will also eat ground squirrels, pocket gophers, and deer mice (*Peromyscus* spp.) (Bechard et al. 2020).

D.2.7.3 Occurrence in and Near the Study Area

There are numerous records for Swainson's hawk nest sites along the Sacramento River and within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable nesting habitat in the study area consists of oak woodland, riparian forest, and landscaped land cover types. Foraging habitat for Swainson's hawk in the study area consists of ruderal annual grassland, agricultural row crops, and fallow land cover types.

D.2.8 White-tailed Kite

D.2.8.1 Status and Distribution

White-tailed kite (*Elanus leucurus*) is fully protected under the California Fish and Game Code. In California, white-tailed kite occurs in coastal and valley lowlands (California Department of Fish and Game 2005a).

D.2.8.2 Habitat Requirements and Biology

White-tailed kite nests in trees or shrubs in open grassland, agricultural, wetland, oak woodland, and savanna habitats (Dunk 2020). Habitat elements that influence nest site selection and nesting distribution include habitat structure (usually trees with a dense canopy) and prey abundance and availability (primarily the association with California vole), while the association with specific vegetation types (e.g., riparian, oak woodland, etc.) appears less important (Erichsen et al. 1996:165, 173; Dunk 2020). White-tailed kite nests have been documented in a variety of tree species, including oak, Fremont's cottonwood (*Populus fremontii*), willow, eucalyptus, box elder (*Acer negundo*), coast redwood (*Sequoia sempervirens*), ornamental trees including olive (*Olea* sp.) and pine (*Pinus* sp.), and in shrubs less than 10 feet tall (e.g., *Atriplex* sp. and *Baccharis* sp.) (Dixon et al. 1957:159; Erichsen et al. 1996:172; Dunk 2020). Nest trees appear to be selected based on structure and security, and thus typically have a dense canopy or are in a dense group of trees or large stands (more than 250 acres). White-tailed kites also nest in single isolated trees and, in the non-breeding season, communally roost in small stands of trees (Dunk 2020). The breeding season lasts from February through October and peaks between May and August (California Department of Fish and Game 2005a).

White-tailed kites prefer grasslands, low shrubs, open woodlands, and cultivated areas for foraging (Dunk 2020). The foraging success of white-tailed kite is directly proportional to the abundance and composition of prey species (Erichsen et al. 1996:173), with rodents being the main prey type (Dunk 2020; Mendelsohn and Jaksic 1989:8). Preferred foraging habitats are ungrazed grasslands, open woodlands, low shrubs, wetlands dominated by grasses, and fence rows and irrigation ditches with residual vegetation adjacent to grazed lands (Mendelsohn and Jaksic 1989:2, 8; Dunk 2020). In cultivated areas, alfalfa and sugar beet fields are preferred, as well as rice stubble fields in the spring (Erichsen et al. 1994:46; Erichsen et al. 1996:170).

D.2.8.3 Occurrence in and Near the Study Area

There are no recorded occurrences of white-tailed kite within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable nesting habitat in the study area consists of oak woodland, riparian forest, and landscaped land cover types. Foraging habitat for white-tailed kite in the study area consists of ruderal annual grassland, agricultural row crops, and fallow land cover types.

D.2.9 Western Yellow-Billed Cuckoo

D.2.9.1 Status and Distribution

The western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is federally listed as threatened (79 FR 59992) and state listed as endangered (California Department of Fish and Wildlife 2021b). The breeding range of western yellow-billed cuckoo in California consists of isolated locations along the South Fork Kern River, lower Colorado River, and Sacramento River (Hughes 2015).

D.2.9.2 Habitat Requirements and Biology

Breeding western yellow-billed cuckoos are riparian obligates and nest almost exclusively in riparian woodland with native broadleaf trees and shrubs (Halterman et al. 2015:3). Suitable habitat has a tree or large-shrub component with a variable overstory canopy and an understory component (U.S. Fish and Wildlife Service 2019a:5, 6). The overstory of the riparian habitat typically includes cottonwood and willow trees (U.S. Fish and Wildlife Service 2019b:6). Nest sites are often in dense foliage, and nests are primarily in willow, Fremont's cottonwood, and mesquite (*Prosopis* sp.). Along the Sacramento River, nests have rarely been found in prune (*Prunus* sp.), English walnut (*Juglans regia*), and almond (*Prunus dulcis*) orchards (Laymon 1998:4). Cottonwoods are used extensively for foraging and are an important component of foraging habitat (78 FR 61634).

Western yellow-billed cuckoo requires large blocks of riparian habitat for breeding (78 FR 61633). Patch size was found to be the most important habitat variable to predict presence of western yellow-billed cuckoo on the Sacramento River (Girvetz and Greco 2009). Large patch sizes (50 to 100 acres, with a minimum width of 328 feet) are typically required for cuckoo occupancy (Riparian Habitat Joint Venture 2004).

Western populations of yellow-billed cuckoos form pairs in mid-June or later and breed from June to August, with a peak in mid-July to early August (Hughes 2015). Breeding is restricted to the middle of summer, presumably because of a seasonal peak in large insect abundance (Rosenberg et al. 1982). To accommodate this, development of young is very rapid with a breeding cycle of 17 days from egg-laying to fledging of young (Hughes 2015). Western populations continue nesting through August, and up to three broods can be raised in a season if the prey base is sufficient. The birds begin their southbound migration in mid-August, and most have left the breeding grounds by mid-September (78 FR 61632).

Little is known about western yellow-billed cuckoo migratory habitat. Yellow-billed cuckoos may be found in a variety of vegetation types during migration, which suggests that the habitat needs of the cuckoo during migration are not as restricted as their habitat needs during the breeding season. Yellow-billed cuckoo may also be found in smaller riparian patches during migration than those in which it typically nests (78 FR 61634).

D.2.9.3 Occurrence in and Near the Study Area

There are no records for western yellow-billed cuckoo occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Western yellow-billed cuckoo habitat in the study area is limited to migratory habitat because the patches of riparian forest are not large enough or wide enough to support breeding cuckoos.

D.2.10 Greater Sandhill Crane

D.2.10.1 Status and Distribution

The greater sandhill crane is state listed as threatened and is also designated as a state Fully Protected species (California Department of Fish and Wildlife 2022b). The Central Valley Population of greater sandhill crane breeds in northeastern California, central and eastern Oregon, southwestern Washington, and southern British Columbia; and winters in the Central Valley of California (Littlefield and Ivey 2000:1–2).

D.2.10.2 Habitat Requirements and Biology

Greater sandhill cranes are primarily birds of open freshwater wetlands. In California, nesting typically occurs in wet meadows, with nests established in open habitat such as rushes *(Juncus spp.),* spikerush *(Eleocharis spp.),* grasses, and sedges *(Carex spp.),* and sometimes in bulrush and burreed

(California Department of Fish and Game 1994:6–7). While breeding sites are on state and federal refuges or U.S. Forest Service lands, more than 60% are on private lands (Ivey and Herziger 2001:3).

Wintering habitat is found almost entirely in cultivated lands, and to a lesser extent in managed wetlands and grasslands. Greater sandhill cranes, like many birds, exhibit a high degree of fidelity to their wintering grounds (Ivey et al. 2015:522–523). Wintering habitat consists of two primary elements: secure roost sites, and sufficient nearby foraging habitat (Ivey et al. 2016:63). In the Delta, croplands and pastures account for the majority of foraging locations; corn is the most commonly used foraging habitat, followed by rice, pasture, oak savannah, fallow fields, wetlands, wheat, and sudan grass (Ivey 2015:74).

Loafing generally occurs midday when birds loosely congregate along levees, rice-checks, ditches, in alfalfa fields or pastures, or along shorelines of wetlands (Littlefield and Ivey 2000:11). Cranes will often loaf in rocky uplands or along gravel roads where they collect grit, which is important in the digestion of grain seeds (Littlefield and Ivey 2000:14). During the late afternoon and evening, cranes begin to congregate into large, dense communal groups where they remain until the following morning. Providing protection from predators during the night, roost sites are typically within 1 to 2.5 miles of foraging and loafing areas (Littlefield and Ivey 2000:11) and thus available roosting sites are an essential component of winter habitat. In a study of night roosts in the Delta, roosting habitat typically consisted of shallowly flooded open fields or seasonal wetlands of variable size (averaging 289 acres). Water depth is important and averages 4 inches (Ivey 2015:108). Ivey (2015:112) recommended that managed roost complexes be large (at least 250 acres) to give security from predators, with individual sites within a complex being at least 12 acres and dominated by shallow water.

Greater sandhill cranes are considered intolerant of excessive human disturbances and the level of disturbance may play a role in habitat selection (Lovvorn and Kirkpatrick 1981:848–850, 853–856). Excessive disturbances have caused cranes to abandon foraging and roosting sites; and repeated disturbance may affect their ability to feed and store the energy needed for survival. Ivey and Herziger (2003:25–28) documented disturbances of greater sandhill cranes on Staten Island, a high-use area, and found that aircraft, vehicles, hunting, and recreational activities (e.g., birding, walking, horseback riding, bicycling, boating) can cause cranes to run or fly away.

D.2.10.3 Occurrence in the Study Area

There is one historic CNDDB record (1924) for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Several observations have also been recorded within 5 miles of the study area in eBird within the last few years (Cornell Lab of Ornithology 2022). Potentially suitable winter foraging habitat for greater sandhill crane consists of fallow agricultural fields and row crops.

D.2.11 Burrowing Owl

D.2.11.1 Status and Distribution

Burrowing owl (*Athene cunicularia*) is a California species of special concern (California Department of Fish and Wildlife 2022b). Burrowing owl is a year-round resident in the Central Valley, San Francisco Bay region, Carrizo Plain, and Imperial Valley (Shuford and Gardali 2008:219).

D.2.11.2 Habitat Requirements and Biology

Burrowing owl occurs primarily in grassland habitats but may also occur in landscapes that are highly altered by human activity. Suitable habitat must contain burrows and relatively short vegetation with minimal amounts of shrubs or taller vegetation. Burrowing owl may also occur in agricultural areas along roads, canals, ditches, and drains. The species most commonly nests and roosts in California ground squirrel (*Otospermophilus beecheyi*) burrows, but may also use burrows dug by other species, as well as culverts, piles of concrete rubble, and pipes. The breeding season is March to August but can begin as early as February. During the breeding season, burrowing owls forage near their burrows but have been recorded hunting up to 1.7 miles away. Rodent populations, particularly California vole (*Microtus californicus*) populations, may greatly influence survival and reproductive success of burrowing owls (Shuford and Gardali 2008:219, 221).

D.2.11.3 Occurrence in the Study Area

There are no CNDDB records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable burrowing owl habitat in the study area consists of ruderal annual grassland and disturbed land cover types.

D.2.12 Loggerhead Shrike

D.2.12.1 Status and Distribution

Loggerhead shrike (*Lanius ludovicianus*) is a California species of special concern (California Department of Fish and Wildlife 2022b). occurs year-round throughout California, except for the northwest, heavily forested higher mountains, and higher areas of deserts (Humple 2008:272). During the breeding season, abundance is highest in portions of the Central Valley, coast ranges, and southeastern deserts. In winter, abundance is highest throughout the San Joaquin Valley, the south-central and southern coasts, and the southeastern deserts (Humple 2008:272–273).

D.2.12.2 Habitat Requirements and Biology

Loggerhead shrike use a variety of open habitats, including pastures, old orchards, cemeteries, golf courses, agricultural fields, riparian areas, and woodlands (Yosef 2020). In the Central Valley, loggerhead shrike show a positive association with grasslands, irrigated pasture, and grain and hay crops, and also use row crops for foraging (Pandolfino and Smith 2012:82–83).

Loggerhead shrike nest in shrubs and trees surrounded by open habitat, and often select nest sites based on degree of cover (Yosef 2020). Nests are generally placed 3–6 feet above the ground (Humple 2008:274; Yosef 2020). Loggerhead shrike feed primarily on large insects, and require grasses, forbs, or bare ground for hunting. They also require tall shrubs, trees, fences, or power lines for hunting perches, as well as thorny plants or barbed wire fences to impale and store prey (Humple 2008:274).

D.2.12.3 Occurrence in the Study Area

There are no CNDDB occurrences recorded within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Several observations of the species have been recorded in eBird within the last few years (Cornell Lab of Ornithology 2022). Potentially suitable habitat in the study area consists of oak woodland, riparian forest, willow riparian scrub, orchard, and landscaped land cover types associated with more open portions of the study area such as ruderal annual grassland and row crops.

D.2.13 Yellow Warbler

D.2.13.1 Status and Distribution

Yellow warbler (*Setophaga petechia*) is a California species of special concern (California Department of Fish and Wildlife 2021b) and is primarily a migrant and summer resident in California (Shuford and Gardali 2008:333). The breeding range of yellow warbler in California consists of the coast range in Del Norte County, east to the Modoc Plateau, south along the coast range to Santa Barbara and Ventura Counties, and along the western slope of the Sierra Nevada south to Kern County. The breeding range also includes the eastern side of California from the Lake Tahoe area south through Inyo County, several southern California mountain ranges, and most of San Diego County (California Department of Fish and Game 2005b). The current breeding range is similar to the historical breeding range, with the exception of the Central Valley, where this species is thought to be largely extirpated (Shuford and Gardali 2008:333). Yellow warbler winters in the Imperial and Colorado River valleys (California Department of Fish and Game 2005b).

D.2.13.2 Habitat Requirements and Biology

Yellow warbler generally occupies riparian vegetation near water along streams and in wet meadows. The species is often found in willows and cottonwoods (*Populus* spp.), and various other riparian shrubs and trees. In northern California, presence of willows and Oregon ash (*Fraxinus latifolia*) are thought to be important predictors of yellow warbler abundance (Shuford and Gardali 2008:335). As a migrant, yellow warbler occupies scrub-shrub and semi-open, second-growth forest, often associated with wetlands (Lowther et al. 2020).

The diet of yellow warbler in California consists mostly of insects, including ants, bees, wasps, caterpillars, beetles, true bugs, flies; and spiders; and a small amount of plant matter (California Department of Fish and Game 2005b; Shuford and Gardali 2008:336). Yellow warbler primarily gleans prey from leaves but utilizes various foraging techniques (Petit et al. 1990:257, 259).

Yellow warbler breeds from mid-April into early August with peak activity in June (California Department of Fish and Game 2005b). The species usually has one brood per season but has been documented to have two (Shuford and Gardali 2008:336). Females typically lay four to five eggs, which are incubated for 11 days, and young fledge in nine to 12 days (California Department of Fish and Game 2005b).

D.2.13.3 Occurrence in the Study Area

There are no CNDDB records for occurrence of yellow warbler within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Several observations of this species have been recorded within 5 miles of the study area in eBird within the last several years (Cornell Lab of Ornithology 2022). Potentially suitable yellow warbler habitat in the study area consists of forested riparian and willow scrub riparian land cover types.

D.2.14 Song Sparrow (Modesto Population)

D.2.14.1 Status and Distribution

The Modesto population of song sparrow (*Melospiza melodia mailliardi*) is a California species of special concern (California Department of Fish and Wildlife 2021b). This population of song sparrow occurs primarily at elevations up to 200 feet above mean sea level from Colusa County south through the Delta (except for Suisun Marsh) to Stanislaus County (Shuford and Gardali 2008:401).

D.2.14.2 Habitat Requirements and Biology

Song sparrow is associated with freshwater marsh that is dominated by tules and cattails, as well as riparian willow thickets. The species may also nest in valley oak riparian forests with blackberry understory, along vegetated irrigation canals and levees, and in recently planted oak restoration sites. Song sparrow requires moderately dense vegetation that provides cover for nest sites, a source of standing or running water, semi-open canopies to allow light penetration, and exposed ground or leaf litter for foraging (Shuford and Gardali 2008:402). The breeding season for the Modesto population of song sparrow is late March to early August (Gardali *n.d.*:1).

D.2.14.3 Occurrence in the Study Area

There are no records for occurrences of Modesto song sparrow within 5 miles of the study area (California Department of Fish and Wildlife 2022a). However, several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2022). Potentially suitable Modesto song sparrow habitat in the study area consists of forested riparian, and willow scrub riparian land cover types.

D.2.15 Mountain Plover

D.2.15.1 Status and Distribution

Mountain plover (*Charadrius montanus*) is a California species of special concern (California Department of Fish and Wildlife 2022b). The geographic range of mountain plover in California consists of the Central Valley from Sutter and Yuba Counties southward, San Joaquin Valley, Imperial Valley, Los Angeles and western San Bernardino Counties, and the central Colorado River valley. There have also been more recent records for occurrences of the species along the northern coast of California (California Department of Fish and Game 2008). California is thought to be the main wintering area for mountain plover, but they do not breed within the state (Andres and Stone 2009).

D.2.15.2 Habitat Requirements and Biology

Nonbreeding, winter habitat for mountain plover consists of grasslands, agricultural pastures and fields, and open sagebrush areas (California Department of Fish and Game 2008, Andres and Stone 2009:12). In the Central Valley, the species is found on short grasslands and plowed fields. Mountain plover often roosts in depressions such as ungulate hoof prints and plow furrows. The diet of mountain plover includes large insects, especially grasshoppers, which are eaten from the ground (California Department of Fish and Game 2008).

Mountain plover nests outside of California in dry grasslands and shrub-steppe tablelands (Andres and Stone 2009:10). The breeding season is from late April through June, with a peak in late May (California Department of Fish and Game 2008).

D.2.15.3 Occurrence in the Study Area

There are no CNDDB records for occurrences of wintering flocks within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable mountain plover wintering habitat consists of ruderal annual grassland land cover types.

D.2.16 Pallid Bat

D.2.16.1 Status and Distribution

Pallid bat (*Antrozous pallidus*) is a California species of special concern (California Department of Fish and Wildlife 2022b) and is considered a species of high concern by the Western Bat Working Group (WBWG) (California Department of Fish and Wildlife 2022b, Western Bat Working Group 2017a). The geographic range for pallid bat extends throughout California (Zeiner et al. 1990b:70). The species is believed to be most prevalent at elevations below 6,000 feet, although it has been observed at higher elevations (Baker et al. 2008, Western Bat Working Group 2017b).

D.2.16.2 Habitat Requirements and Biology

Generally, the habitat for pallid bat includes deserts, grasslands, shrublands, woodlands, and forests from sea level up level to 6,000 feet, although it has been observed at higher elevations (Baker et al. 2008, Western Bat Working Group 2017b). The species is most common in open, dry habitats and is a year-long resident in most of its range (Zeiner et al. 1990b:70).

Pallid bat is known to roost in crevices in rocky outcrops and cliffs, caves, mines, trees, and various human-made structures. Roosts generally have unobstructed entrances/exits, and are high above the ground, warm, and inaccessible to terrestrial predators. The species also tends to day roost and night roost in alternate structures (Baker et al. 2008:269). Overwintering roosts have relatively cool, stable temperatures in protected structures beneath the forest canopy or on the ground, out of direct sunlight (Western Bat Working Group 2017b). This species is sensitive to disturbance of its roosting sites (Western Bat Working Group 2017b, Zeiner et al. 1990b:70).

Pallid bat forages over a variety of landscapes, including open shrub-steppe grasslands, oak savanna grasslands, open ponderosa pine forests, talus slopes, gravel roads, lava flows, orchards, and vineyards (Western Bat Working Group 2017b). Pallid bat catches a variety of prey, including arthropods on plant surfaces and insects in midair, and has been observed eating lizards and small rodents (Western Bat Working Group 2017b).

This species may roost alone but often roosts in groups and will roost with other species of bats (Zeiner et al. 1990b:70). The mating season is typically between October and February. Females give birth to one to two pups between April and July, pups are weaned by August, and maternity colonies disperse between August and October (Western Bat Working Group 2017b). Pallid bat travels short distances to hibernate in winter alone or in small groups (Western Bat Working Group 2017b, Zeiner et al. 1990b:70).

D.2.16.3 Occurrence in the Study Area

There are no CNDDB records for occurrences within 5 miles of the study area. Potentially suitable pallid bat roosting and foraging habitat in the study area consists of oak woodland, ditch, developed, disturbed, riparian forest, willow riparian scrub, orchard, landscaped woodland, fallow and agricultural row crops, perennial stream, and ruderal annual grassland land cover types.

D.2.17 Western Red Bat

D.2.17.1 Status and Distribution

Western red bat (*Lasiurus blossevillii*) is a California species of special concern (California Department of Fish and Wildlife 2021b) and is considered a species of high concern by the WBWG (California Department of Fish and Wildlife 2022b; Western Bat Working Group 2017a). The geographic range of western red bat extends throughout most of California (Zeiner et al. 1990b:60).

D.2.17.2 Habitat Requirements and Biology

Generally, the habitat for this species consists of forests and woodlands, and this species is thought to prefer open habitats or habitat mosaics with access to trees for cover and open areas or habitat edges for foraging (Zeiner et al. 1990b:60).

Western red bat is commonly associated with forests and woodlands and appears to prefer open habitats or habitat mosaics with access to trees for roosting. Western red bat typically roosts in tree foliage and prefers roost sites that are protected from above and open below (Zeiner et al. 1990b:60). A study from New Mexico also suggests that this species may choose roost sites based on higher foliage density (Andersen and Geluso 2018:177–179). This species appears to be associated with intact riparian habitat (particularly willows, cottonwoods, and sycamores [*Platanus* spp.]) (Pierson et al. 2006:14, Western Bat Working Group 2017b), but has been observed in a variety of trees, including orchard trees (Pierson et al. 2006:15).

Western red bat forages over a wide variety of habitats, including riparian habitats (Pierson et al. 2006:14), grasslands, shrublands, open woodlands and forests, and croplands (Zeiner et al. 1990b:60). This species eats a variety of insects (Zeiner et al. 1990b:60; Western Bat Working Group 2017b).

Western red bats typically mate in August and September and females give birth to two or three pups between May and July. The pups are volant within 3 to 6 weeks. It is thought that western red bat is highly migratory (Western Bat Working Group 2017b) and migrates short distances between seasonal roosts (Zeiner et al. 1990b:60). The winter behavior of this species is not well understood, but some winter foraging has been observed on warmer days (Western Bat Working Group 2017b).

D.2.17.3 Occurrence in the Study Area

There are no CNDDB records for western red bat occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable western red bat roosting habitat in the study area consists of oak woodland, riparian forest, landscaped, and orchard, land cover types. Potentially suitable western red bat foraging habitat in the study area consists of annual grassland, barren, oak woodland, disturbed, ditch, perennial stream, orchard, agricultural row crops, and ruderal annual grassland land cover types.

D.2.18 Hoary Bat

D.2.18.1 Status and Distribution

Hoary bat (*Lasiurus cinereus*) is considered a species of moderate concern by the WBWG (California Department of Fish and Wildlife 2022b, Western Bat Working Group 2017a). The geographic range of hoary bat extends throughout California (Zeiner et al. 1990b).

D.2.18.2 Habitat Requirements and Biology

Hoary bat habitat consists of woodlands and forests (Zeiner et al. 1990b). Hoary bat is thought to prefer open habitats or habitat mosaics, with access to trees for roosting and open areas or habitat edges for foraging (Western Bat Working Group 2017b, Salganek 2019:47, Zeiner et al. 1990b).

Hoary bats are known to roost primarily in the foliage of medium to large trees (Western Bat Working Group 2017b, Zeiner et al. 1990b), and while this species is typically associated with natural woodland and forest land cover types, it has also been observed in suburban trees (Quirk pers. comm.). This species is also thought to prefer roost locations that are protected above and open below (Salganek 2019:6–7; Zeiner et al. 1990b). Hoary bats typically roost in foliage of medium to large deciduous or coniferous trees (Western Bat Working Group 2017b; Zeiner et al. 1990b) and are thought to prefer roosting at the ends of branches (Western Bat Working Group 2017b). In addition, other species of foliage-roosting bats (e.g., western red bat) are known to use orchard trees (Pierson et al. 2006:15, Western Bat Working Group 2017b); therefore, there is potential for hoary bat to roost in similar types of trees.

Hoary bats forages primarily in open areas or along habitat edges (Western Bat Working Group 2017b, Zeiner et al. 1990b), but this species may forage in smaller openings between trees within woodland areas. This species is thought to prefer moths but eats a variety of insects (Western Bat Working Group 2017b, Zeiner et al. 1990b). Hoary bats typically mate in the fall and females give birth to one to four pups the following May through July.

D.2.18.3 Occurrence in the Study Area

There are no CNDDB records for hoary bat occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable hoary bat roosting habitat in the study area consists of oak woodland, riparian forest, willow riparian scrub, orchard, and landscaped land cover types. Potentially suitable hoary bat foraging habitat in the study area consists of ruderal annual grassland, oak woodland, riparian forest, willow riparian scrub, ditch, perennial stream, orchard, row crops, and orchard land cover types.

D.2.19 Western Small-Footed Myotis

D.2.19.1 Status and Distribution

Western small-footed myotis is identified by the WBWG as moderate priority (California Department of Fish and Wildlife 2022b). This species occurs in coastal California from Contra Costa

County south to the Mexico border, and on the west and east side of the Sierra Nevada, and in Great Basin and desert habitats from Modoc to Kern and San Bernardino Counties (Harris 1984b).

D.2.19.2 Habitat Requirements and Biology

Primary habitat includes relatively arid wooded and brushy uplands near water, from sea level to 8,900 feet. Western small-footed myotis typically roosts in rock crevices, mines, caves, and occasionally in buildings, bridges, and other human structures. Forages among trees and water, feeding on a variety of small flying insects (Harris 1984b).

D.2.19.3 Occurrence in the Study Area

No recorded CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable roosting habitat in the study area consists of oak woodland, riparian forest, willow riparian scrub, orchard, and landscaped land cover types. Potentially suitable foraging habitat in the study area consists of ruderal annual grassland, oak woodland, riparian forest, willow riparian scrub, ditch, perennial stream, orchard, row crops, and orchard land cover types.

D.2.20 Yuma Myotis

D.2.20.1 Status and Distribution

Yuma myotis is identified by the WBWG as low to moderate priority (California Department of Fish and Wildlife 2022b). Yuma myotis is common and widespread throughout California from sea level to 11,000 feet (although uncommon above 8,000 feet), excluding the Mojave and Colorado Desert regions (Harris 1984b).

D.2.20.2 Habitat Requirements and Biology

Yuma myotis habitat includes open forests and woodlands with water sources. The species roost in a variety of structures, including bridges, buildings, caves, mines, trees and rock crevices, and have been known to roost in cliff swallow nests. They typically forage low over water sources such as ponds, streams, and stock ponds, feeding on a wide variety of flying insects (Harris 1984b).

D.2.20.3 Occurrence in the Study Area

No recorded CNDDB occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2022a). Potentially suitable roosting habitat in the study area consists of oak woodland, riparian forest, willow riparian scrub, orchard, and landscaped land cover types. Potentially suitable foraging habitat in the study area consists of ruderal annual grassland, oak woodland, riparian forest, willow riparian scrub, ditch, perennial stream, orchard, row crops, and orchard land cover types.

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Appendix E

Aquatic Species Life Histories

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E.1 Winter-Run Chinook Salmon—Sacramento River ESU

The Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU) is listed as endangered under the ESA (59 FR 440; January 4, 1994). The ESU consists of one population in the mainstem of the upper Sacramento River in California's Central Valley below Keswick Dam, though efforts to reintroduce the run in Battle Creek have had success in recent years with at least 700 subadults and adults returning in 2020 as a result of juvenile releases undertaken in 2018 and 2019 (U.S. Fish and Wildlife Service 2020). NMFS reaffirmed the listing of the Sacramento River winter-run Chinook salmon ESU as endangered on June 28, 2005 (70 FR 37160), and expanded the ESU to include winter-run Chinook salmon produced by the Livingston Stone National Fish Hatchery (LSNFH) artificial propagation program in the ESU The Sacramento River winter-run Chinook salmon ESU was listed as endangered under CESA in September 1989.

NMFS designated critical habitat for Sacramento River winter-run Chinook salmon on June 16, 1993 (58 FR 33212–33219); critical habitat includes the water column, river bottom, and adjacent riparian zones of the Sacramento River up to the OHWM, as defined by the USACE in 33 CFR 329.11. The biological and physical features (also referred to as primary constituent elements) of critical habitat in the action area include freshwater rearing habitat with water quantity and quality, natural cover, forage, and passage conditions supporting migration and rearing of winter-run Chinook salmon. Within the study area, the Sacramento River and adjacent riparian zones below the ordinary high water mark (OHWM) are considered critical habitat for this species.

Winter-run Chinook salmon currently are found in the mainstem Sacramento River downstream of Keswick Dam and in Battle Creek where a nascent reintroduction effort is underway. Areas where winter-run Chinook salmon historically migrated to and spawned are now inaccessible because of the construction of Keswick and Shasta Dams. The current population in the Sacramento River is maintained through cold water releases from Shasta Reservoir that create spawning and rearing habitat in the reach between Keswick Dam (RM 302) and the Red Bluff Diversion Dam (RBDD) (RM 243). Efforts currently are underway to reestablish a population of Sacramento River winter-run Chinook salmon in North Fork Battle Creek with the purpose of recovering the species.

Winter-run Chinook salmon spend 1 to 3 years in the ocean. Adult winter-run Chinook salmon leave the ocean and migrate up the Sacramento River from December through July, with the majority of the run passing the RBDD from January through May, peaking in mid-March (National Marine Fisheries Service 2009a, 2014). Adults spawn from mid-April through August, peaking in June and July. Current spawning is confined to the mainstem of the Sacramento River above RBDD (RM 243) and below Keswick Dam (RM 302) (National Marine Fisheries Service 2014). Fry emerge from the gravel beginning in late June, with emergence continuing through October (Fisher 1994). Juvenile winter-run Chinook salmon have been observed emigrating past RBDD from early July to early June in the following year, with most (80%) passing RBDD from late August into December, based on USFWS rotary screw trap (RST) data from 2006 to 2020 (SacPAS 2021).

During juvenile rearing and downstream movement, salmonids prefer stream margin habitats with sufficient depths and velocities to provide suitable cover and foraging opportunities. Ephemeral habitats, such as floodplains and the lower reaches of small streams, also are very important to rearing Chinook salmon as these areas can be much more productive than the main channel and provide refuge from predatory fishes (Maslin et al. 1997; Sommer et al. 2001). For example, juveniles have also been found to rear in areas such as the lower American River, lower Feather River, Battle Creek, Mill Creek, Deer Creek, and the Delta (Phillis et al. 2018). In addition to the Sacramento River, Big Chico Creek in the study area has been found to be important nonnatal rearing area for winter-run Chinook salmon (Bettelheim 2001). Winter-run Chinook salmon use the Sacramento River within the study area for upstream migration (adults) and downstream migration and rearing (juveniles); spawning and egg incubation do not occur in the study area.

One of the main factors in the decline of winter-run Chinook salmon is habitat loss and degradation. On the Sacramento River, Shasta Dam initially blocked access to historical spawning and rearing habitat. Other factors affecting abundance include the effects of reservoir operations on water temperature, drought effects, passage impediments, harvesting and fishing pressure, entrainment in diversions, contaminants, predation by non-native species, and interaction with hatchery stock (U.S. Army Corps of Engineers 2000).

In the Sacramento River, operation of the Central Valley Project (CVP) and State Water Project (SWP) influences river flow, which can reduce habitat area and adversely affect water quality. Factors such as levee construction and bank armoring have altered the critical habitat of winter- run Chinook salmon. These factors reduce floodplain habitat, change riverbank substrate size, and decrease the amount of SRA cover and riparian habitat—which in turn, reduce habitat availability and quality (National Marine Fisheries Service 2006).

E.2 Spring-Run Chinook Salmon—Central Valley ESU

The Central Valley (CV) spring-run Chinook salmon (*Oncorhynchus tshawytscha*) ESU is federally listed as threatened (70 FR 37160; June 28, 2005). The ESU includes naturally spawned populations in the Sacramento River and its tributaries, including Antelope, Battle, Big Chico, Butte, Clear, Cottonwood, Deer, and Mill Creeks, and the Yuba River, as well as artificially propagated fish from the Feather River Fish Hatchery (National Marine Fisheries Service 2016). Native spring-run Chinook salmon have been extirpated from the San Joaquin River watershed, which represented a large portion of their historical range. The CV spring-run Chinook salmon ESU was listed as threatened under CESA in February 1999.

NMFS proposed critical habitat for CV spring-run Chinook salmon on December 10, 2004, and published a final rule designating critical habitat for this ESU on September 2, 2005 (70 FR 52488, September 2, 2005). Critical habitat for CV spring-run Chinook salmon includes the water column, river bottom, and adjacent riparian zone of the Sacramento River up to the OHWM, as defined by the USACE in 33 CFR 329.11. The physical and biological features of critical habitat in the Sacramento River within the action area include freshwater rearing habitat with water quantity and quality, natural cover, forage, and passage conditions supporting migration and rearing of spring-run Chinook salmon. Within the study area, the Sacramento River, Big Chico Creek, and Butte Creek and adjacent riparian zones below the OHWM are considered critical habitat for this species.

Spring-run Chinook salmon share some similar life history and habitat requirements as those described for winter-run Chinook salmon, with differences primarily in the duration and time of year that the spring-run Chinook salmon ESU occupies freshwater habitat. Adult spring-run Chinook salmon enter the mainstem Sacramento River from mid-February and July, with the peak upstream migration occurring from May through June (Yoshiyama et al. 1998). Adults generally enter tributaries from the Sacramento River between mid-April and mid-June (National Marine Fisheries Service 2006). Spring-run Chinook salmon are sexually immature during upstream migration; and adults hold in deep, cold pools near spawning habitat until spawning commences in late summer and fall. Spawning habitat occurs in the upper reaches of the Sacramento River (between Keswick Dam [RM 302] and RBDD [RM243]) and some tributaries.

Fry emerge from gravels from November to March (Williams 2006). Rearing takes place in their natal streams, the mainstem of the Sacramento River, inundated floodplains (including the Sutter and Yolo Bypasses), nonnatal streams, and the Delta. Juvenile spring-run Chinook salmon typically spend up to 1 year rearing in fresh water before migrating to sea as yearlings, but some may migrate downstream as young-of-year juveniles. Juvenile spring-run Chinook salmon have been observed emigrating past RBDD from mid-October to July, with most (80%) passing RBDD from mid-October into early May, based on USFWS rotary screw trap (RST) data from 2006 to 2020 (SacPAS 2021).

Juveniles prefer stream margin habitats with enough depth and velocities to provide suitable cover and foraging opportunities during rearing and downstream movement. Off-channel areas and floodplains can provide important rearing habitat. A greater availability of prey and favorable rearing conditions in floodplains increases juvenile growth rates compared with conditions in the mainstem Sacramento River, which can lead to improved survival rates during both their migration through the Delta and later in the marine environment (Sommer et al. 2001). Spring-run Chinook salmon use the Sacramento River within the study area for upstream migration (adults) and downstream migration and rearing (juveniles); spawning and egg incubation do not occur in the study area.

Reasons for the decline and current status of spring-run Chinook salmon fall into three general categories: (1) loss of historical spawning habitat; (2) degradation of remaining habitat; and (3) threats to the genetic integrity of the wild spawning populations. The construction of debris, hydropower, flood control, and water supply dams eliminated virtually all historical spawning habitat of spring-run Chinook salmon. Altered flows and water temperatures from dam operations and water diversions; losses of suitable spawning substrate; channel alterations (e.g., channelization and levees) associated with navigation and flood risk reduction; and associated losses of riparian, floodplain, and wetland habitat are contributing factors to past declines and the current status of spring-run Chinook salmon populations in the Central Valley.

E.3 Fall and Late Fall–Run Chinook Salmon–Central Valley ESU

The CV fall-run and late fall–run Chinook salmon (*Oncorhynchus tshawytscha*) ESU includes all naturally spawned populations of fall-run and late fall-run Chinook salmon in the Sacramento and San Joaquin River basins and their tributaries east of the Carquinez Strait in California (64 FR 50394). On September 16, 1999, after reviewing the best available scientific and commercial information, NMFS determined that listing CV fall- and late fall–run Chinook salmon was not warranted. On April 15, 2004, the CV fall- and late fall–run Chinook salmon ESU was identified by NMFS as a species of concern (69 FR 19975). The CV fall- and late fall-run Chinook salmon ESU is not listed under CESA but is considered a California species of special concern (Moyle et al. 2015). Critical habitat is not designated for fall- and late fall-run Chinook salmon because the species is not listed under the ESA.

Adult fall-run Chinook salmon migrate through the Delta and into Central Valley rivers from June through December. Adult late fall–run Chinook salmon migrate through the Delta and into the Sacramento River from October through April. Currently, fall-run Chinook salmon spawn below rim dams and barriers to migration in the Sacramento and San Joaquin Rivers and their tributaries. Some smaller streams that lack unpassable barriers have runs that extend into historical fall-run habitat. Late fall–run Chinook salmon currently spawn almost exclusively in the upper Sacramento River from Keswick Dam (RM 302) to RBDD (RM 243).

The fall-run Chinook salmon has an ocean-maturing type of life history adapted for spawning in lowland reaches of big rivers, including the mainstem Sacramento River. The late fall–run Chinook salmon has a stream-maturing type of life history (Moyle 2002). Similar to spring-run, adult late fall–run Chinook salmon typically hold in the river for 1 to 3 months before spawning, while fall-run Chinook salmon generally spawn shortly after entering fresh water. Fall-run Chinook salmon migrate upstream past RBDD on the Sacramento River between July and December, typically spawning in upstream reaches from October through March. Late fall–run Chinook salmon migrate upstream past RBDD from August to March and spawn from January to April (National Marine Fisheries Service 2009b; Tehama-Colusa Canal Authority 2008).

Upon emergence from the gravel, fry swim or are displaced downstream (Healey 1991); most movement occurs during twilight (National Marine Fisheries Service 2014). Fry seek nearshore habitats providing shallow water; vegetation; and substrates that provide aquatic and terrestrial invertebrates, cover and shelter from predators, and slower water velocities for resting (National Marine Fisheries Service 2014).

CV fall-run Chinook salmon fry (i.e., juveniles shorter than 2 inches long) generally emerge from December through March, with peak emergence occurring by the end of January. Most fall-run Chinook salmon fry rear in fresh water from December through June, with smolt emigration occurring primarily from April through June. Smolts that arrive in the estuary after rearing upstream migrate quickly through the Delta and Suisun and San Pablo Bays. A very small number (generally less than 5 percent) of fall-run juveniles spend over a year in fresh water and emigrate as yearling smolts the following November through April. Juvenile fall-run Chinook salmon have been observed emigrating past RBDD in all months of the year, with most (80%) passing through the area mid-December to late June, based on USFWS RST data from 2006 to 2020 (SacPAS 2021).

In the Sacramento River, CV late fall-run Chinook salmon fry generally emerge from April through June and rear in fresh water from April through the following April. Juvenile late fall-run Chinook salmon have been observed emigrating past RBDD from April to early March, with most (80%) passing through the area in from early April to mid-December, based on USFWS RST data from 2006 to 2020 (SacPAS 2021).

CV fall- and late fall-run Chinook salmon use the Sacramento River within the study area for upstream migration (adults) and downstream migration and rearing (juveniles); spawning and egg incubation do not occur in the study area (Moyle 2002).

Factors that contributed to the decline of CV fall- and late fall-run Chinook salmon are similar to those described earlier for Sacramento River winter-run Chinook salmon and CV spring-run Chinook salmon. Access to much or all of their historical spawning habitat was eliminated by dams, although fall-run Chinook salmon were less affected by these barriers because much of their historical spawning habitat included the lower-gradient reaches downstream of these dams (Reynolds et al. 1993; Yoshiyama et al. 2001). Levee construction, channelization, and bank armoring have reduced and degraded the value and availability of natural habitat features for rearing and emigrating juvenile Chinook salmon (Brandes and McLain 2001). Other factors that have contributed to the current status of CV fall-run and late fall-run Chinook salmon—and currently affect their abundance include harvest, artificial propagation programs (ecological and genetic effects), entrainment, and contaminants (Moyle 2002).

E.3.1 Steelhead—California Central Valley DPS

The CCV steelhead (*Oncorhynchus mykiss irideus*) DPS was federally listed as threatened on March 19, 1998 (63 FR 13347). The threatened status of CCV steelhead was reaffirmed in NMFS's final listing determination on January 5, 2006 (71 FR 834). At the same time, NMFS adopted the term DPS, in place of ESU, to describe CCV steelhead and other population segments of this species. The DPS includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries. Artificially propagated fish from Coleman National Fish Hatchery and Feather River Fish Hatchery are included in the DPS (71 FR 834, January 5, 2006).

On August 15, 2011, after conducting a 5-year review, NMFS issued its findings concerning the status of the CCV steelhead DPS (76 FR 50447). Based on new information, NMFS determined that the status of the DPS was worse than the previous review (Good et al. 2005), and the DPS faces an even greater extinction risk. This review found that the decline in natural production of steelhead had continued unabated since the 2005 status review, and the level of hatchery influence on the DPS corresponds to a moderate risk of extinction.

The CCV steelhead DPS is not listed under CESA but is designated as a California SSC.

Critical habitat for CCV steelhead was designated by NMFS on September 2, 2005 (70 FR 52488) and includes all stream reaches accessible to CCV steelhead in the Sacramento and San Joaquin Rivers and their tributaries. Also included are adjacent riparian zones within the OHWM (70 FR 52537, September 2, 2005). The physical and biological features of critical habitat in the study area are freshwater rearing habitat with water quantity and quality, natural cover, forage, and passage conditions supporting migration and rearing of steelhead. Within the study area, the Sacramento River and adjacent riparian zones below the OHWM are considered critical habitat for this species.

Steelhead exhibit highly variable life history patterns throughout their range but are broadly categorized into winter and summer reproductive ecotypes. Winter steelhead, the most widespread reproductive ecotype, is the only type currently present in Central Valley streams (McEwan and Jackson 1996). Winter steelhead become sexually mature in the ocean; enter spawning streams in summer, fall, or winter; and spawn a few months later in winter or spring (Meehan and Bjornn 1991; Behnke 1992).

Adult steelhead immigration into Central Valley streams typically begins in August, continues into March or April (McEwan 2001; National Marine Fisheries Service 2014), and generally peaks during January and February (Moyle 2002); but adult steelhead immigration potentially can occur during all months of the year (National Marine Fisheries Service 2009a). Steelhead spawning generally occurs from December through April, with peaks from January through March, in small streams and tributaries (National Marine Fisheries Service 2009a).

After fry emerge, they inhabit shallow areas along the stream margin and prefer riffles; they use a greater variety of habitats as they grow and develop (Barnhart 1986; National Marine Fisheries Service 2014). Habitat use is affected by the presence of predators; and juvenile steelhead survival increases when cover, such as wood debris and large cobble, is available (Mitro and Zale 2002).

Juvenile CCV steelhead typically migrate to the ocean after spending 1 to 3 years in fresh water (McEwan 2001). Steelhead fry and fingerlings rear and migrate downstream in the Sacramento River during most months of the year, but the primary period of emigration is January to June (Hallock et al. 1961; McEwan 2001). Juvenile unclipped (wild) steelhead have been observed emigrating past RBDD in all months of the year, with most (80%) passing through the area from March through September and occasionally into December, based on USFWS RST data from 2006 to 2020 (SacPAS 2021). Because of their varied freshwater residence times, steelhead fry and juveniles can be rearing and migrating in the Sacramento River year- round (McEwan 2001).

In the Sacramento River, CCV steelhead are found downstream of Keswick Dam. The primary spawning area used by steelhead in the Sacramento River is the area from Keswick Dam downstream to RBDD. Unlike Pacific salmon, steelhead may live to spawn more than once and generally rear in freshwater streams for 2 to 4 years before outmigrating to the ocean. Both spawning areas and migratory corridors are used by juvenile steelhead for rearing prior to outmigration. The Sacramento River functions primarily as a migration channel, although some rearing habitat remains in areas with setback levees (primarily upstream of Colusa) and flood bypasses (e.g., Yolo Bypass) (National Marine Fisheries Service 2009a).

CCV steelhead use the Sacramento River in the study area for upstream migration (adults) and downstream migration (post-spawning adults and juveniles) and rearing (juveniles); spawning and egg incubation do occur in the study area.

Steelhead once were abundant in Central Valley drainages; however, population numbers have declined significantly in recent decades. Factors that have contributed to their present status include habitat loss as a result of barriers, water development, water conveyance and flood control, hatchery operations and practices, land use activities, water quality, sport harvest, disease and predation, environmental variation (e.g., climatic and ocean conditions), and invasive species (National Marine Fisheries Service 2014).

E.3.2 North American Green Sturgeon—Southern DPS

The North American green sturgeon (*Acipenser medirostris*) population is composed of two DPSs: the Northern DPS, which includes all populations in the Eel River and northward; and the Southern DPS, which includes all populations south of the Eel River. The Northern DPS green sturgeon currently spawns in the Klamath River in California and the Rogue River in Oregon and is designated as a Species of Concern (69 FR 19975). Only the Southern DPS is found in the Central Valley, including the Sacramento River. The Sacramento River basin supports the southernmost spawning population of green sturgeon (Moyle 2002). NMFS listed the southern DPS of North American green sturgeon as threatened under the ESA on April 7, 2006 (71 FR 17757–17766). Green sturgeon is not listed under CESA; however, CDFW considers green sturgeon to be a California SSC (Moyle et al. 2015).

NMFS designated critical habitat for green sturgeon on October 9, 2009 (74 FR 52300), including the water column, river bottom, and adjacent riparian zone of the Sacramento River up to the OHWM. In the study area, only the Sacramento River is designated as critical habitat for the Southern DPS. The physical and biological features of critical habitat in the study area include freshwater areas with water flow, water quality, depth, forage, sediment quality, and passage conditions supporting migration and rearing of green sturgeon.

The green sturgeon is anadromous, but it is the most marine-oriented species in the sturgeon family and has been found in nearshore marine waters from Mexico to the Bering Sea (Colway and Stevenson 2007; Moyle 2002; 70 FR 17386–17401). Green sturgeon reach maturity around 14 to 16 years of age and can live to be 70 years old, returning to their natal rivers every 3 to 5 years for spawning (Van Eenennaam et al. 2005). They are known to spawn in the Sacramento, Feather, Yuba, and Klamath Rivers in California, and in the Rogue River in Oregon (Moyle et al. 1992; Adams et al. 2002; Poytress et al. 2015; Seesholtz et al. 2015). Following their initial spawning run upriver, adults may hold for a few weeks to months in the upper river before moving back downstream in fall (Vogel 2008; Heublein et al. 2009), or they may migrate immediately back downstream through the Delta. Radio-tagged adult green sturgeon have been tracked moving downstream past Knights Landing (RM 90) during summer and fall, typically in association with pulse flows in the river (Heublein et al. 2009), similar to behavior exhibited by adult green sturgeon on the Rogue River and Klamath River systems (Erickson et al. 2002; Benson et al. 2007).

The Sacramento River provides habitat for green sturgeon spawning, adult holding, foraging, and juvenile rearing. Sturgeon spawn in deep pools (averaging about 28 feet [8.5 meters] deep) (National Marine Fisheries Service 2018). Suitable spawning temperatures and spawning substrate exist for green sturgeon in the Sacramento River upstream and downstream of RBDD (U.S. Bureau of Reclamation 2008). Although the upstream extent of historical green sturgeon spawning in the Sacramento River is unknown, the observed distribution of sturgeon eggs, larvae, and juveniles indicates that spawning occurs from Hamilton City (RM 199) to as far upstream as the Inks Creek confluence (RM 264.5) and possibly up to the Cow Creek confluence (RM 280) (Brown 2007; Poytress et al. 2013). Adult green sturgeon that migrate upstream in April, May, and June are completely blocked by the Anderson-Cottonwood Irrigation District (ACID) diversion dam (RM 298.5) (National Marine Fisheries Service 2009b), rendering approximately 3 miles of spawning habitat upstream of the diversion dam inaccessible. The number of green sturgeon accessing the upper Sacramento River appears to have increased following the decommissioning of RBDD (Steel et al. 2019).

Adults enter San Francisco Bay around late winter through early spring and generally migrate to spawning areas from late February through April. Spawning mainly occurs April through late July, with some occurring in late summer and early fall (Heublein et al. 2017a). Green sturgeon eggs are believed generally to hatch about a week after fertilization (Heublein et al. 2017b). Green sturgeon larval distribution is estimated to extend at least 62 miles downstream from spawning habitats on the Sacramento and Feather Rivers in high-flow years. This estimated downstream distribution corresponds with the Colusa area on the Sacramento River (RM 157) (Heublein et al. 2017a:14). Larval green sturgeon have been regularly captured during their dispersal stage at about 2 weeks of age (24 to 34 mm fork length) in rotary screw traps at RBDD (California Department of Fish and Game 2002) and at about 3 weeks old when captured at the Glenn-Colusa Irrigation District (GCID) intake (RM 205) (Van Eenennaam et al. 2001). Young green sturgeon appear to rear for the first 1 to 2 months in the Sacramento River between Keswick Dam and Hamilton City (California Department of Fish and Game 2002) before migrating to the Delta (Heublein et al. 2017b:15).

Green sturgeon use the Sacramento River, including in the study area, as a migration corridor during upstream (adult) and downstream (adult, juvenile, larvae) migration, for holding and spawning (adult), and rearing (larvae, juveniles).

Musick et al. (2000) noted that the abundance of North American green sturgeon populations has declined by 88 percent throughout much of its range. The current population status is unknown (Beamesderfer et al. 2007; Adams et al. 2007), though attempts have been made to estimate the population in the Sacramento River. Mora et al. (2018) used results from acoustic telemetry and dual-frequency identification sonar (DIDSON) studies to locate green sturgeon in the Sacramento River to derive an adult spawner abundance estimate of 2,106 fish (95% confidence interval = 1,246–2,966).

In part because of their bottom-oriented feeding habits, sturgeon are at risk of harmful accumulations of toxic pollutants in their tissues, especially pesticides such as pyrethroids and heavy metals such as selenium and mercury (Israel and Klimley 2008; Stewart et al. 2004).

NMFS (2009b) noted that, similar to winter-run Chinook salmon, the restriction of spawning habitat for green sturgeon to only one reach of the Sacramento River increases the vulnerability of this spawning population to catastrophic events, which is one of the primary reasons that the Southern DPS of green sturgeon was federally listed as a threatened species in 2006. However, there is evidence that green sturgeon also spawn in the Feather River, although perhaps irregularly (Seesholtz et al. 2015).

E.3.3 White Sturgeon

White sturgeon (*Acipenser transmontanus*) is not presently listed under the ESA or CESA, but is a California SSC (Moyle et al. 2015:102–117). The population status of white sturgeon in the Sacramento River is unclear. Overall, information on trends in adults and juveniles suggests that numbers are declining (Moyle 2002; National Marine Fisheries Service 2009b). White sturgeon is a recreationally important species in the Delta, and CDFW has established special angling regulations (e.g., slot and bag restrictions) for white sturgeon to protect the declining population within the San Francisco Estuary and its tributaries (California Department of Fish and Game 2012).

White sturgeon are generally similar to green sturgeon in terms of their biology and life history. Like green sturgeon and other sturgeon species, white sturgeon are late-maturing and infrequent spawners, which makes them vulnerable to overexploitation and other sources of adult mortality. White sturgeon are believed to be most abundant within the San Francisco Estuary and Delta region, but the population spawns mainly in the Sacramento River (Moyle 2002). White sturgeon larvae rear primarily in the Sacramento River and the Delta (Moyle 2002; Israel et al. 2008). White sturgeon are found in the Sacramento River primarily downstream of RBDD (Tehama-Colusa Canal Authority 2008), with most spawning occurring between Knights Landing and Colusa (Schaffter 1997).

The Central Valley population of white sturgeon spawns mainly in the Sacramento and Feather Rivers, with occasional spawning in the San Joaquin River (Moyle 2002; Jackson and Van Eenennaam 2013). Most spawning in the Sacramento River occurs in April and May between Knights Landing (RM 90) and Colusa (RM 144) (Kohlhorst 1976). Spawning-stage adults generally move into the lower reaches of rivers during winter prior to spawning and migrate upstream in response to higher flows to spawn from February to early June (McCabe and Tracy 1994; Schaffter 1997). It is thought that adults broadcast spawn in the water column in deep water over gravel substrates or in rocky pools with swift currents (Moyle et al. 2015). Young white sturgeon use river edge habitats, especially floodplain and backwater habitats containing flooded riparian vegetation and rocky substrates (Moyle et al. 2015). After absorbing yolk sacs and initiating feeding, young-of-year white sturgeon make an active downstream migration that disperses them widely to rearing habitat throughout the lower Sacramento River and the Delta (McCabe and Tracy 1994; Israel et al. 2008).

White sturgeon use the Sacramento River for upstream (adults) and downstream (adults and juveniles) migration, spawning (adults), and rearing (larvae, juveniles).

Numerous factors likely affect the white sturgeon population. Survival during early life history stages may be adversely affected by insufficient flows, lack of rearing habitat, predation, warm water temperatures, decreased dissolved oxygen, chemical toxicants in the water, and entrainment at diversions (Cech et al. 1984; Israel et al. 2008). Historical habitats, including shallow intertidal feeding habitats, have been lost in the Delta because of channelization. Overexploitation by recreational fishing and poaching also likely has been an important factor adversely affecting numbers of adult sturgeon (Moyle 2002), although new regulations have been implemented by CDFW to reduce harvest.

E.3.4 Pacific Lamprey

Pacific lamprey (*Entosphenus tridentatus*) is a federal species of concern and a California SSC (Moyle et al. 2015; California Department of Fish and Wildlife 2022). CDFW classifies the current status of the species as Moderate Concern (Moyle et al. 2015). Critical habitat for Pacific lamprey has not been designated because the species has not been listed.

Adult Pacific lamprey spend the predatory phase of the life in the ocean and migrate into freshwater streams from January through June to spawn (Moyle 2002). Most movement occurs at night. After hatching, juvenile lamprey (ammocoetes) spend a short period in the nest before being washed downstream to areas of soft sand or mud where they burrow tail first into the substrate. It is thought that ammocoetes spend the next 5 to 7 years filter feeding in fresh water before metamorphosing into adult forms and migrating to the ocean (in winter and spring) where they prey on a wide variety of fishes, including salmon (Moyle 2002).

Adult Pacific lamprey spend the predatory phase of the life in the ocean and migrate into freshwater streams to spawn (Moyle 2002). Pacific lamprey adults enter the Sacramento River from the Delta primarily during about March through June and hold in the river for about a year prior to spawning (Moyle et al. 2015). Spawning occurs in gravel redds in the upper river from March through July. Adults spawn by constructing a nest in gravelly areas of streams containing relatively fast velocities and with depths of 1 to 5 feet (Moyle 2002). The eggs and pro-larvae incubate for about 1 to 1.5 months. After the larvae (ammocoetes) emerge, they drift downstream and burrow into fine sediments primarily in off-channel habitats, where they rear (Schultz et al. 2014; Moyle et al. 2015). After 5 or more years, the ammocoetes metamorphose to the macropthalmia (juvenile) stage and migrate downstream to the Delta and ocean. Migration downstream is closely associated with rainfall events, with most migrants sampled in the upper Sacramento River being collected on the day of a rainfall event or the following 2 days (Goodman et al. 2015).

River flow potentially affects survival of Pacific lamprey eggs and larvae, and the migratory habitat of the juveniles and adults. Pacific lamprey build their spawning redds in shallow water (about 0.5 to 3.5 feet or 0.15 to 1 m) (Gunckel et al. 2009; Schultz et al. 2014; Moyle et al. 2015), so reductions in water level can dewater the redds. The larvae select habitats, often off-channel, with fine sediments, low flow velocity, and shallow depths (approximately 1 ft or 0.3 m), so they are vulnerable to stranding by reductions in water level.

Pacific lamprey use the Sacramento River within the study area for migration (adult, juvenile) and rearing (ammocoete).

E.3.5 Western River Lamprey

The river lamprey (*Lampetra a*yresi) is not listed under ESA or CESA. On January 27, 2003, a broad group of West Coast conservation organizations petitioned the USFWS to list river lamprey, along with three other lamprey species on the West Coast, as threatened or endangered (Klamath-Siskiyou Wildlands Center et al. 2003). However, the petition was declined in a 90-day finding on December 27, 2004, citing insufficient evidence that listing was warranted (69 FR 77158). Critical habitat for river lamprey has not been designated because the species has not been listed.

The river lamprey is considered a California SSC (Moyle et al. 2015).

Although river lamprey is widely believed to be in decline, the species' exact status is uncertain, partly because it is often overlooked and seldom studied. Both historical and current abundance and distribution data are lacking, but loss and degradation of historical habitats supports the conclusion that populations may have declined.

River lamprey life history is poorly known, especially in California (Moyle et al. 2015). The adults migrate from the ocean to spawning areas during the fall and late winter (Beamish 1980). Spawning is believed to occur February through May in small tributary streams (Moyle 2002). The redds are built at the upstream end of small riffles (Moyle 2002). After the larvae (ammocoetes) emerge, they drift downstream and burrow into sediments in pools or side channels where they rear. After several years, the larvae metamorphose in late July and the juveniles (macropthalmia) migrate downstream in the following year from May to July (Moyle 2002).

River flow potentially affects survival of river lamprey eggs and larvae, and migratory habitat of the juveniles and adults. River lamprey build their spawning redds in shallow water (Moyle et al. 2015), so reductions in water level can dewater the redds. Assuming river lamprey larvae habitat requirements are similar to those of Pacific lamprey, the larvae select habitats that are often off-channel, with low flow velocity and shallow depths; therefore, they are vulnerable to stranding by reductions in water level.

In the Sacramento River, they have been documented upstream to RBDD (Hanni et al. 2006; Moyle et al. 2009). River lamprey have also been collected in the Feather and American Rivers and Mill and Cache Creeks (Vladykov and Follett 1958; Hanni et al. 2006; Moyle et al. 2009).

River lamprey use the Sacramento River within the study area for migration (adult, juvenile) and rearing (ammocoete).

E.3.6 Sacramento Hitch

Sacramento hitch (*Lavinia exilicauda exilicauda*) is not listed under the ESA or CESA, and critical habitat has not been designated for the species. However, Sacramento hitch is a California SSC (Moyle et al. 2015). CDFW classifies the current status of the species as Moderate Concern.

Sacramento hitch once were found throughout the Central Valley in low elevation streams and rivers, and in the Delta. Presently, scattered populations of Sacramento hitch are found in the Sacramento River drainage, the San Joaquin River drainage downstream of the Merced River, a few larger tributaries to the San Francisco Estuary, and the Delta. Populations also have become established in several reservoirs in California as a result of introductions, including populations in several Southern California reservoirs that receive water from the California Aqueduct. (Moyle et al. 2015.)

Sacramento hitch inhabit a wide range of habitats, including clear streams, turbid sloughs, lakes, and reservoirs. In streams, they generally prefer shallow (less than 3 feet deep) stream habitats where they inhabit pools or runs containing aquatic vegetation and substrates ranging from mud to small gravel. Young Sacramento hitch also will use riffles. Sacramento hitch can withstand a wide range of water temperatures (up to 38°C [100.4°F] for short periods of time with proper acclimation), although they are most abundant in the wild in habitats that remain cooler than 25°C (77°F) in summer. Although found primarily in fresh water, they can tolerate salinities as high as 9 ppt. The spawning habits and requirements of Sacramento hitch are poorly understood; however, spawning has been documented in streams, ponds, and reservoirs from May to July. In streams, Sacramento hitch spawn mainly in riffles and have been observed to spawn on vegetation. Spawning occurs at temperatures ranging from 14 to 26°C (57.2 to 78.8°F). In the first few months, young hitch occupy shallow water, often in close association with aquatic vegetation such as emergent tules. At about 50 mm fork length, juvenile hitch leave the shallows in favor of more open water. Young also will use floodplain habitats when available.

Sacramento hitch are likely to occur in the Sacramento River, although they are probably less common in the Sacramento River than other fish species.

E.3.7 Sacramento Splittail

The Sacramento splittail (*Pogonichthys macrolepidotus*) was listed as threatened under ESA on February 8, 1999 (64 FR 5963). This ruling was challenged by two lawsuits (San Luis & Delta-Mendota Water Authority v. Anne Badgley et al. and State Water Contractors et al. v. Michael Spear et al.). On June 23, 2000, the Federal Eastern District Court of California found the ruling to be unlawful and on September 22 of the same year remanded the determination back to the USFWS for re-evaluation of their original listing decision. Upon further evaluation, Sacramento splittail was removed from the ESA on September 22, 2003 (68 FR 55139). On August 13, 2009, the Center for Biological Diversity challenged the 2003 decision to remove Sacramento splittail from the ESA. However, on October 7, 2010, the USFWS found that listing of Sacramento splittail was not warranted (75 FR 62070). The Sacramento splittail is designated as a California SSC by the CDFW.

Sacramento splittail are found primarily in marshes, turbid sloughs, and slow-moving river reaches throughout the Delta subregion (Sommer et al. 1997, 2008). Sacramento splittail are most abundant in moderately shallow, brackish tidal sloughs and adjacent open-water areas, but they also can be found in freshwater areas with tidal or riverine flow (Moyle et al. 2004). Historically, Sacramento splittail were widespread in the Sacramento River from Redding to the Delta (Rutter 1908, as cited in Moyle et al. 2004). This distribution has become somewhat reduced in recent years (Sommer et al. 1997, 2007).

Adult Sacramento splittail typically migrate upstream from brackish areas in January and February and spawn in fresh water, particularly on inundated floodplains when they are available, in March and April (Sommer et al. 1997; Moyle et al. 2004; Sommer et al. 2008). A substantial amount of Sacramento splittail spawning occurs in the Yolo and Sutter Bypasses and the Cosumnes River area of the Delta (Moyle et al. 2004). During drier years there is evidence that spawning occurs farther upstream (Feyrer et al. 2005). Adult Sacramento splittail migrate upstream in the lower Sacramento River to above the mouth of the Feather River and into the Sutter and Yolo Bypasses (Sommer et al. 1997; Feyrer et al. 2005; Sommer et al. 2007). Each year, mainly during the spring spawning season, a small number of individuals have been documented at the Red Bluff Pumping Plant and the entrance to the GCID intake (Moyle et al. 2004). In the Sacramento drainage, the most important spawning areas appear to be the Yolo and Sutter Bypasses, in years that they are inundated. However, some spawning occurs almost every year along inundated river edges and backwaters created by small increases in flow. Sacramento splittail spawn in the Sacramento River from Colusa to Knights Landing in most years (Feyrer et al. 2005).

Although juvenile Sacramento splittail are known to rear in upstream areas for a year or more (Baxter 1999), most move to the Delta after only a few weeks or months of rearing in floodplain habitats along the rivers (Feyrer et al. 2006). Juveniles move downstream into the Delta from April to August (Meng and Moyle 1995; Feyrer et al. 2005).

Sacramento splittail recruitment is largely limited by extent and period of inundation of floodplain spawning habitats, with abundance observed to spike following wet years and dip after dry years (Moyle et al. 2004). However, the 5- to 7-year life span buffers the adult population abundance (Sommer et al. 1997; Moyle et al. 2004). Other factors that may adversely affect the splittail population in the Delta include entrainment, predation, changed estuarine hydraulics, nonnative species (Moyle et al. 2004), pollutants (Greenfield et al. 2008), and limited food.

Sacramento splittail use the Sacramento River in the study area for migration (adult, juvenile), spawning (adult), and rearing (juveniles).

E.3.8 Hardhead

Hardhead (Mylopharodon conocephalus) is a California SSC (Moyle et al. 2015). The species is found throughout the Sacramento–San Joaquin River Basin and are fairly common in the Sacramento River and the lower reaches of the American and Feather Rivers. In other parts of their range, populations have declined or have become increasingly isolated (Moyle 2002). Hardhead also inhabit reservoirs and are abundant in a few impoundments where water level fluctuations prevent black bass from reproducing in large numbers (Moyle 2002). Hardhead tend to be absent from areas that have been highly altered (Moyle et al. 1995) or that are dominated by introduced fish species, especially centrarchids (species of the black bass and sunfish) (Moyle et al. 1995).

Hardhead spawn mainly in April and May, but some may spawn as late as August in the foothill regions of the upper San Joaquin River (Wang 2010). They migrate upstream and into tributary streams as far as 45 miles (72.4 km) to spawning sites. Spawning behavior has not been documented, but it is assumed to be similar to that of Sacramento pikeminnow, which deposit their eggs over gravel-bottomed riffles, runs, and at the head of pools (Moyle et al. 1995). Spawning substrates may also include sand and decomposed granite (Wang 2010).

Hardhead larvae and juveniles likely inhabit stream margins with abundant cover and move into deeper habitats as they grow larger. Adults occupy the deepest part of pools. Juvenile and adult hardhead are present in the Sacramento River year-round. They tend to prefer water temperatures near 67°F (19.4°C) (Thompson et al. 2012), but have been captured at RBDD, where water temperatures are generally much cooler (Tucker et al. 1998).

Hardhead occur in the Sacramento River, but are likely to enter tributary streams to spawn.

E.3.9 Central California Roach

The Sacramento–San Joaquin Roach (*Lavinia symmetricus symmetricus*), a California SSC, is part of the California Roach complex, which consists of various subspecies (Moyle 2002). Central California roach is a small (usually less than 10-cm total length), stout-bodied minnow that occurs in tributaries to the Sacramento and San Joaquin Rivers and tributaries to San Francisco Bay. Their historic distribution in the upper Sacramento River Basin is poorly understood, but their upstream range limit is thought to have been Pit River Falls (Moyle et al. 2015).

Central California roach are found in small, high gradient, often intermittent tributaries but appear to be poorly adapted to lakes and reservoirs. Where dams have been constructed on Central Valley streams, Central California roach persist only in small tributaries to the resultant reservoirs (Moyle et al. 2015). Their absence from reservoirs is likely due both to habitat alteration and to the presence of introduced predatory fish species.

They primarily inhabit small streams, but may occur in backwaters with dense riparian cover along the mainstem rivers (Baumsteiger and Moyle 2019). Central California roach frequent a wide variety of habitats, which are often isolated by downstream barriers. They are adaptable fish and tolerate relatively high water temperatures and low oxygen levels (Moyle et al. 2015). They spawn from March through early July, usually when water temperatures exceed about 61°F (16.1°C) (Moyle 2002). Hatching takes place in 2 to 3 days, and fry remain in crevices until they can actively swim. Roach are omnivores, eating such items as terrestrial insects, filamentous algae, aquatic insect larvae and adults, crustaceans, and detritus.

Central California roach are likely to occur in the Sacramento River, although they are probably less common in the Sacramento River than other fish species.

E.3.10 Striped Bass

Striped bass (*Morone saxatilis*) has no state or federal listing status, nor does the species have any other special status in California other than being an important recreational species.

Striped bass are one of the most abundant fish in the San Francisco Bay estuary and are widely distributed along the Pacific Coast (Moyle, 2002). They are the most important sportfish in the estuary. Striped bass spend most of their lives in San Pablo and San Francisco bays and move upstream to spawn. Spawning can occur as early as April but peaks during May and early June when water temperatures range from 14 to 20°C. Spawning occurs in the Delta and in the Sacramento River. In the Sacramento River, striped bass spawn from below the mouth of the Feather River upstream to above Colusa (Moyle, 2002). Striped bass spawn in open water, and their eggs must remain suspended in the current to prevent mortality. Embryos and larvae in the Sacramento River are carried into the Delta and Suisun Bay, where rearing appears to be best (Moyle, 2002). Adult striped bass are open-water predators and opportunistic feeders.

Striped bass are found in the Sacramento River portion of the study area for migration and rearing, but most spawning occurs in the Sacramento River between Sacramento and Colusa. Striped bass are not expected to occur in Butte and Big Chico creeks because of the small size of these streams.

E.3.11 American Shad

American shad (*Alosa sapidissima*) have no state or federal listing status, nor does the species have any other special status in California other than being an important recreational species.

American shad are native to the Atlantic coast and were planted in the Sacramento River from 1871 to 1881. They are found along the West Coast of North American, from Todos Santos Bay in Mexico to Cook Inlet, Alaska, as well along the Kamchatka Peninsula in Russia (Moyle 2002). In the Central Valley, American shad occur in the Sacramento River, its major tributaries (American, Feather, and Yuba rivers), the San Joaquin River, and the Delta.

Adult American shad typically enter Central Valley streams from the ocean from late March through early July, with the spawning migration peaking from mid-May through June (Moyle 2002). Water temperature is an important factor influencing the timing of spawning. American shad are reported to spawn at water temperatures ranging from approximately 46 to 78.8°F (Wang 2010), although optimal spawning temperatures are reported to range from approximately 60 to 70°F. When suitable spawning conditions are found, American shad school and broadcast their eggs throughout the water column. Spawning takes place mostly in the main channels of rivers. At 62°F, eggs hatch in 6 to 8 days. Larval American shad have been found in off-channel floodplain habitats. The Sacramento River from Colusa to the north Delta is believed to be the main summer nursery area for young American shad (Moyle 2002).

American shad use the Sacramento River within the study area for migration, and rearing, and possibly spawning.

E.3.12 Black Bass

Largemouth, smallmouth, and spotted bass (*Micropterus* spp.) have no state or federal listing status, nor do these species have any other special status in California other than being an important recreational species.

Largemouth, smallmouth, and spotted bass are native to the Mississippi River drainage. They were introduced into California during the late 1800s and have since spread to the most suitable waters. Largemouth and smallmouth bass are an important sport fishery component of the Central Valley and are one of the most sought-after warm water game fish in the state. Largemouth bass are extremely vulnerable to angling, and this vulnerability helps to support a popular fishery, including bass tournaments that are popular among amateur and professional bass anglers. They are more successful in disturbed environments than are native species. In general, they are adapted to warm, slow-moving, and nutrient rich waters (Moyle 2002).

Largemouth, smallmouth, and spotted bass mostly spawn during the spring and summer. Males build nests in sand, gravel, or debris-laden bottoms. The eggs adhere to the substrate and hatch in several days. The sac fry usually spend about 1 week in or around the nest, and are guarded by the parental male. In reservoirs, these species spawn in the nearshore, shallow littoral zone and are susceptible to reduced spawning success from reservoir fluctuations. For the first 1 or 2 months, fry feed mainly on rotifers and small crustaceans. By the time they are 2 to 3 inches long, they feed primarily on aquatic insects and fish fry. After reaching a length of 4 inches, adults feed primarily on fish (both native and introduced species) and large aquatic invertebrates (Moyle, 2002).

The Sacramento River provides suitable habitat for largemouth, smallmouth, and spotted bass

E.4 Literature

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Appendix F

Air Quality Calculations and Assumptions

Schedule

Phase	Phase	Start Date	End Date	Working Days
1	Utility Relocations (PG&E, Frontier)	1/1/2023	4/15/2023	75
2	Clear (trees only to limit risk of nesting birds)	1/15/2023	2/1/2023	13
3	Grub (stump removal, etc.)	4/15/2023	5/15/2023	21
4	HazMat Removal - Structures	4/1/2023	4/15/2023	10
5	Demo Structures	4/15/2023	5/1/2023	11
6	2nd Street Widening	4/24/2023	4/28/2023	5
7	SWPPP BMP's/Enviro Fencing	4/15/2023	5/1/2023	14
8	Set Control/Stake Limits	4/15/2023	5/1/2023	11
9	Set K-Rail	4/20/2023	5/7/2023	12
10	Remove Gates/Fences/Stumps	4/20/2023	4/25/2023	4
11	Cut & Cap Storm Drain Discharge LM 33.04	4/20/2023	4/25/2023	4
12	Levee Degrade	5/1/2023	5/16/2023	14
13	Irrigation Bypass LM 32.45 (24")	5/7/2023	5/15/2023	7
14	Irrigation Bypass LM 32.76 (24")	5/21/2023	5/30/2023	8
15	Remove Pipe LM 31.87 (18")	5/15/2023	5/21/2023	6
16	Remove Pipe LM 31.89 (12")	5/15/2023	5/21/2023	6
17	Remove Pipe - LM 32.27 (2 EA 4")	5/15/2023	5/21/2023	6
18	Remove Pipe - LM 32.45 (24")	5/15/2023	5/21/2023	6
19	Remove Pipe - LM 32.70 (36")	5/1/2023	5/7/2023	6
20	Remove Pipe - LM 32.76 (24")	6/1/2023	6/7/2023	6
21	Sub-Degrade Cap	5/24/2023	6/5/2023	11
22	SB Cutoff Wall Mob	5/15/2023	6/5/2023	16
23	SB Cutoff Wall	6/1/2023	7/15/2023	39
24	Remove Temporary Wall Cap	7/1/2023	8/7/2023	32
25	Levee Regrade	7/7/2023	8/31/2023	48
26	Track Walk Slopes	8/15/2023	8/31/2023	15
27	SCCB Wall Mob	8/7/2023	8/21/2023	11
28	SCCB Wall	9/1/2023	9/7/2023	6
29	Pipe Replacements (32.45, 32.76, 33.04)	8/7/2023	10/31/2023	74
30	Crown Road AB	9/24/2023	10/24/2023	26
31	Rock Slope Protection	9/1/2023	9/15/2023	13
32	Hydroseed	10/24/2023	11/7/2023	13
33	Reconstruct Gates/Fences	10/24/2023	11/7/2023	11
34	Remove K-Rail	11/1/2023	11/15/2023	11
35	De-Mob	10/24/2023	11/30/2023	28

Offroad Equipment

Phase	Equipment	Hrs/day	HP	LF	Fuel	Pounds per Day								
						ROG	NOX	CO	PM10E	PM2.5E	SO2	CO2	CH4	N2O
2	Excavators	8	158	0.38	Diesel	0.2	1.6	3.3	0.1	0.1	0.0	503	0.2	0.0
3	Excavators	8	158	0.38	Diesel	0.2	1.6	3.3	0.1	0.1	0.0	503	0.2	0.0
4	Excavators	8	158	0.38	Diesel	0.2	1.6	3.3	0.1	0.1	0.0	503	0.2	0.0
5	Excavators	8	158	0.38	Diesel	0.2	1.6	3.3	0.1	0.1	0.0	503	0.2	0.0
5	Skid Steer Loaders	8	65	0.37	Diesel	0.1	1.4	1.5	0.0	0.0	0.0	223	0.1	0.0
6	Excavators	8	158	0.38	Diesel	0.2	1.6	3.3	0.1	0.1	0.0	503	0.2	0.0
6	Rollers	8	80	0.38	Diesel	0.3	2.1	2.3	0.1	0.1	0.0	278	0.1	0.0
6	Plate Compactors	8	8	0.43	Diesel	0.0	0.3	0.2	0.0	0.0	0.0	34	0.0	0.0
6	Graders	8	187	0.41	Diesel	0.5	4.8	4.7	0.3	0.2	0.0	645	0.2	0.0
7	Skid Steer Loaders	8	65	0.37	Diesel	0.1	1.4	1.5	0.0	0.0	0.0	223	0.1	0.0
7	Forklifts	8	89	0.20	Diesel	0.1	1.0	1.2	0.1	0.1	0.0	149	0.0	0.0
9	Excavators	10	158	0.38	Diesel	0.2	1.9	4.1	0.1	0.1	0.0	628	0.2	0.0
9	Forklifts	10	89	0.20	Diesel	0.1	1.2	1.4	0.1	0.1	0.0	186	0.1	0.0
10	Excavators	8	158	0.38	Diesel	0.2	1.6	3.3	0.1	0.1	0.0	503	0.2	0.0
11	Tractors/Loaders/Backhoes	8	97	0.37	Diesel	0.2	1.5	2.2	0.1	0.1	0.0	300	0.1	0.0
12	Excavators	20	158	0.38	Diesel	0.5	3.9	8.2	0.2	0.2	0.0	1,257	0.4	0.0
12	Rubber Tired Dozers	10	247	0.40	Diesel	0.8	8.8	3.8	0.4	0.4	0.0	1,022	0.3	0.0
12	Plate Compactors	10	8	0.43	Diesel	0.1	0.3	0.3	0.0	0.0	0.0	43	0.0	0.0
13	Excavators	10	158	0.38	Diesel	0.2	1.9	4.1	0.1	0.1	0.0	628	0.2	0.0
13	Forklifts	10	89	0.20	Diesel	0.1	1.2	1.4	0.1	0.1	0.0	186	0.1	0.0
13	Generator Sets	10	84	0.74	Diesel	0.7	5.0	5.2	0.2	0.2	0.0	779	0.1	0.0
14	Excavators	6	158	0.38	Diesel	0.1	1.2	2.5	0.1	0.1	0.0	377	0.1	0.0
14	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
14	Generator Sets	10	84	0.74	Diesel	0.7	5.0	5.2	0.2	0.2	0.0	779	0.1	0.0
15	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
15	Rubber Tired Dozers	3	247	0.40	Diesel	0.2	2.2	1.0	0.1	0.1	0.0	255	0.1	0.0
15	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
15	Plate Compactors	3	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	11	0.0	0.0
16	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
16	Rubber Tired Dozers	3	247	0.40	Diesel	0.2	2.2	1.0	0.1	0.1	0.0	255	0.1	0.0
16	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
16	Plate Compactors	3	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	11	0.0	0.0
17	Excavators	5	158	0.38	Diesel	0.1	1.0	2.0	0.0	0.0	0.0	314	0.1	0.0
18	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
18	Rubber Tired Dozers	3	247	0.40	Diesel	0.2	2.2	1.0	0.1	0.1	0.0	255	0.1	0.0
18	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
18	Plate Compactors	3	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	11	0.0	0.0
19	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
19	Rubber Tired Dozers	3	247	0.40	Diesel	0.2	2.2	1.0	0.1	0.1	0.0	255	0.1	0.0
19	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
19	Plate Compactors	3	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	11	0.0	0.0
20	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0

20	Rubber Tired Dozers	3	247	0.40	Diesel	0.2	2.2	1.0	0.1	0.1	0.0	255	0.1	0.0
20	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
20	Plate Compactors	3	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	11	0.0	0.0
21	Rubber Tired Dozers	5	247	0.40	Diesel	0.4	4.4	1.9	0.2	0.2	0.0	511	0.2	0.0
21	Plate Compactors	8	8	0.43	Diesel	0.0	0.2	0.2	0.0	0.0	0.0	32	0.0	0.0
21	Graders	5	187	0.41	Diesel	0.3	3.0	2.9	0.2	0.2	0.0	403	0.1	0.0
22	Excavators	3	158	0.38	Diesel	0.1	0.5	1.0	0.0	0.0	0.0	157	0.1	0.0
22	Forklifts	5	89	0.20	Diesel	0.1	0.6	0.7	0.0	0.0	0.0	93	0.0	0.0
22	Graders	3	187	0.41	Diesel	0.2	1.5	1.5	0.1	0.1	0.0	202	0.1	0.0
23	Excavators	22	158	0.38	Diesel	0.5	4.3	9.0	0.2	0.2	0.0	1,382	0.4	0.0
23	Rubber Tired Dozers	1	247	0.40	Diesel	0.1	0.9	0.4	0.0	0.0	0.0	102	0.0	0.0
23	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	51	0.0	0.0
23	Generator Sets	11	84	0.74	Diesel	0.8	5.6	5.8	0.2	0.2	0.0	857	0.1	0.0
24	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
25	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
25	Rubber Tired Dozers	18	247	0.40	Diesel	1.5	15.4	6.7	0.7	0.6	0.0	1,788	0.6	0.0
25	Plate Compactors	15	8	0.43	Diesel	0.1	0.5	0.4	0.0	0.0	0.0	65	0.0	0.0
25	Graders	8	187	0.41	Diesel	0.5	4.5	4.4	0.2	0.2	0.0	605	0.2	0.0
26	Rubber Tired Dozers	13	247	0.40	Diesel	1.1	11.0	4.8	0.5	0.5	0.0	1,277	0.4	0.0
27	Excavators	2	158	0.38	Diesel	0.0	0.4	0.8	0.0	0.0	0.0	126	0.0	0.0
27	Forklifts	4	89	0.20	Diesel	0.1	0.5	0.6	0.0	0.0	0.0	74	0.0	0.0
27	Cranes	2	231	0.29	Diesel	0.1	0.9	0.5	0.0	0.0	0.0	139	0.0	0.0
28	Excavators	8	158	0.38	Diesel	0.2	1.6	3.4	0.1	0.1	0.0	518	0.2	0.0
28	Generator Sets	11	84	0.74	Diesel	0.8	5.6	5.8	0.2	0.2	0.0	857	0.1	0.0
29	Excavators	5	158	0.38	Diesel	0.1	1.0	2.0	0.0	0.0	0.0	314	0.1	0.0
29	Forklifts	3	89	0.20	Diesel	0.0	0.3	0.4	0.0	0.0	0.0	46	0.0	0.0
29	Plate Compactors	3	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	11	0.0	0.0
29	Tractors/Loaders/Backhoes	3	97	0.37	Diesel	0.0	0.5	0.7	0.0	0.0	0.0	94	0.0	0.0
30	Rollers	20	80	0.38	Diesel	0.9	5.2	5.6	0.3	0.3	0.0	696	0.2	0.0
30	Graders	10	187	0.41	Diesel	0.7	6.0	5.8	0.3	0.3	0.0	806	0.3	0.0
31	Excavators	18	158	0.38	Diesel	0.4	3.4	7.2	0.2	0.2	0.0	1,099	0.4	0.0
31	Rubber Tired Dozers	5	247	0.40	Diesel	0.4	4.4	1.9	0.2	0.2	0.0	511	0.2	0.0
33	Excavators	2	158	0.38	Diesel	0.0	0.4	0.8	0.0	0.0	0.0	126	0.0	0.0
34	Excavators	8	158	0.38	Diesel	0.2	1.5	3.1	0.1	0.1	0.0	471	0.2	0.0
34	Forklifts	8	89	0.20	Diesel	0.1	0.9	1.1	0.1	0.1	0.0	139	0.0	0.0
35	Excavators	2	158	0.38	Diesel	0.0	0.4	0.8	0.0	0.0	0.0	126	0.0	0.0
35	Rubber Tired Dozers	2	247	0.40	Diesel	0.2	1.8	0.8	0.1	0.1	0.0	204	0.1	0.0
35	Rollers	2	80	0.38	Diesel	0.1	0.5	0.6	0.0	0.0	0.0	70	0.0	0.0
35	Skid Steer Loaders	2	65	0.37	Diesel	0.0	0.4	0.4	0.0	0.0	0.0	56	0.0	0.0
35	Forklifts	2	89	0.20	Diesel	0.0	0.2	0.3	0.0	0.0	0.0	37	0.0	0.0
35	Plate Compactors	2	8	0.43	Diesel	0.0	0.1	0.1	0.0	0.0	0.0	9	0.0	0.0
35	Tractors/Loaders/Backhoes	2	97	0.37	Diesel	0.0	0.4	0.6	0.0	0.0	0.0	75	0.0	0.0
35	Cranes	2	231	0.29	Diesel	0.1	0.9	0.5	0.0	0.0	0.0	139	0.0	0.0
35	Graders	2	187	0.41	Diesel	0.1	1.2	1.2	0.1	0.1	0.0	161	0.1	0.0

Onsite Onroad

						Pounds per Day										
Phase	Vehicle	Vehicle Type	Trips/day	Miles/day	Fuel	ROG	NOX	CO	PM10E	PM2.5E	PM10D	PM2.5D	SO2	CO2	CH4	N2O
1	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
2	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
3	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
4	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
5	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
6	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
7	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
10	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
11	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
12	Line Truck/Mechanic Truck	MHDT	1	20	Diesel	0.0	0.3	0.1	0.0	0.0	9.0	0.9	0.0	131	0.0	0.0
13	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
14	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
15	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
16	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
17	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
18	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
19	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
20	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
21	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
22	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
23	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
24	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
25	Line Truck/Mechanic Truck	MHDT	1	20	Diesel	0.0	0.3	0.1	0.0	0.0	9.0	0.9	0.0	131	0.0	0.0
27	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
28	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
29	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
30	Line Truck/Mechanic Truck	MHDT	1	20	Diesel	0.0	0.3	0.1	0.0	0.0	9.0	0.9	0.0	131	0.0	0.0
31	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
32	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
33	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
34	Line Truck/Mechanic Truck	MHDT	1	2	Diesel	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	13	0.0	0.0
35	Line Truck/Mechanic Truck	MHDT	1	10	Diesel	0.0	0.2	0.1	0.0	0.0	4.5	0.5	0.0	65	0.0	0.0
6	Water Truck	MHDT	8	1	Diesel	0.0	0.1	0.1	0.0	0.0	0.4	0.0	0.0	8	0.0	0.0
12	Water Truck	MHDT	40	80	Diesel	0.1	1.6	0.7	0.0	0.0	36.2	3.6	0.0	536	0.0	0.0
21	Water Truck	MHDT	40	80	Diesel	0.1	1.6	0.7	0.0	0.0	36.2	3.6	0.0	536	0.0	0.0
25	Water Truck	MHDT	40	80	Diesel	0.1	1.6	0.7	0.0	0.0	36.2	3.6	0.0	536	0.0	0.0
30	Water Truck	MHDT	40	80	Diesel	0.1	1.6	0.7	0.0	0.0	36.2	3.6	0.0	536	0.0	0.0
32	Water Truck	MHDT	4	8	Diesel	0.0	0.2	0.1	0.0	0.0	3.6	0.4	0.0	54	0.0	0.0

Offsite Onroad

Phase	Vehicle	Vehicle Type	Trips/day	Miles/day	Fuel	Pounds per Day ROG	NOX	CO	PM10E	PM2.5E	PM10D	PM2.5D	SO2	CO2	CH4	N2O
1	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
2	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
3	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
4	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
5	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
6	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
7	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
8	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
9	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
10	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
11	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
12	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
13	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
14	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
15	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
16	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
17	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
18	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
19	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
20	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
21	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
22	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
23	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
24	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
25	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
26	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
27	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
28	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
29	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
30	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
31	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
32	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
33	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
34	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
35	Pickup	LDT	1	100	Mix	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	79	0.0	0.0
1	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
2	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
3	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
4	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
5	Worker	LDA-LDT	3	270	Mix	0.0	0.1	0.7	0.0	0.0	0.4	0.1	0.0	188	0.0	0.0
6	Worker	LDA-LDT	7	630	Mix	0.1	0.1	1.7	0.0	0.0	0.8	0.2	0.0	440	0.0	0.0
7	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
8	Worker	LDA-LDT	2	180	Mix	0.0	0.0	0.5	0.0	0.0	0.2	0.1	0.0	126	0.0	0.0
9	Worker	LDA-LDT	8	720	Mix	0.1	0.2	2.0	0.0	0.0	0.9	0.2	0.0	503	0.0	0.0

10	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
11	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
12	Worker	LDA-LDT	6	540	Mix	0.0	0.1	1.5	0.0	0.0	0.7	0.2	0.0	377	0.0	0.0
13	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
14	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
15	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
16	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
17	Worker	LDA-LDT	6	540	Mix	0.0	0.1	1.5	0.0	0.0	0.7	0.2	0.0	377	0.0	0.0
18	Worker	LDA-LDT	8	720	Mix	0.1	0.2	2.0	0.0	0.0	0.9	0.2	0.0	503	0.0	0.0
19	Worker	LDA-LDT	8	720	Mix	0.1	0.2	2.0	0.0	0.0	0.9	0.2	0.0	503	0.0	0.0
20	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
21	Worker	LDA-LDT	17	1,530	Mix	0.1	0.3	4.1	0.0	0.0	2.0	0.5	0.0	1,068	0.0	0.0
22	Worker	LDA-LDT	15	1,350	Mix	0.1	0.3	3.7	0.0	0.0	1.8	0.4	0.0	942	0.0	0.0
23	Worker	LDA-LDT	7	630	Mix	0.1	0.1	1.7	0.0	0.0	0.8	0.2	0.0	440	0.0	0.0
24	Worker	LDA-LDT	3	270	Mix	0.0	0.1	0.7	0.0	0.0	0.4	0.1	0.0	188	0.0	0.0
25	Worker	LDA-LDT	8	720	Mix	0.1	0.2	2.0	0.0	0.0	0.9	0.2	0.0	503	0.0	0.0
26	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
27	Worker	LDA-LDT	15	1,350	Mix	0.1	0.3	3.7	0.0	0.0	1.8	0.4	0.0	942	0.0	0.0
28	Worker	LDA-LDT	6	540	Mix	0.0	0.1	1.5	0.0	0.0	0.7	0.2	0.0	377	0.0	0.0
29	Worker	LDA-LDT	12	1,080	Mix	0.1	0.2	2.9	0.0	0.0	1.4	0.3	0.0	754	0.0	0.0
30	Worker	LDA-LDT	6	540	Mix	0.0	0.1	1.5	0.0	0.0	0.7	0.2	0.0	377	0.0	0.0
31	Worker	LDA-LDT	5	450	Mix	0.0	0.1	1.2	0.0	0.0	0.6	0.1	0.0	314	0.0	0.0
32	Worker	LDA-LDT	8	720	Mix	0.1	0.2	2.0	0.0	0.0	0.9	0.2	0.0	503	0.0	0.0
33	Worker	LDA-LDT	4	360	Mix	0.0	0.1	1.0	0.0	0.0	0.5	0.1	0.0	251	0.0	0.0
34	Worker	LDA-LDT	8	720	Mix	0.1	0.2	2.0	0.0	0.0	0.9	0.2	0.0	503	0.0	0.0
35	Worker	LDA-LDT	10	900	Mix	0.1	0.2	2.4	0.0	0.0	1.2	0.3	0.0	628	0.0	0.0
7	Vendor	MHDT-HHDT	0	12	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39	0.0	0.0
9	Vendor	MHDT-HHDT	9	936	Diesel	0.1	3.5	0.9	0.1	0.1	1.4	0.3	0.0	2,928	0.0	0.4
13	Vendor	MHDT-HHDT	1	52	Diesel	0.0	0.2	0.1	0.0	0.0	0.1	0.0	0.0	163	0.0	0.0
14	Vendor	MHDT-HHDT	1	52	Diesel	0.0	0.2	0.1	0.0	0.0	0.1	0.0	0.0	163	0.0	0.0
22	Vendor	MHDT-HHDT	1	104	Diesel	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	325	0.0	0.0
23	Vendor	MHDT-HHDT	1	104	Diesel	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	325	0.0	0.0
27	Vendor	MHDT-HHDT	1	104	Diesel	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	325	0.0	0.0
28	Vendor	MHDT-HHDT	1	104	Diesel	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	325	0.0	0.0
29	Vendor	MHDT-HHDT	1	104	Diesel	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	325	0.0	0.0
32	Vendor	MHDT-HHDT	1	20	Diesel	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	64	0.0	0.0
33	Vendor	MHDT-HHDT	1	40	Diesel	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	126	0.0	0.0
34	Vendor	MHDT-HHDT	9	936	Diesel	0.1	3.5	0.9	0.1	0.1	1.4	0.3	0.0	2,928	0.0	0.4
35	Vendor	MHDT-HHDT	2	208	Diesel	0.0	0.8	0.2	0.0	0.0	0.3	0.1	0.0	651	0.0	0.1
6	Haul	HHDT	10	50	Diesel	0.0	0.4	0.2	0.0	0.0	0.1	0.0	0.0	196	0.0	0.0
21	Haul	HHDT	120	600	Diesel	0.1	4.4	1.8	0.0	0.0	0.9	0.2	0.0	2,355	0.0	0.4
23	Haul	HHDT	1	65	Diesel	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	228	0.0	0.0
25	Haul	HHDT	120	600	Diesel	0.1	4.4	1.8	0.0	0.0	0.9	0.2	0.0	2,355	0.0	0.4
28	Haul	HHDT	1	65	Diesel	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	228	0.0	0.0
30	Haul	HHDT	25	2,000	Diesel	0.1	8.2	0.8	0.1	0.1	3.0	0.8	0.1	7,000	0.0	1.1
31	Haul	HHDT	15	90	Diesel	0.0	0.6	0.2	0.0	0.0	0.1	0.0	0.0	346	0.0	0.1

Earthmoving, Demolition, and Paving

Phase	Grading (acres/day)	Dozing (hr/day)	Cut/fill (cy/day)	Pounds PM10D	Pounds PM2.5D
12	1.20	10	5,500	9.9	4.4
21	0.50	8	1,800	6.5	3.2
25	0.75	8	3,500	7.1	3.3

Phase	Demo (sf)	Demo (sf/day)	Pounds PM10D	Pounds PM2.5D
5	82,000	7,455	7.6	1.2

Phase	Paving (sf/day)	Striping (sf/day)	Pounds ROG
6	1,133	68	0.1

Batching

Phase	Daily Ton	Total Ton	Pounds per day PM10 (abated)					
			Sand Transfer	Aggregate Transfer	Cement Unloading	Cement Supplement Unloading	Weight Hopper Loading	Truck Mix Loading
28	203	1340	0.02	0.09	0.01	0.02	0.14	0.75

Phase	Daily Ton	Total Ton	Pounds per day PM2.5 (abated)					
			Sand Transfer	Aggregate Transfer	Cement Unloading	Cement Supplement Unloading	Weight Hopper Loading	Truck Mix Loading
28	203	1340	0.01	0.05	0.00	0.00	0.07	0.11

Electricity

Year	MWh/year	lb/MWh*			Metric Tons per Year			
		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2e
2023	10	2.68	0.032	0.004	0.0122	0.0001	0.0000	0.0212

*PG&E 2021; egrid 2022

Grimes Trees - Colusa County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Grimes Trees
Colusa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	56
Climate Zone	1			**Operational Year**	2024
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.00	1.00
tblSequestration	NumberOfNewTrees	0.00	190.00
tblSequestration	NumberOfNewTrees	0.00	12.00
tblSequestration	NumberOfNewTrees	0.00	1.00
tblSequestration	NumberOfNewTrees	0.00	1.00

Emissions Summary

	Total CO2	CH4	N2O	CO2e
Category	MT			

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Unmitigated	151.018	0	0	151.018

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Cedar/Larch	1	0.528	0	0	0.528
Mixed Hardwood	190	139.46	0	0	139.46
Pine	1	0.638	0	0	0.638
Soft Maple	12	10.392	0	0	10.392
Total		**151.018**	**0**	**0**	**151.018**