2022 – 2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations

Draft Environmental Assessment/ Initial Study

CGB-EA-2022-012

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U.S. Department of the Interior, Bureau of Reclamation
California Great Basin Region
Sacramento, California

Sites Project Authority
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Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

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

The mission of the Sites Project Authority is to provide affordable water sustainably managed for California's farms, cities, and environment for generations to come.

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Acronyms

AB	Assembly Bill
ADL	aerially deposited lead
ARB	California Air Resources Board
AST	aboveground storage tank
Authority	Sites Project Authority
BMP	best management practice
CAAQS	California Ambient Air Quality Standards
CCAPCD	Colusa County Air Pollution Control District
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society
CO	carbon monoxide
CPT	cone penetration test
CRHR	California Register of Historical Resources
CUPA	Certified Unified Program Agencies
CWA	Clean Water Act
dB	decibels
DOC	Department of Conservation
DOI	U.S. Department of the Interior
DWR	California Department of Water Resources
EA	Environmental Assessment
EA/IS	Environmental Assessment/Initial Study
EIS	Environmental Impact Statement
ERI/ERT	Electrical resistivity imaging/tomography
ESA	Endangered Species Act
FHSZ	fire hazards severity zone
FONSI	Finding of No Significant Impact

GCAPCD	Glenn County Air Pollution Control District
GCID	Glenn-Colusa Irrigation District
GIS	Geographic Information System
GHG	Greenhouse Gas
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HSP	Health and Safety Plan
I-5	Interstate 5
IS	Initial Study
ITA	Indian Trust Assets
MCL	Maximum Contaminant Levels
MM	mitigation measures
msl	mean sea level
MT CO_2e	metric tons of carbon dioxide equivalent
NAHC	California Native American Heritage Commission
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NO_2	nitrogen dioxide
0_3	ozone
OPR	Governor's Office of Planning and Research
Pb	lead
PEC	potential environmental concern
PG&E	Pacific Gas & Electric
$PM_{2.5}$	fine particulate matter
PM_{10}	inhalable particulate matter
PRC	California Public Resources Code
Reclamation	U.S. Bureau of Reclamation
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SCPT	seismic cone penetration test
SHPO	State Historic Preservation Office
SIP	state implementation plan
SO_2	sulfur dioxide
SR	State Route
SVAB	Sacramento Valley Air Basin
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
TC	Tehama Colusa Canal

TCR	Tribal Cultural Resources
TDS	total dissolved solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
YSAQMD	Yolo Solano Air Quality Management District

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1 Introduction/Purpose and Need

This Environmental Assessment (EA)/Initial Study (IS) was jointly prepared by the Bureau of Reclamation (Reclamation) and the Sites Project Authority (Authority), to satisfy the requirements of both the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) for the proposed 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations ("Proposed Action"). Reclamation and the Authority are proposing to conduct geotechnical, geologic and geophysical investigations ("investigations") in Glenn, Colusa, and Yolo Counties. These investigations are intended to provide technical information to assist in the ongoing efforts to formulate and refine the engineering design and to assist in the preparation of permit applications for the proposed Sites Reservoir and its associated facilities in western Sacramento Valley.

1.1 Background

The proposed Sites Reservoir would include construction and operation of a new offstream storage reservoir with a capacity of approximately 1.3-1.5 million acre-feet and associated water management facilities. The reservoir would be located approximately 10 miles west of the town of Maxwell, in both Glenn and Colusa Counties. Other proposed Sites Reservoir facilities would be located in Glenn, Colusa, Tehama, and Yolo Counties.

The proposed Sites Reservoir would use existing infrastructure to divert unappropriated flow from the Sacramento River at Red Bluff and Hamilton City and convey the water to a new offstream reservoir. New and existing facilities would move water into and out of the reservoir, with ultimate release back to the Sacramento River system via existing canals and a new pipeline proposed near Dunnigan, California. The proposed Sites Reservoir would require modifications to the Glenn-Colusa Irrigation District (GCID) system and the Tehama-Colusa (TC) Canal to move water into and out of the reservoir. Water conveyance between the proposed Sites Reservoir and the canals and Dunnigan pipeline would be facilitated by one existing and one new regulating reservoir and two new associated pumping/generating plants.

Reclamation and the Authority are proposing to conduct geologic, geotechnical, and geophysical investigations to provide technical information to assist in formulating and refining the engineering design and assist in the preparation of permit applications for the proposed Sites Reservoir.

Previous geotechnical explorations that have been undertaken in support of the proposed Sites Reservoir were found to be categorically excluded from NEPA under Bureau of Reclamation Departmental Manual Exclusion Category, Series 31, Part 516, Chapter 14, B(3), which covers "data collection studies that involve test excavations for cultural resources investigations or test pitting, drilling, or seismic investigations for geologic exploration purposes where the impacts will be localized" and that have no extraordinary circumstances that could trigger further analysis. The efforts were also exempt from the provisions of CEQA under Categorical Exemption Class 6 *Information Collection*, which exempts those activities "which do not result in a serious or major disturbance to an environmental resource. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded" (CEQA Guidelines 15306).

Those initial geotechnical explorations provided data to inform the proposed Sites Reservoir design very early in the process and there was a high level of flexibility in determining the exploration sites. That flexibility enabled the Authority and Reclamation to ensure avoidance of potential adverse environmental effects, meeting the criteria of a NEPA exclusion and CEQA exemption. As the Authority and Reclamation have since refined the proposed Sites Reservoir design, the Authority and Reclamation retain flexibility in determining locations for subsequent investigations, but will need to restrict investigations to a general footprint of interest relevant to the more mature engineering design. In addition, parcel access remains limited for field surveys. Because of the more constricted area within which data is needed, Reclamation and the Authority determined that an EA/IS should be prepared to address the potential environmental effects of the proposed investigations.

Much of the environmental and regulatory setting information in this EA/IS is derived from the numerous technical analyses and studies and extensive data gathering efforts that have been conducted to date for the evaluation of the proposed Sites Reservoir Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement. To supplement this information, the Authority conducted a comprehensive desktop analysis to identify locations for proposed investigations that would avoid and minimize effects on sensitive resources during early development of the Proposed Action. In support of this effort, the Authority referenced biological and cultural survey data collected by the California Department of Fish and Wildlife (CDFW) and the California Department of Water Resources (DWR) in much of the proposed Sites Reservoir footprint in Colusa and Glenn Counties in the early 2000s, as well as more recent wetland and waters mapping.

It is important to note that the current Proposed Action, consisting of the proposed geologic, geotechnical, and geophysical investigations, is a preliminary action that is necessary to obtain the requisite data and information to support the ongoing efforts to formulate and refine the design of the proposed Sites Reservoir. The current Proposed Action does not in any way commit Reclamation or the Authority (or any other party) to any definite course of action regarding the proposed Sites Reservoir, including the evaluation of alternatives and mitigation measures under CEQA and NEPA, which has been done separate from this EA/IS. Reclamation and the Authority's decisions on whether, and if so, how, to approve the proposed Sites Reservoir will not be made until a Sites Reservoir Final Environmental Impact Report/Environmental Impact Statement is completed and considered by the decision-makers.[1]

1.2 Proposed Action Area

The Proposed Action is located in Glenn, Colusa, and Yolo Counties in Northern California. The Proposed Action vicinity is shown in Figure 1-1 and investigation locations are shown in Figure 1-2. The Proposed Action Area generally includes the areas in and near the Antelope Valley in Colusa and Glenn Counties where the dams, reservoirs, pipelines, and related facilities could be located for the proposed Sites Reservoir, along with areas near the town of Dunnigan in Yolo County where pipelines and related facilities could be located for the proposed Sites Reservoir.

1.3 Purpose and Need and Project Objectives

The Proposed Action purpose and need and objectives are defined in the following sections.

1.3.1 Statement of Purpose and Need

The NEPA purpose and need for the Proposed Action is to conduct geologic, geotechnical, and geophysical investigations to obtain information necessary to support the ongoing engineering evaluations and design development for the proposed Sites Reservoir and associated facilities. Results from the investigations will also assist in the preparation of permit applications for the proposed Sites Reservoir and associated facilities.

1.3.2 Objectives

The CEQA objectives for the Proposed Action are the same as the statement of purpose above. In addition, the Authority has the goal of conducting these field investigation and survey efforts in a way that avoids and minimizes impacts to resources, including biological, cultural and Tribal resources, to the extent possible, while still collecting the necessary information.

- [1] A Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) was publicly released for the proposed Sites Reservoir Project on November 12, 2021.

1.4 Application of NEPA and CEQA Terminology and Processes in this EA/IS

NEPA and CEQA require preparation of an environmental analysis to evaluate the potential environmental effects of proposed actions (and, in some cases, alternatives to those actions) that are subject to governmental approval. While many concepts are common to NEPA and CEQA, there are several differences between the two in terminology, procedures, environmental document content, and substantive mandates to protect the environment. Under NEPA, an EA is prepared for a proposed action that is not likely to have a significant effect on the environment or to determine whether a proposed action would have a significant effect. (40 C.F.R. § 1501.5.) Under CEQA, an IS is prepared to determine whether a proposed project would cause a significant environmental effect. (CEQA Guidelines §§ 15063, 15064.)

Most of the environmental resource areas assessed in an EA and an IS are the same; evaluation of these resources can be found in Sections 3.2 to 3.12. For each resource, the potential for effects are described. This EA/IS does not provide NEPA findings, which will be stated in Reclamation's findings documentation (that is, Finding of No Significant Impact [FONSI], Mitigated FONSI, Environmental Impact Statement [EIS], or project disapproval). To comply with NEPA, an EA is also required to assess Environmental Justice, Indian Trust Assets, and Socioeconomics; these analyses can be found in Section 4 – Additional NEPA Requirements. In compliance with CEQA, under each resource area's consequences section, a CEQA determination is clearly stated. Following any CEQA determination of potential significant effect, mitigation that can avoid or minimize that effect is provided.

To improve readability of this document, NEPA terminology has been used and is intended to also represent the correlated activity in CEQA. As a result, the EA/IS generally uses the NEPA terms Proposed Action, No Action (Alternative), Affected Environment, and Environmental Consequences; these terms also represent CEQA's Proposed Project, No Project, Environmental Setting, and Environmental Impacts, respectively. The only exception is in those sections specific to CEQA (that is, CEQA Significance Criteria and CEQA Determination subsections). Comparability between the No Action Alternative and the No Project Alternative is discussed further in Section 2.1 – No Action.

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Figure 1-1
Proposed Action Area

Legend

Proposed Action Area

Antelope Valley

Dunnigan Area

0 2.5 5 10
Miles

Notes:

Basemap Source: ESRI, 2020
Coordinate System: NAD 1983 CA Zone II
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88, U.S. Feet

Path: \\PDCO1\RDSGIS1\Projects_1\Sites_PA\00528_20\Figures\Doc\GeoTechPermits\EA_EIS\Figure_1_4_1_ProjectLocation.mxd; Author: ; Date: 4/20/2022

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Figure 1-2, Proposed Geologic, Geophysical, and Geotechnical Investigation Locations

LEGEND

- Geotechnical Investigation Locations
- Geophysical Survey LInes
- Geologic Mapping Survey Areas
- City/Town/Community
- Canal
- Proposed Sites Reservoir Inundation Area

N

0 1 2 4
Miles

Notes:
Base Map Source:ICF, 2021
Imagery Source: ESRI World Imagery 2021
Coordinate System: NAD 1983 CA Zone II
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88, U.S. Feet

Tehama-Colusa Canal
Glenn County
Colusa County
GCID Main Canal
Colusa Basin Drain
Funks Reservoir
Sites
Sites Lodoga Rd
Huffmaster Rd
Maxwell Sites Rd
Maxwell
Antelope Valley
Sacramento River
5
Dunnigan
Tehama-Colusa Drain
Colusa Basin Drain
Yolo County

PATH: \\PDCCITRDSGIS1\PROJECTS_1\SITES_PA\00528_20\FIGURES\DOC\GEOTECH\PERMITS\EA_EIS\TESTING FIGURE_1_4_2_SITESPROJECT.MXD - USER: 34153 - DATE: 4/21/2022

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2 Proposed Action Alternatives

This EA/IS considers two potential alternatives: the No Action, and the Proposed Action. These alternatives are described below.

2.1 No Action

Under NEPA, the No Action analysis addresses the existing conditions as well as what would be reasonably expected to occur in the foreseeable future if the project was not approved. The environmental review considers the effects of not implementing the proposed action. Under CEQA, the baseline for environmental impact analysis consists of the existing conditions at the time the environmental studies began. CEQA also requires evaluation of the future No Project alternative. For this EA/IS, given the short timeline of the Proposed Action (2022-2024) and the rural nature of the Proposed Action Area, where significant physical changes to existing conditions are not reasonably anticipated to occur over the course of the Proposed Action (see discussion below), it is assumed that the NEPA No Action, CEQA Existing Conditions and CEQA future No Project are the same and are collectively referred to in this EA/IS as the No Action for assessment.

Under the No Action, Reclamation and the Authority would not conduct field investigations and surveys to obtain the necessary data to support engineering and design evaluations and preparation of permit applications for the proposed Sites Reservoir. The majority of the Proposed Action Area is zoned for agricultural use and would generally be expected to remain in that use into the future as there is little urbanization pressure or demand for large scale urban development in the Proposed Action Area. Agricultural zoning coupled with many parcels being contracted under the Williamson Act for landowner tax benefits (Section 3.3 – Land Use and Agriculture), makes conversion to non-agricultural uses more challenging and less likely to occur within the timeframe of the Proposed Action. Some lands may change from certain agricultural uses to other agricultural uses, such as the conversion of row crops to orchards based on market factors and decisions of individual landowners.

However, this is expected to be minor and may occur in more limited areas of the Proposed Action Area, being more likely to occur near the GCID Main Canal and TC Canal, due to soil conditions and greater reliability of water supplies in those areas. Generally, the grazing lands and range lands within the Proposed Action Area are not expected to convert to irrigated agriculture because of the lack of reliable water supply of suitable quantity and quality in those areas. The only known potential future change in land use within the Proposed Action Area is the construction of the proposed Sites Reservoir and associated facilities. Because the construction of the proposed Sites Reservoir would not be anticipated to start until after the Proposed Action is completed, it is not considered within the scope of the No Action.

2.2 Proposed Action

The Proposed Action includes conducting geologic, geotechnical, and geophysical investigations, focusing on those areas proposed for the Sites Reservoir saddle dams, roads, bridges, pumping and generating plants, borrow areas, tunnels, pipelines, and transmission corridors. The investigations would be sited in areas where additional or updated data is needed to inform engineering cost projections, design, and preparation of permit applications for the proposed Sites Reservoir and associated facilities.

Three types of investigations are planned, and are described in subsections 2.2.1 through 2.2.2. Generally, the three types include surface geologic investigations (pedestrian surveys), surface geophysical investigations to gather data and test samples at the shallow subsurface down to about 3 feet, and subsurface geotechnical investigations, which provide information on geological conditions 20 to 550 feet below grade. A list of the Proposed Action's proposed investigations by proposed Sites Reservoir feature is included in Table 2-1. Figure 1-2 shows the proposed investigation locations.

Table 2-1. Investigation Types, Approximate Numbers, and Approximate Depths by Proposed Sites Reservoir Feature

Proposed Sites Reservoir Feature	Approximate Numbers, Investigation Types, and Approximate Depths
Sites Reservoir Inundation Area	1. 70 Pavement Cores, 3 feet below grades 2. 190 Borings, 30 to 550 feet below grades 3. 45 Piezometers, 100 to 350 feet below grades 4. 100 Geophysics Surveys, 700 to 3,000 feet in length, at each investigation point, non-invasive 5. 10 Geologic Mapping Walking Surveys, non-invasive.
Funks Reservoir	1. 10 Borings, 20 to 100 feet below grades 2. 2 Piezometers, 100 to 350 feet below grades 3. 1 Geologic Mapping Walking Survey, non-invasive.
Terminal Regulating Reservoir Pipeline	1. 36 Borings, 50 to 90 feet below grades 2. 16 Cone Penetration Test Probes, 70 to 90 feet below grades 3. 5 Seismic Cone Penetration Test Probes, 70 to 90 feet below grades 4. 15 Piezometers, 100 to 350 feet below grades 5. 1 Geologic Mapping Walking Survey, non-invasive.
Dunnigan Pipeline	1. 20 Borings, 35 to 80 feet below grades 2. 6 Cone Penetration Test Probes, 70 to 90 feet below grades 3. 6 Seismic Cone Penetration Test Probes, 70 to 90 feet below grades 4. 8 Piezometers, 50 to 80 feet below grades 5. 4 Geologic Mapping Walking Surveys, non-invasive.
Total	**1. 70 Pavement Cores, 3 feet below grades** **2. 258 Borings, varying from 20 to 550 feet below grades** **3. 70 Piezometers, varying from 50 to 350 feet below grades** **4. 33 Cone Penetration Test Probes, varying from 70 to 90 feet below grades** **5. 16 Geologic Mapping Surveys, non-invasive** **6. Geophysics Survey at each investigation point (348 total) in addition to 100 survey transects, varying in length from 700 to 3,000 feet, non-invasive.**

In total, up to 70 pavement core locations and 25 borings would be located in developed areas (e.g., existing roadways, areas of exposed soil in croplands, or developed areas). Most of the remaining augers and borings would be in grasslands and oak woodlands located north and south of the town of Sites, around Funks Reservoir, and adjacent to Funks Creek, Stone Corral Creek, and Antelope Creek in Glenn and Colusa Counties (Figure 1-2). Most of these locations have been sited during Proposed Action planning to be more than 250 feet from potentially regulated Federal and State wetlands and waters. The only exceptions are three locations within Funks Reservoir, one location in a potentially regulated seasonal wetland, and 39 locations in grasslands but within 250 feet of potential seasonal wetlands.

The proposed investigations are scheduled to occur between July 2022 and December 2024. The three subsurface investigations proposed in Funks Reservoir are scheduled to occur when the reservoir has been drained as part of its regular annual maintenance activities which generally occur in January and February. In addition, the one bore location within a potentially regulated seasonal wetland would be conducted in the summer ensuring dry conditions for work activities and would be returned to previous conditions following investigation. The sequence of investigations would depend on site and seasonal conditions, as well as landowner access. It is anticipated that approximately 10% of the proposed investigations would occur in each of the third and fourth quarters of 2022 (20% of total investigations); approximately 15% of the proposed investigations would occur in each quarter of 2023 (60% of total); and approximately 10% would occur in each of the first two quarters of 2024 (20% of total).

The duration of field sample collection and testing activities at each location would vary from 0.5 days to 3 weeks, depending on the conditions and activity. Up to 70 piezometers (described below) would be installed at select boring locations and would be left in the ground for up to 10 years. The proposed piezometers are the only data-gathering equipment that would remain in the field following the investigations and require longer-term monitoring. All proposed investigations and monitoring activities would be conducted during daylight hours.

As noted in Section 1 – Introduction/Purpose and Need, CDFW and DWR conducted biological and cultural surveys in much of the proposed Sites Reservoir footprint in Colusa and Glenn Counties in 2000. The results of these previous surveys were obtained and reviewed to identify and propose, to the greatest extent possible, investigation locations outside of sensitive habitats and known cultural sites. In addition, preliminary wetland and waters mapping has also been completed as part of the proposed Sites Reservoir permitting efforts. This mapping was also reviewed to avoid siting investigation locations in potential wetland areas to the extent possible. Using these available materials for reference, early Proposed Action development work involved an extensive review of desktop aerial imagery and geographic information system (GIS) data with a goal of selecting investigation locations that would avoid potential sensitive resources to the extent possible.

In addition to siting the Proposed Action investigation locations to avoid potential sensitive resources, access to the investigation locations was considered during the desktop evaluation process. Though existing roads were the primary and more desired option, numerous investigation locations are anticipated to require overland access in areas where no roads exist or where existing roads are inaccessible. With avoidance of impacts to sensitive resources a key consideration in developing of an overland access plan, engineers, cultural and biological specialists, and land access managers met multiple times to refine overland access routes. This process made it possible for the Authority and Reclamation to identify access routes which would avoid known culturally sensitive locations, known biological resources (e.g., wetland features, beds and banks of streams, creeks, channels), and areas that were expected to cause increased landowner sensitivity (e.g., active orchards, grazing pastures).

2.2.1 Surface Geologic Investigations

These surveys would include mapping the existing geology of the proposed inundation area, conveyance facilities, and roads. Surface geologic investigations (pedestrian surveys) involve noninvasive physical methods of survey to determine soil and rock properties at the surface, including walking transects, soil mapping, and rock analyses using hand tools (i.e., small hammer). These standard investigation methods are commonly used and effects, if any, are typically localized and negligible. The specific walking investigations would be conducted immediately surrounding Funks Reservoir and lands between the existing reservoir and the proposed Sites Reservoir inundation area including lands south of Hunters Creek, east and south of Funks Creek, adjacent to Maxwell Sites Road, at the northside of the proposed Sites Reservoir, and throughout the Dunnigan Pipeline corridor (Figure 1-2).

2.2.2 Surface Geophysical Investigations

These walking surveys would consist of up to 100 transect lines within and along the eastern edge of the proposed Sites Reservoir inundation area (Figure 1-2). Up to 16 additional geophysical pedestrian surveys are also proposed in the broader Proposed Action Area. Geophysical investigations are limited linear survey transects and typically involve various noninvasive or minimally invasive physical methods, including seismic, gravitational, magnetic, electrical, and electromagnetic testing to determine the properties of the subsurface. These investigation methods are commonly used and ground disturbance, if any, is typically localized and negligible.

Two types of geophysical surveys are proposed: (1) surface seismic refraction testing; and (2) electrical resistivity imaging/tomography. Each linear survey test would typically be performed over a 1- or 5-day period of 10- to 12-hour days, as daylight allows. Surveys are planned for both wet and dry weather conditions. No equipment would be left onsite overnight. Upon completion of the investigation, equipment would be removed and the sites would be returned to their original condition.

Surface seismic refraction testing would be used to determine the properties of the subsurface. This method consists of seismic recorders and receiver groups (geophones), a seismic source, and various cables. The geophones are placed in the ground on spikes that are approximately 4 to 6 inches long. The seismic source may include sledgehammer or weight drop. Three to five field staff would lay an array of cables and geophones parallel and perpendicular to the axis of each proposed embankment and other proposed associated features' location. The arrays would vary in length between 100 to 500 feet at a time and can be viewed easily by the crew to ensure no disturbance of the equipment occurs during an array test. Typically, no other ground disturbance would be necessary, although loose soil may be removed by shovel to a depth of approximately 3 inches to provide adequate contact for the geophones.

Electrical resistivity imaging/tomography (ERI/ERT) is a geophysical survey method to determine geo-electrical properties of the subsurface. Field measurements commonly utilize half-inch diameter stainless steel electrodes, which are driven approximately 4 to 6 inches into the ground with a hand-sledge or other small sledgehammer. Electrodes are connected to the controller electronics by means of multi-channel resistivity cables that convey electrical current to a pair of electrodes and are used to measure voltages across other pairs of electrodes. The injected electrical current varies from tens of milliamps (10 mA) to about half an amp (500 mA) at approximately 400 volts DC.

2.2.3 Subsurface Geotechnical Investigations

These geotechnical investigations would include up to 70 pavement cores, 258 augers and borehole drillings (borings), and 33 cone penetration test (CPT) probes throughout the Proposed Action Area in Colusa, Glenn, and Yolo Counties (Table 2-1). Of the 33 CPT probes, 11 are characterized as seismic CPTs [SCPT]. In addition, approximately 70 piezometers (a type of groundwater monitoring well) are proposed to be installed at select auger or boring locations. Combined, these various types of subsurface investigations allow for onsite material examination and data collection, sampling for additional offsite laboratory testing and support determination of material processing requirements.

Geotechnical exploratory pavement borings, auger and rotary wash borings with downhole testing and rock coring, and CPT probes would be used to collect subsurface data and samples, and to examine material processing requirements. Downhole testing and laboratory analysis would determine physical properties and conditions of the subsurface materials. Downhole testing would include permeability and aquifer testing, packer testing, dilatometer testing, pressure meter testing, seismic logging, televiewers, and caliper measurements. Descriptions for each subsurface geotechnical investigation type are provided in subsections below and representative illustrations, including examples of the standard types of rigs used to conduct the investigations, are provided in Appendix A.

All subsurface geotechnical investigation techniques would require some degree of ground disturbance to gain necessary geotechnical information, including spot leveling of areas directly below truck leveling jacks and holes measuring 2 to 10 inches in diameter through which augers and sampling equipment would be lowered to collect subsurface data and samples. Site preparation is not anticipated prior to commencement of activities at the majority of the geotechnical investigation locations. Minor site surface grading may be necessary only at investigation areas with moderate to steep slopes or uneven terrain to stabilize equipment. Proposed geotechnical investigation areas would consist of the smallest footprint necessary to complete the investigations and avoid or minimize impacts to biological resources, cultural resources, and any other sensitive resources.

Activities at each investigation location would require up to ten personnel, including equipment operators and assistants, a utility locator, a geologist/engineer to document conditions encountered, biological, cultural, and tribal monitors, project managers, and safety staff. Each geotechnical investigation site would be active for a period ranging from 1 day for pavement cores and CPT probes up to 21 days for deep boreholes.

Borehole Drilling

Borehole drilling (i.e., pavement, auger, or rotary wash borings) would be performed with a drill rig that uses a combination of pilot bit, hollow stem flight augers, and rotary diamond core drilling. Pavement borings are used in roads and on other paved surfaces to remove the surface materials and allow access to earth below. In

auger boring, vertical holes are drilled by rotating the cross arm of the auger and pushing the auger into the ground. When the auger is filled with the soil, it is withdrawn and the soil is removed from the auger for examination. The auger is then inserted back into the borehole, pushed into the bottom soil by rotation of the cross arm, and the process is repeated.

For rotary wash borings a casing is first driven into the ground. A hollow drill rod, with a chisel-shaped chopping bit at its bottom, is then inserted inside the casing. Water is pumped down into the drill rod and acts as a strong jet through the small openings of the bit at the bottom of the drill rod. The jet disintegrates the soil in the borehole and carries the broken fragments upward through the space between the casing and the drill rod. A separate tube may also be inserted into the casing for sample collection. The hollow stem would likely have 8.5-inch outer diameter, and 4.25-inch inner diameter, with a 5-foot-long split tube inner barrel for dry core sample collection. Standard Penetration Test samplers may also be used at 5-foot intervals within the borehole. All drill cuttings and any drilling fluids would be contained onsite in drums or bins and removed from the site to an existing permitted landfill or waste treatment facility.

At a given auger or rotary wash boring location, various types of downhole testing (testing within the borehole) would be conducted either concurrently with drilling or following drilling. Downhole testing may include any combination of the following methods at frequencies by the engineering team and as conditions dictate in the field: dilatometer-pressure meter, optical televiewer, acoustic televiewer, suspension logging (seismic downhole), packer testing, dissipation testing, hydraulic profiling tools, mini-pump testing tools, and others as deemed appropriate depending on the conditions encountered during field work.

Drilling equipment at select locations would need to be left onsite until drilling and downhole testing activities are completed. Boreholes would be covered overnight. Once work at each boring site is complete, augers and testing equipment are removed, and boring and probes would be grouted and resurfaced in accordance with California regulations and industry standards (Water Well Standards, DWR 74-81 and 74-90) or would be equipped with a piezometer as described below and the site would be returned to its original condition. With respect to fill in four aquatic features (one potentially regulated seasonal wetland and three locations within Funks Reservoir) that could not be avoided, the top 12 inches of these boreholes would be backfilled with existing topsoil. The areas would then be cleared of work items. The duration of activities at a single location would range from one day to a three-week period.

Cone Penetration Tests

CPTs are minimally invasive and consist of a specialized vehicle that inserts a 1.7-inch-diameter cone (probe) into the ground with a hydraulic direct push system, with the probe being advanced out of the center of the truck box housed on a diesel truck. Once each test is complete (typically 12 hours), the rod is retracted, the hole is grouted and capped with soil, and the area is cleared of work items. Cone tip resistance, friction, and pressure data is collected and transmitted to electronic files in realtime via the probe and no samples are collected. CPTs allow for more concise mapping of soil profiles (layers) and are also used to assess soil properties.

Seismic CPTs are similar to CPTs and only differ in that they include a seismic cone for measuring downhole response to a shear wave. A shear wave source is induced into the ground by striking a steel beam at the ground surface with a hammer. Once each test is complete (typically 12 hours), the rod is retracted, the hole is grouted and capped with soil, and the area is cleared of work items and returned to its original condition.

Piezometers and Aquifer Tests

Both temporary and longer-term (10 years) piezometers would be installed in up to 70 selected boring locations in accordance with California regulations and industry standards (Water Well Standards, DWR 74-81 and 74-90). Installation of piezometers would not result in additional ground disturbance beyond the original boring footprint. Piezometers would be used to evaluate and monitor fluctuations in groundwater levels.

Water levels in piezometers would be monitored approximately four times a year for a period of up to 10 years. Some locations would be instrumented with an electronic data logger capable of collecting data remotely. Monitoring is continuous with this function and only needs to be downloaded periodically. Two

personnel in one pickup truck or sport utility vehicle would be required for each quarterly monitoring event. All monitoring activities would be conducted within the area used to install the piezometers. Access to the piezometers would be consistent with the access paths utilized during the initial investigation and installation of the piezometers, would be overland, and coordinated with private landowners.

Aquifer testing would be conducted once at select boring locations where piezometers have been installed and would consist of either a bail test or a slug test. During a bail test, water is removed to empty the casing rapidly (completely or partially) and then the water level recharge is monitored as it recovers to its original level. It is estimated that less than 60 gallons of water would be removed during a bail test, and this water would be containerized in a 55-gallon drum and the contents would be tested to determine appropriate disposal.

The containerized water would be managed and disposed of in accordance with applicable Regional Water Quality Control Board (RWQCB) requirements. During a slug test, a cylindrical solid slug is lowered into the piezometer to displace water and water levels are monitored to see when the water table equilibrates; the slug is then removed, and water table recovery is monitored. No water is pumped into or out of the piezometer during a slug test. Bail and slug tests would be conducted during a normal day shift and would not require long-term monitoring.

2.2.4 Investigation Equipment, Required Personnel, and Site Access

Access to the proposed investigation areas would include vehicle travel via existing roadways and overland access routes. Access would use existing public and private roads to the extent possible. Minor maintenance, such as repairing potholes or impassable portions of roads, could occur, as necessary, for safe vehicle access. If required, the maintenance would be completed according to the applicable county standards. Where roads do not exist, some of the proposed investigation locations would require overland access through portions of grasslands and woodlands.

Overland access routes would be as direct as possible. Minor drainage crossings are anticipated and would require the use of clean, contained, temporary fill such as steel plates or hard density plastic mats to be placed over the drainage for temporary vehicular access. No fill would be placed within the waterway and crossings would be avoided to the extent possible. Final access routes would be determined in the field during the pre-investigation siting surveys (Section 3.1.2 – Sensitive Resources Mitigation) with biological, cultural, and tribal monitors present to avoid sensitive resources, including disturbances to bed, bank, and wetland/riparian habitats. Any locations requiring drainage crossings would be returned to existing or better conditions upon completion of investigations.

Vegetation removal is not anticipated, but if required either for access or to avoid hazards (e.g., wildland fire), the footprint would be limited to the minimum area required and would be conducted with biological, cultural and tribal resource monitors present (Sections 3.2, 3.6 and 3.7). If vegetation removal is necessary, the vegetation may be trimmed using handheld gas- or battery-powered equipment. No tree removal or trimming would be required. Excavation or grubbing would also not be required.

Equipment, vehicles, and materials would be temporarily staged at each designated investigation location. Equipment use would be planned to optimize onsite staging and reduce offsite traffic and travel. All staging areas would be located outside of wetlands and other aquatic resources and adhere to species-specific buffer zones. Workers in remote areas would be provided necessary onsite amenities (e.g., waste and sanitary facilities). Carpooling would be encouraged to the extent feasible. Crew vehicles and equipment would access the investigation areas daily over the Proposed Action duration. Flaggers, cones, and other measures would be used to control the flow of traffic near active roadways where necessary. Neighbors would be notified prior to commencement of Proposed Action activities as necessary. Table 2-2 provides the estimated number of each type of equipment required to complete the Proposed Action.

Table 2-2. Proposed Action Equipment and Anticipated Duration of Use

Equipment	Estimated Maximum of Pieces of Equipment	Hours Per Day
Auger Drill Rig	1	12
Cone Penetration Testing Rig	1	12
Rock Coring Drill Rig	1	12
Skid Steer	1	12
Backhoe	1	<12
Generator	2	12
Pump	2	12
Water Trucks	2 (included for dust suppression)	<12
ATV and trailers	2	<12
Pickup trucks/Sport Utility Vehicles	3	<12

2.2.5 Standard Protocols and Procedures Incorporated into the Proposed Action

The following standard protocols and procedures have been incorporated as part of the Proposed Action and would be implemented prior to and throughout the proposed investigations. These standard protocols and procedures are summarized below and described further in Appendix B.

- Stormwater Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs) pursuant to the State Water Resources Control Board's National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. BMPs would include temporary erosion control measures. Investigation-derived groundwater generated during field activities would be contained onsite and disposed of properly.
- **Spill Prevention and Hazardous Materials Management**. Hazardous materials and hazardous wastes including fuels, oils, grease, and lubricants would be used, stored, and disposed of in accordance with applicable regulations during the proposed investigations. Spill prevention and control BMPs would be followed to minimize effects from spills of hazardous or petroleum substances. Additional BMPs designed to avoid spills from equipment would also be implemented.
- **Standard Fugitive Dust Control**. Water would be applied as needed to minimize dust emissions. All visibly dry, disturbed, unpaved road surface areas of operation would be watered to minimize dust emissions. Haul vehicles would be covered. Onsite vehicles would be limited to a speed of 15 miles per hour on unpaved roads.
- **Standard Measures to Reduce Equipment Usage and Exhaust**. This measure includes a number of activities to reduce equipment usage and associated exhaust emissions. Key activities include the following: maintain equipment; minimize idling; comply with emission standards and requirements set by state regulations; utilize off-road equipment with tier 3 or higher certified engines; utilize on-road vehicles with engines that are certified model year 2012 or newer; and, implement best available emissions control technology.
- **Traffic Management and Hazards**. Specific haul and access routes would be identified. Haul traffic would be dispersed when multiple investigation locations are under evaluation concurrently. Traffic control devices would be installed per State and County regulations to maintain safe driving conditions, including use of signage to alert motorists of activities and potential hazards, as well as the use of flaggers when appropriate.
- **Emergency Access**. Access for local emergency vehicles would be maintained on all roadways throughout the investigations and coordination with local service providers would be conducted.
- **Health and Safety Plan (HSP)**. A HSP will be prepared for the Proposed Action. The HSP will include an assessment of known hazards (if present), how to avoid known hazards, how to prevent and control accidental spills of hazardous materials, recommendations for remediating accidental

spills of hazardous materials, procedures for conducting utility screenings, and precautionary fire prevention and suppression methods.

- **Fire Prevention and Suppression at Investigation Locations**. Keep all investigation locations in neat and clean order. Flammables will be stored in appropriate containers at all times. Drilling equipment will have vertical exhaust systems and be diesel powered. Personnel working on site will perform fire prevention and suppression drills at each new location. Firefighting hand tools and equipment will be available for each crew member. Site inspections will be performed at the end/shut down of every day.

2.2.6 Applicable Regulatory Requirements and Required Coordination

The federal laws, permits, licenses, and policy requirements that have directed, limited, or guided the NEPA and CEQA analysis and decision-making process of this EA/IS are provided in Appendix C *Regulatory Permits, Approvals, and Authorizations*.

3 Affected Environment and Environmental Consequences

3.1 Introduction

The following sections describe the affected environment in the context of potential environmental resource areas affected by the Proposed Action. It provides the NEPA and CEQA analysis of potential environmental consequences anticipated with implementation of the Proposed Action or the No Action. Assumptions considered, methodologies used, and references that were consulted during the preparation of the analyses are identified by resource/issue area subsection. As noted in Section 2.2.5 – Standard Protocols and Procedures Incorporated into the Proposed Action, the Proposed Action would adhere to the standard protocols and procedures that have been incorporated into the Proposed Action, which will serve to limit the Proposed Action's adverse environmental effects.

Following a description of the Affected Environment for each resource area, CEQA significance criteria are provided and an assessment of the potential for effects under NEPA and CEQA are included in the Environmental Consequences section. Additionally, in compliance with CEQA regulations, a CEQA Determination and, as warranted, mitigation measures are included. As noted in Section 1 – Introduction/Purpose and Need, Reclamation will utilize the information provided in this EA/IS to make their findings on the Proposed Action in a final decision document (that is, FONSI, Mitigated FONSI, EIS, or project disapproval).

Field investigations (other than groundwater monitoring at piezometers) would be short term and temporary. Accordingly, impacts identified in the following sections are, for the most part, limited to the temporary installation and use of investigation equipment and associated investigation and survey activities. For the majority of the proposed investigations, the site will be prepared, examined, and restored in a matter of days or weeks, thus impacts would be temporary. For the 70 piezometers, workers would return to these locations up to 4 times a year over 10 years to monitor the equipment and obtain data.

3.1.1 Resources Not Considered in Detail

Due to the temporary and short-term nature of the Proposed Action, as well as a lack of related resources within or near the Proposed Action Area that would be affected by the Proposed Action, there would be no impact on: aesthetics and visual resources, minerals, population and housing, public services, fluvial geomorphology, flood control and management, recreation, forestry resources, utilities and service systems, and power production/energy. These resource areas are not considered further.

3.1.2 Sensitive Resources Mitigation

As discussed in Section 2.2 – Proposed Action, the proposed investigations have been sited through desktop evaluation and coordination with the engineering team to avoid sensitive resources and receptors, to the extent possible. Access to the proposed investigation locations is limited due to the number of private properties in the Proposed Action Area, therefore field verification to confirm that sensitive resources have been fully avoided has not been conducted. For that reason, there remains a potential for effects to sensitive resources at the proposed investigation locations.

As a result, the Authority and Reclamation propose to implement Mitigation Measure (MM) Gen-1, which will require that a pre-investigation siting survey is conducted at least one week prior to mobilization at each proposed investigation location. If implementation of MM Gen-1 and other specific mitigation measures presented in this EA/IS for biological resources, cultural resources, paleontological resources, or tribal cultural resources do not avoid or minimize permanent impacts to sensitive resources, and resource avoidance would require relocation of the investigation location outside of the proposed area where data

collection is needed to inform design, then the Authority and Reclamation will reevaluate the need for an investigation at that specific location as part of the overall Proposed Action investigation plan and implement MM Gen-2.

Under MM Gen-2, the Authority and Reclamation will reprioritize a specific investigation within the Proposed Action schedule, including potentially changing the Proposed Action schedule to conduct the relevant investigation at a different time of the year, when impacts may be avoided. Conversely, under MM Gen-2, if reprioritization of a specific investigation cannot occur to avoid impacts, then the relevant investigation will be removed from this Proposed Action and will be postponed to a subsequent investigation effort that would require separate environmental documentation and potential permitting.

Mitigation

Table 3.1-1. Mitigation Measures for Sensitive Resources

Mitigation Measure Title	Description
MM Gen-1: Conduct Pre-Investigation Siting Survey	At least one week prior to mobilization for Proposed Action activities at each investigation location, the Proposed Action contractor and staff, along with a qualified biologist, a cultural resources specialist, and a tribal monitor will conduct a pre-investigation siting survey. Following review of the proposed site locations and investigation plan, the team will conduct a coordinated field survey and provide recommendations to the Proposed Action team to assist in finalizing investigation sites and provide findings as to the extent of the ground surface preparations (if any) that would be needed at each location. The team will also confirm the means of access by personnel and equipment, which includes the biologist, tribal and cultural specialist demarcating the overland access route that avoids impacts to any identified sensitive resources during the siting survey. Adjustments in the exact location of the investigation areas and in the application of species/habitat-specific mitigation measures may be required to avoid or minimize impacts to sensitive resources, to avoid potential utility conflicts, or if specific site conditions are different than anticipated. These adjustments will be limited to the vicinity of the general investigation locations shown in Figure 1-2 and will remain compliant with any permit restrictions placed on specific areas in the Proposed Action Area.
MM Gen-2: Reprioritize or Postpone proposed investigations if sensitive resources cannot be avoided.	If implementation of MM Gen-1 and species/habitat-specific mitigation measures do not avoid or minimize permanent impacts to sensitive resources, and resource avoidance would require relocation of the investigation location outside of the area where data collection is needed to inform design, then the need for an investigation at that specific location would be re-evaluated as part of the overall Proposed Action investigation plan and, if found to be necessary, the effort would be reprioritized within the Proposed Action schedule to avoid or minimize permanent impacts (e.g., moving investigation to later date in schedule to avoid an active bird nest) or postponed to a subsequent investigation effort that would require separate environmental evaluation and permitting.

3.2 Biological Resources

This section describes existing biological resources within and adjacent to the Proposed Action and the potential for impacts from implementation of the Proposed Action.

3.2.1 Affected Environment

The information presented below is based on published sources, previous surveys of the Proposed Action Area (CDFG, 2003a, 2003b; DWR, 2003) and current searches of the California Natural Diversity Database (CDFW, 2021) and Inventory of Rare and Endangered Plants (California Native Plant Society, 2021).

Natural Communities

The Proposed Action Area consists of both terrestrial and aquatic natural communities, as well as developed and agricultural areas, which includes canals and ditches. The natural communities within the Proposed Action Area include annual grassland, oak woodlands, riparian, freshwater marsh, seasonal wetlands, ponds,

reservoir, and streams. A summary of these communities is provided in Appendix D *Biological Resources Existing Conditions*.

Special-status Species

For the purpose of this EA/IS, special-status species are plants and animals that are legally protected under the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. For this EA/IS, special-status species are those that are (1) listed, proposed for listing, or candidates for listing under ESA and/or CESA as threatened or endangered; (2) listed or candidates for listing under the ESA and/or CESA as threatened or endangered; (3) a state fully protected species; (4) a CDFW Species of Special Concern; (5) wildlife species of special concern to the CDFW, Special Animals List; (6) fish species of special concern to CDFW; or (7) a species listed on the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California. This includes plants designated with a California Rare Plant Rank of 1 or 2. More detail on the criteria for special-status species is presented in Appendix D.

Special-status Plants

Forty-four special-status plant species have a moderate to high potential to occur in the Proposed Action Area based on known occurrences in or within 10 miles or presence of potential suitable habitat. Table 1, S*pecial-status Plant Species Occurring in or Near the Proposed Action Area,* of Appendix D lists the species identified from the sources cited above, their status, distribution, and habitat requirements, and their potential to occur in the Proposed Action Area.

Special-status Wildlife

Thirty-one special-status wildlife species have a moderate to high potential to occur in the Proposed Action Area based on known occurrences in or within 5 miles or presence of potential suitable habitat. Table 2, S*pecial-status Wildlife Species Occurring in or Near the Proposed Action Area*, in Appendix D lists the species identified from the sources cited above, their status, distribution, and habitat requirements, and their potential to occur in the Proposed Action Area.

Waters of the U.S./Waters of the State

Potential regulated waters of the U.S./State occur throughout the Proposed Action Area. These include freshwater marsh, seasonal wetlands, ponds, Funks Reservoir, and various other waterways, including the Colusa Basin Drain, Funks Creek, Stone Corral Creek, Antelope Creek, Bird Creek, and some canals and ditches (see Appendix D for more detail). Overall there are approximately 285 acres of potential regulated waters of the U.S./State in the Proposed Action Area, however, the proposed investigation areas would only intersect with a fraction of the potential regulated waters of the U.S./State.

3.2.2 Environmental Consequences

This section discusses CEQA Significance Criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on biological resources that could occur as a result of the proposed investigations. Potential impacts are described below for those species, both plants and wildlife, that were found to have a moderate to high potential to occur in the Proposed Action Area (Appendix D).

CEQA Significance Criteria

An impact on biological resources would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area:

- 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 (CDFW) or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.
- Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or State HCP.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Under the No Action, biological resources in the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

A desktop evaluation of the Proposed Action Area was conducted and GIS data reviewed to avoid siting the proposed investigations on or near sensitive biological resources, including but not limited to nesting and foraging habitat, aquatic and terrestrial habitat. To confirm the results of the desktop evaluation and determine if any potential impacts exist to sensitive biological resources, the Authority and Reclamation will conduct a pre-investigation siting survey (MM Gen-1) at least one week prior to mobilization. Reclamation is coordinating compliance under ESA with USFWS. A Supplemental Biological Assessment was sent to USFWS on February 15, 2022.

Potential effects to federally listed species identified below are consistent with the Proposed Action's Supplemental BA. The Proposed Action's potential impacts on sensitive biological resources are discussed below for each specific resource. Where additional analysis and mitigation is warranted to ensure that potential impacts to sensitive biological resources are avoided and minimized, details are also provided. All biological mitigation measures are provided in Table 3.2-1 at the end of this section.

Wetlands and Waters of the U.S./State: One of the proposed geotechnical borings would be conducted in a potential seasonal wetland, and three would be conducted in Funks Reservoir. No other ground-disturbing activities or placement of fill would take place within state or federal protected wetlands or potentially regulated waters.

The investigation within the seasonal wetland and three investigations in Funks Reservoir would result in the excavation or discharge of fill material within potential regulated waters (also referred to as aquatic resources). Site preparation is not anticipated prior to commencement of activities at each of the investigation areas and therefore would not result in a discharge of dredge or fill material. Temporary indirect impacts could include soil disturbance from construction vehicle access and equipment staging resulting in increased erosion and sedimentation that could be discharged to potential regulated waters in the Proposed Action Area. Removal of groundcover in investigation areas could also increase stormwater runoff.

The use of fuels and oils to operate equipment in the investigation areas and accidental spills from equipment or onsite storage of hazardous materials could temporarily affect water quality if they are discharged to potential regulated waters in the Proposed Action Area. Temporary direct impacts to aquatic resources would only be associated with borehole drilling during the subsurface geotechnical investigations, due to the need to grout fill the subsurface geotechnical boreholes. Permanent direct impacts to the four proposed investigation locations within potentially regulated waters are not expected because the top 12 inches of the boreholes will be backfilled with existing topsoil (temporary direct fill) and the rest of the borehole will be filled with grout (permanent direct fill), resulting in less than a tenth of an acre of temporary direct impacts. The discharge of grout at greater depths is required to comply with California regulations and industry standards (Water Well Standards, DWR 74-81 and 74-90). The remaining, minimal amount of native soils resulting from bore activities will be removed and disposed of in an acceptable area located in uplands. It is anticipated that the Proposed Action would result in less than a tenth of an acre of temporary direct impacts to potentially regulated waters. These activities would not change the surface elevation. The surface conditions are expected to be restored to pre-project conditions within a year. Due to the negligible amount of clean, porous fill (grout) at each location (less than 14 cubic yards of fill), the hydrology of each feature would not be significantly impacted.

Geotechnical drilling activities could also impair water quality should accidental spills or discharges of hazardous materials or contaminants enter these four potentially regulated wetland features. Standard Protocols and Procedures would be incorporated into the Proposed Action for SWPPP and BMPs and spill prevention and hazardous materials management.

CEQA Determination: In addition to MM Gen-1, the Authority and Reclamation would implement MMs Bio-1 through Bio-3 and Bio-16, to further reduce the risk of impacts on wetlands and non-wetland waters of the U.S./State in and adjacent to the Proposed Action Area. If implementation of the mitigation measures does not result in avoidance of impacts to wetlands and waters of the U.S./State, MM Gen-2 would be implemented so that the site is removed from the current schedule and re-evaluated, then either reprioritized for later in the Proposed Action schedule if the change reduces effects to less than significant or removed from the Proposed Action. Therefore, for the purposes of CEQA, impact on wetlands would be less than significant with mitigation incorporated.

Valley Elderberry Longhorn Beetle: Based on the desktop evaluation, the proposed investigations are not anticipated to be near or within 165 feet of an elderberry shrub. Although some investigations may occur within or in the vicinity of riparian habitat, the activities would not require any vegetation removal.

CEQA Determination: During the pre-investigation siting surveys (MM Gen-1), a biologist would confirm if elderberry shrubs are present within the investigation areas. If present, the Proposed Action team would avoid impacts to elderberry shrubs by adjusting the investigation area to be more than 165 feet away from the shrub. In addition to MM Gen-1, the Authority and Reclamation would implement MM Bio-1, Bio-2, and Bio-4 to further avoid any potential impacts to valley elderberry longhorn beetle or elderberry shrubs. If investigations cannot be sited more than 165 feet away from an elderberry shrub, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts to the valley elderberry longhorn beetle would be less than significant with mitigation incorporated.

Vernal Pool Branchiopods: Based on the desktop evaluation, the proposed investigations are not anticipated to be near or within 250 feet of vernal pool branchiopod habitat. Therefore, the Proposed Action is not anticipated to result in any direct or indirect impacts on vernal pool branchiopods (vernal pool fairy shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp) or their habitat.

CEQA Determination: If during the pre-investigation siting survey (MM Gen-1), vernal pool branchiopod habitat is identified to be within the proposed investigation locations, the Authority and Reclamation would implement MM Bio-5, which would not allow investigations to occur within 250 feet of suitable vernal pool branchiopod habitat. Additionally, through the implementation of MM Bio-1, MM Bio-2, and MM Bio-3, impacts on vernal pool branchiopods would be further minimized or avoided. Therefore, under CEQA any

impacts to vernal pool branchiopods or their habitat would be less than significant with mitigation incorporated.

Pollinators: Based on the desktop evaluation, potential suitable habitat for special-status pollinators, including monarch butterfly, crotch bumble bee, and western bumble bee, is present within the Proposed Action Area. Therefore, the proposed investigations could result in an effect, through habitat modifications, on special-status pollinators. Minor vegetation trimming (if needed), overland access, and ground disturbance could modify habitat.

CEQA Determination: As work would be implemented in potential habitat for special-status pollinator species, the proposed investigations could result in an effect, either directly or through habitat modifications, on special-status pollinator species. Implementation of MM-Gen-1, will require a biologist to verify host-plant species are within the investigation areas. If suitable host-plants are present, then the investigation locations would be adjusted so that work would avoid these host plants. In addition, to ensure that impacts to special-status pollinators and their host plants would be further avoided and minimized, the Authority and Reclamation would implement Bio-16. If the proposed investigations still cannot avoid effects to special-status pollinators and their host plants, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on special-status pollinators would be less than significant with mitigation incorporated.

Giant Garter Snake: Based on the desktop evaluation, the proposed investigations are not anticipated to be near or within 200 feet of suitable upland habitat for giant garter snake (areas within 200 feet of aquatic habitat with suitable refugia, such as small mammal burrows); however, work would be implemented on existing roads. Small mammal burrows underneath the road prism may provide habitat for giant garter snake. No proposed investigations would take place in giant garter snake aquatic habitat.

CEQA Determination: As work would be implemented on existing roads adjacent to suitable aquatic habitat, the proposed investigations could result in an effect, either directly or indirectly, on giant garter snake. Implementation of MM Gen-1, will require a biologist to verify if investigation areas are within 200 feet of suitable upland habitat, as well as verify that there are no burrows present underneath or adjacent to the roadways. If suitable habitat is present, then the investigation locations would be adjusted so that no work would occur within 200 feet of suitable upland habitat and roadway borings would avoid any identified burrows. In addition, the Authority and Reclamation would implement MMs Bio-1 through Bio-3 and Bio-6 to minimize and avoid impacts to giant garter snake.

If proposed investigation areas cannot be sited to avoid suitable habitat, MM Gen-2 would be implemented. Therefore, the Proposed Action is not anticipated to result in any direct or indirect impacts on giant garter snake or their habitat. For the purposes of CEQA, impacts on giant garter snake would be less than significant with mitigation incorporated.

Special-status Fish: All proposed investigations are sited outside of bed and banks of nearby aquatic habitat (e.g., streams, channels, creeks). Therefore, the Proposed Action would not result in any effects to special-status fish species, designated critical habitat for listed species and essential fish habitat for Pacific salmon (Chinook salmon), and other native species.

CEQA Determination: As work is not proposed within any bed or banks of aquatic habitat, the proposed investigations would not result in any effect, either directly or through habitat modifications, on special-status fish species. Therefore, for the purposes of CEQA, there would be no impact on special-status fish or their habitat and no mitigation is required.

California Red-legged Frog: Based on the desktop evaluation, the proposed investigations are not anticipated to take place in California red-legged frog aquatic habitat. Several surface and subsurface geotechnical investigations near Funks Creek, Stone Corral Creek, Antelope Creek, and several unnamed intermittent streams would encroach upon potential upland habitat for California red-legged frog (areas within 300 feet of aquatic habitat). Both surface and subsurface geotechnical investigations in these areas

would not result in any substantial ground-disturbing activities. Vegetation trimming would only occur if needed, and handheld equipment would be required to reduce the risk of fire. As described in Section 2 – Proposed Action Alternatives, surface seismic refraction testing would place long pins with attached geophones in the ground to record vibrations created by a sledgehammer or weight drop. Typically, no other ground disturbance would occur with these surveys; however, in cases where loose soil is present at the surface, it may be removed by shovel to a depth of approximately 3 inches to provide adequate contact.

California red-legged frogs occurring in the area during minor vegetation trimming, placement of pins, and any digging could be injured or killed. California red-legged frogs occurring near the surface seismic refraction could also be disturbed by the loud noise and vibrations associated with the testing, which could disrupt normal behaviors and increase energy expenditures. ERI/ERT geophysical surveys require the placement of 0.5-inch-diameter stainless-steel electrodes 4 to 6 inches into the ground and an electrical current through a wire at 50-foot intervals at a time. California red-legged frogs could be injured or killed if they come into contact with the pins underground or with the wire on the surface.

Proposed investigations would also take place in grassland and woodland areas that are considered to be potential California red-legged frog dispersal habitat (areas within 1 mile of potential aquatic habitat), but these areas would only be considered dispersal habitat during wet weather in the fall and winter. If the proposed investigations occur during wet weather in the fall or winter and California red-legged frogs are dispersing through the area, the movement of work vehicles and equipment, and other activities could result in injury or mortality of California red-legged frogs. Therefore, the Proposed Action activities could result in the temporary disturbance of approximately 50 acres of dispersal habitat.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modifications, on California red-legged frog. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations to determine if the proposed work areas are within or near California red-legged frog habitat. Additionally, implementation of MM Bio-1 through MM Bio-3 and MM Bio-7 would further minimize impacts on California red-legged frogs. If direct impacts to California red-legged frog and its habitat cannot be avoided, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on California red-legged frogs would be less than significant with mitigation incorporated.

Western Spadefoot Toad: Based on a desktop evaluation, proposed investigations would not take place in western spadefoot toad aquatic habitat, but activities would take place in potential upland habitat and during times when both juveniles and adults may be dispersing across the landscape or when seeking refuge in subsurface retreats, such as burrows and soil cracks.

As described above for the California red-legged frog, the geophysical investigations in grasslands areas would not result in any substantial ground-disturbing activities. No ground disturbance would be required, with the exception of pin placement for surface seismic refraction testing, potential vegetation trimming to reduce the risk of fire, and potential loosening of soil to provide adequate contact for geophones. These activities could disrupt normal behaviors and increase energy expenditures of western spadefoot toad. Additionally, similar to the concern described earlier, for California red-legged frog, the ERI/ERT surveys could injure or kill western spade foot toads if they were to come into contact with the pins underground or with the wire on the surface. In addition, the movement of work vehicles and equipment, and other activities could result in injury or mortality of western spadefoot toad because the proposed investigations would take place in suitable upland habitat for the species. In total, the proposed investigations would temporarily affect 50 acres of suitable upland habitat.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modifications, on western spadefoot toad. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to western spadefoot toad would be further avoided and minimized, the Authority and Reclamation would implement MMs Bio-1 through Bio-3, Bio-7, and Bio-8. If the proposed investigations still cannot avoid effects to western spadefoot toad, the Authority and Reclamation would implement MM Gen-2.

Therefore, for the purposes of CEQA, impacts on western spadefoot toad would be less than significant with mitigation incorporated.

Foothill Yellow-legged Frog: Based on the desktop evaluation completed for the Proposed Action, the proposed investigations have been sited to avoid work within 300 feet of any potential foothill yellow-legged frog habitat (i.e., intermittent or perennial streams with moderate gradient and rocky substrates). Several subsurface and surface investigation work areas would be sited near the top of the bank of relatively low-gradient segments of streams, including Funks Creek, just west of Funks Reservoir, as well as of Stone Corral Creek, and Antelope Creek. During Proposed Action planning the beds and banks of these aquatic habitats were also avoided. In addition, Funks Creek is influenced by the water elevations in Funks Reservoir, which would be considered atypical habitat for this species. Given the low quality habitat in the Proposed Action Area, as well as the temporary nature of both the surface and subsurface work, the likelihood of impacts to foothill yellow-legged frog is limited. Nonetheless, the potential for the proposed investigations to effect foothill yellow-legged frog still remains because field verification has not occurred.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modifications, on foothill yellow-legged frog. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to foothill yellow-legged frog would be further avoided and minimized, the Authority and Reclamation would implement MMs Bio-1 through Bio-3 and Bio-8. If the proposed investigations still cannot avoid effects to foothill yellow-legged frog, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on foothill yellow-legged frog would be less than significant with mitigation incorporated.

Western Pond Turtle: Similar to other aquatic species discussed earlier, the proposed investigations have been sited to not occur within or near western pond turtle habitat to the extent possible. In-water borings are not proposed as part of the Proposed Action. Proposed investigations would not be located in ponds or streams, and most would be located at least 300 feet away from potential aquatic habitat. However, the geophysical investigations near Funks, Stone Corral, and Antelope creeks would be within 300 feet of suitable aquatic habitat, and investigations in these areas could disrupt normal behaviors such as basking, breeding, and foraging. Also, the area adjacent to these creeks represent potential upland nesting habitat for western pond turtle. The placement of pins for both surface seismic refraction testing and ERI/ERT could damage nests if present in these areas, and the trimming of vegetation, if needed, and the noise associated with the seismic testing could disrupt nesting behaviors. The ERI/ERT surveys could also subject western pond turtles to potential electrical current that could cause injury or mortality if touched.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modifications, on western pond turtle. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to western pond turtle would be further avoided and minimized, the Authority and Reclamation would implement MMs Bio-1 through Bio-3, Bio-6, and Bio-7, to avoid and minimize impacts on the western pond turtle. If the proposed investigations still cannot avoid effects to western pond turtle, the Authority and Reclamation would implement MM Gen-2. Therefore for the purposes of CEQA, impacts on western pond turtle would be less than significant with mitigation incorporated.

Swainson's Hawk: Based on a desktop evaluation, the entirety of the Proposed Action Area is identified as suitable Swainson's hawk habitat; therefore, Proposed Action investigations could result in the disruption of nesting and foraging activities, if present within or near the investigation areas. These effects would result from noise and physical disturbance associated with the drill rigs, vehicles, and surface seismic refraction testing and the ERI/ERT testing that would be conducted at the geophysical work areas. Tree removal would not occur under the Proposed Action.

CEQA Determination: The proposed investigations could result in an effect, either directly or indirectly, on Swainson's hawk. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation

locations at least one week prior to mobilization. In addition, to ensure that impacts to Swainson's hawk would be further avoided and minimized, the Authority and Reclamation would implement MMs Bio-9 and Bio-11. MM Bio-9 consists of general nesting bird surveys and MM Bio-11 includes species-specific pre-activity surveys, avoidance buffers, and timing restrictions that would result in no take of Swainson's hawk. If the proposed investigations still cannot avoid effects to Swainson's hawk with implementation of MM Bio-9 and MM Bio-11, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on Swainson's hawk would be less than significant with mitigation incorporated.

Western Burrowing Owl: Similar to the evaluation completed for Swainson's hawk, the desktop evaluation determined that grasslands and agricultural areas within the Proposed Action Area are potential suitable western burrowing owl habitat. Proposed Action investigations could result in the disruption of western burrowing owl activities, if present within or near the investigation areas. These effects would result from noise and physical disturbance associated with the drill rigs, vehicles, and surface seismic refraction testing and the ERI/ERT testing that would be conducted at the geophysical work areas. Although vegetation trimming where needed could disrupt normal behaviors it would be localized and minor and would not result in the injury or mortality of burrowing owls.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modification, on western burrowing owl. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to western burrowing owl would be further avoided and minimized, the Authority and Reclamation would implement MM Bio-12, which requires pre-activity surveys, the establishment of avoidance buffers around occupied habitat, relocation of work areas, and biological monitoring. If the proposed investigations still cannot avoid effects to western burrowing owl, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on western burrowing owl would be less than significant with mitigation incorporated.

Bald Eagle, Golden Eagle, and Other Special-status and Migratory Birds: The desktop evaluation determined that the Proposed Action Area is identified as suitable habitat for bald and golden eagles and other special-status and migratory bird species, including but not limited to northern harrier, white-tailed kite, mountain plover, yellow-breasted chat, yellow warbler, song sparrow, tricolored blackbird and bank swallows. The proposed investigations could result in the disruption of nesting and foraging activities of special-status and migratory birds. These effects would result from noise and physical disturbance associated with the drilling rigs, vehicles, and surface seismic refraction testing and the ERI/ERT testing that would be conducted at the geophysical work areas.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modification, on special-status and migratory birds. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to bald eagles, golden eagles, and other special-status and migratory birds would be further avoided and minimized, the Authority and Reclamation would implement MMs Bio-9 through Bio-11, Bio-13, and Bio-14. These measures include a general nesting bird survey and species-specific pre-activity surveys, avoidance buffers, and timing restrictions, and would require that there is no permanent take of protected birds and that other effects are minimized or avoided. If the proposed investigations still cannot avoid permanent effects to bald eagle, golden eagle, and other special-status and migratory birds, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on bald eagles, golden eagles, and other special-status and migratory birds would be less than significant with mitigation incorporated.

Special-status Bats: The Proposed Action Area was reviewed, via a desktop evaluation, to determine if potential roosting habitat for special-status bats is present in the vicinity of the proposed investigation locations. Specifically, many of the large trees and snags in the oak woodland habitat throughout the Proposed Action Area could provide suitable habitat for bats in the form of cavities or loose bark. No structures or trees would be removed as part of the Proposed Action. Tree trimming is also not anticipated as part of the Proposed Action. However, noise associated with the proposed activities including operating drilling rigs, vehicles, and surface seismic refraction testing could temporarily disturb roosting bats, if present in the vicinity of the investigation locations. Additionally, an overall increase in human activity could disturb breeding bats. Direct mortality or disturbance to breeding bats would be considered a significant impact.

CEQA Determination: The proposed investigations could result in an effect, either directly or indirectly, on special-status bats. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to special-status bats would be further avoided and minimized, the Authority and Reclamation would implement MM Bio-1, Bio-2, and Bio-17. These mitigation measures require a worker environmental awareness training, general measures to avoid and minimize effects on sensitive resources, including bats, as well as bat specific surveys and avoidance. If the proposed investigations still cannot avoid effects to special-status bats, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on special-status bats would be less than significant with mitigation incorporated.

American Badger: Based on the desktop evaluation, potential habitat for American badger is present within the Proposed Action Area; therefore, the proposed investigations could affect American badger and its habitat. Because the American Badger is a burrowing animal, effects would be similar to those identified for western burrowing owl and would include noise and physical disturbance associated with the site preparation, equipment use and operation, and surface and subsurface investigations in or near suitable grassland habitat for the species. Other activities that could temporarily disrupt normal behaviors of the species, such as foraging, dispersal, and breeding include the potential need for minor vegetation trimming and visual disturbance.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modification, on American badger. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to American badger would be further avoided and minimized, the Authority and Reclamation would implement MM Bio-1, Bio-2, and Bio-15. The American-badger specific measure (MM Bio-15) would ensure that no investigations occur within 50 feet of an active American badger den, as well as requiring a biological monitor to be present during all work activities within 50 to 100 feet of an active den. If the proposed investigations still cannot avoid effects to American badger, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on American badger would be less than significant with mitigation incorporated.

Special-status Plants: Based on the desktop evaluation, up to 33 special-status plant species have been identified to have a potential to occur within the Proposed Action Area. Therefore, the Proposed Action investigations, such as vegetation trimming (if needed), overland travel, and ground disturbance associated with the investigations, have a potential to impact all special-status plants having a moderate to high potential to occur in the Proposed Action Area.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modification, on special-status plant species. Implementation of MM Gen-1 will require a botanist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to special-status plants would be further avoided and minimized, the Authority and Reclamation would implement Bio-16. If the proposed investigations still cannot avoid effects to special-status plants, the

Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on special-status plants would be less than significant with mitigation incorporated.

Riparian Habitat and Other Sensitive Natural Communities: Proposed investigations would avoid impacts to riparian habitat and would avoid work within any tree canopy associated with riparian habitat and other sensitive natural communities. However, activities associated with the Proposed Action investigations, such as overland travel, vegetation trimming (if needed), and ground disturbance, have a potential to impact woodland habitat, as the desktop evaluation shows investigations occurring within this identified habitat. The only other natural terrestrial community identified by the desktop evaluation that would be affected would be annual grassland; however, this natural community is not considered sensitive by CDFW or USFWS.

CEQA Determination: The proposed investigations could result in an effect, either directly or through habitat modifications, on woodland habitat, a sensitive natural community protected by local or regional plans, policies, regulations, or by CDFW or USFWS. However, Proposed Action investigations would not result in the permanent loss of woodland habitat. Implementation of MM Gen-1 will require a biologist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to riparian and other sensitive natural communities (including woodlands) would be further avoided and minimized, the Authority and Reclamation would implement MMs Bio-1 and Bio-2. Mitigation measure Bio-2 specifically requires investigations activities to occur outside of tree canopies and that the upper 12 inches of topsoil are restored. If the proposed investigations still cannot avoid effects to these sensitive natural communities, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on woodland habitat would be less than significant with mitigation incorporated.

Migratory Wildlife Species, Corridors, and Nursery Sites: The Proposed Action investigations would not interfere 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. No native wildlife nursey sites are known to occur in the Proposed Action Area. No in-water investigations would occur. Proposed geotechnical borings within Funks Reservoir would be conducted when Funks Reservoir is under maintenance by Tehama Colusa Canal Authority, during which time, Funks Reservoir is dewatered; therefore, the proposed investigations would have no appreciable effect on the movement of special-status and native fish.

CEQA Determination: Implementation of MM Gen-1 would require a biologist to confirm that native resident or migratory wildlife corridors are not present within or conflict with the proposed investigation areas. Additionally, because of the short-term nature of these activities and considering the baseline conditions at adjacent agricultural areas, which includes both the presence of farm workers and the periodic operation of farm equipment, the impact on native resident or migratory wildlife species, corridors, and nursery sites would be less than significant, under CEQA. No mitigation is required.

Biological Ordinances and Policies: The desktop evaluation identified several local policies that protect biological resources, including the Colusa County General Plan (Colusa County 2012), Glenn County General Plan Update Existing Conditions Report (Glenn County 2020), and 2030 Countywide General Plan (County of Yolo 2009). Biological resources protected by these counties include vegetation and wetland resources such as special-status plant and wildlife species, riparian habitat, oak woodlands, wetlands, and streams. The 2030 Countywide General Plan also protects large valley oaks (although there are none in the Proposed Action Area in Yolo County) and promotes removal of invasive plant species. Though special-status plants and wildlife species, riparian habitat, oak woodlands, and streams do occur within the Proposed Action Area, the proposed investigations would not result in substantial impacts to these resources (as described earlier under each resource). Tree removal, work within the tree canopy, in-water work, or work within the beds and banks of aquatic resources (e.g., creeks, streams, channels) is not proposed.

CEQA Determination: The proposed investigations would not conflict with any local policies or ordinances protecting biological resources. The Proposed Action does not include new construction or land uses that

would have the potential to substantially affect biological resources. Implementation of MM Gen-1 requires the investigations be sited to avoid effects to biological resources. Additionally, implementation of MM Bio-1 through MM Bio-17, would further minimize or avoid impacts to biological resources. If the proposed investigations still cannot avoid effects to these sensitive natural communities, the Authority and Reclamation would implement MM Gen-2. Therefore, impacts on local policies and ordinances would be less than significant with mitigation incorporated.

HCPs and NCCPs: The desktop evaluation identified that the Yolo County HCP/NCCP (Yolo Habitat Conservancy 2018) and the Yolo Bypass Wildlife Area Land Management Plan (California Department of Fish and Game 2008) are the only conservation plans that encompass the Proposed Action Area. The proposed investigations along the Dunnigan Pipeline portion of the Proposed Action Area, are the only proposed investigations located in Yolo County. No proposed investigations would occur in the Yolo Bypass Wildlife Area. Additionally, the Proposed Action investigations are not covered under the Yolo County HCP/NCCP, therefore, the Yolo County HCP/NCCP does not apply.

CEQA Determination: The Proposed Action investigations are not covered under the Yolo County HCP/NCCP, and no work within the Yolo Bypass Wildlife Area is proposed. Therefore, for the purposes of CEQA, there would be no impact on the provisions of an adopted HCP, NCCP, or other approval local, regional, or state HCP. No mitigation is required.

Mitigation

Table 3.2-1. Mitigation Measures for Biological Resources

Mitigation Measure Title	Description
MM Bio-1: Conduct Mandatory Biological Resources Awareness Training	Prior to Proposed Action implementation, a qualified biologist will conduct a mandatory biological resources awareness training for all Proposed Action personnel. A qualified biologist is defined as someone with training, knowledge, and experience with the species this document is concerned with. The training will cover special-status species and their habitats that could be encountered in the Proposed 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, as well as 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. Reclamation will maintain the record of training and make it available to USFWS upon request. The Authority-provided biological monitor will verify that the new personnel brought onto the Proposed Action team receive the mandatory training before starting work.
MM Bio-2: General Measures to Avoid and Minimize Effects on Sensitive Biological Resources	General restrictions and guidelines that will be followed by personnel are listed below. The contractor and Authority-provided biological monitor will be responsible for ensuring that crew members adhere to these measures. • Qualified biologists (USFWS-approved for giant garter snake and California red-legged frog, see below) will monitor all terrestrial activities. Any observations of federally listed species will be reported to Reclamation and USFWS within 24 hours. • Personnel driving vehicles will observe the posted speed limit on paved roads and a 15 mile-per-hour speed limit on unpaved roads during travel in the Proposed Action area. • All project personnel will have stop work authority if a potentially listed species is observed within an active work area. • All food-related trash 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 Proposed Action area. • Personnel conducting aquatic surveys for amphibians will follow USFWS-approved decontamination protocols prior to any staff entering a wetland or stream (USFWS, 2005a) (see MM Bio-17 below). • All Proposed Action-related equipment will be maintained to prevent leaks of fuels, lubricants, or other fluids. Daily equipment inspections will include inspections for leaks. • Temporary signs, staking, or flagging will be used to identify sensitive biological resources 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 qualified or approved biologist on a daily basis. • 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 Authority-provided biological monitor, who will immediately report the incident to Reclamation. Reclamation will provide oral notification to the USFWS Sacramento Endangered Species Office within 1 working day. Reclamation will follow up with written notification to USFWS within 5 working days. • Vehicles and equipment left onsite overnight will be thoroughly inspected each day for wildlife (both underneath the vehicle and in open cabs) before they are moved. 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 300 feet of any aquatic habitat. • Work will be restricted to open areas in riparian habitat and other sensitive natural communities, including woodlands. All work will remain outside of the tree canopy. Additionally, the upper 12 inches of topsoil will be restored at drilled work area within these habitats.

MM Bio- 3: Waters of the U.S./State	The following measures will be implemented to avoid, minimize, and mitigate impacts on wetlands and waters subject to federal and State jurisdiction: • At least 48 hours prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping within proposed investigation areas and staging areas, including areas within 250 feet where accessible (i.e., where access has been granted by the property owner), to confirm the presence and absence of wetlands and waters. All wetlands and waters not previously identified will be mapped in the field using a global positioning system (GPS) with submeter accuracy and will be used to update the land cover mapping. • To the extent practicable, investigations will not take place in or within 250 feet of wetlands and waters (i.e., ponds, streams, reservoirs), except for the investigation sites within Funks Reservoir and the potential regulated water and for activities identified in the Proposed Action description that are near or adjacent to canals and ditches in the agricultural areas. • If work needs to occur within 250 feet of wetlands and waters that are not also restricted by environmental commitments for special-status wildlife species (see MM Bio-4, 5, and 6), the following measures will be implemented: o Sediment control measures: Prevent transport of sediment from work area; Reduce runoff velocity on exposed slopes; and Reduce offsite sediment tracking. o Management measures for investigation materials: Cover and berm loose stockpiled materials; Store chemicals in watertight containers; and Minimize exposure of work materials to stormwater. o Designate refueling and equipment inspection/maintenance locations at least 300 feet from aquatic habitats. A spill prevention plan will be implemented. o A biological monitor will be onsite during all work within 250 feet of waters and wetlands. o In coordination with the Authority provided biological monitor, disturbed areas will be returned to their original condition, which may include the following: Restoring original topography to the degree possible; Placement of erosion control BMPs (e.g., wattles, soil binders, straw mulch, geotextiles) may be used to help stabilize work areas once work is complete; and Hydroseeding with noninvasive plant seed.
MM Bio-4: Valley Elderberry Longhorn Beetle	The following measures will be implemented to avoid, minimize, and mitigate impacts on valley elderberry longhorn beetle throughout the Proposed Action Area. • Pre-activity surveys for elderberry shrubs will be conducted in and adjacent to potential work areas by a qualified biologist familiar with the appearance of valley elderberry longhorn beetle exit holes in elderberry shrubs. Pre-activity surveys will be conducted in accordance with the USFWS's 2017 *Framework for Assessing Impacts to the Valley Elderberry* Longhorn *Beetle (Desmocerus californicus dimorphus)*. Any elderberry shrubs in the Proposed Action Area will be mapped. Those shrubs that are within 300 feet of Proposed Action activities will be identified with flagging and protected with high-visibility fencing (at the edge of the work area) and signs indicating the potential for beetle presence and excluding any Proposed Action activity within 165 feet of the plants. • A qualified biologist will be responsible for ensuring the buffer area fences are maintained throughout Proposed Action implementation. • Gravel roadways, staging areas, and other applicable areas will be sprayed with water as needed to minimize dust moving onto elderberry shrubs.
MM Bio-5: Vernal Pool Branchiopods	The following measures will be implemented to avoid, minimize, and mitigate impacts on federally listed vernal pool branchiopods. • Prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping that was done for the Proposed Action Biological Assessment (BA) within the above identified investigation areas and staging areas, including areas within 250 feet, to confirm the presence or absence of habitat suitable for vernal pool branchiopods. All suitable branchiopod habitat will be mapped in the field using a GPS with submeter accuracy and will be used to update the land cover mapping. Updated maps with exclusion buffers for listed species will be provided to all Proposed Action personnel. • Vehicles and equipment will not travel in identified branchiopod habitat. • Investigations will fully avoid effects on vernal pool branchiopods and their habitat. Full avoidance requires a minimum 250-foot no-disturbance buffer around all suitable habitat potentially supporting vernal pool branchiopods or drainage features feeding or draining these areas. The buffers will be identified with flagging or high- visibility fencing as well as signs identifying it as off limits and protected habitat.

	• Geophysical activities will not take place within 250 feet of suitable vernal pool branchiopod habitat. All geophysical lines will avoid going through pools that represent potential suitable habitat for these species. • The Authority-provided qualified biologist will ensure that the contractor complies with these avoidance buffers.
MM Bio-6: Giant Garter Snake	No work would occur within aquatic habitat for giant garter snake. However, the following measures will be implemented to avoid, minimize, and mitigate impacts on the giant garter snake and its upland habitat. • Prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping that was done for the Proposed Action BA within the above identified investigation areas and staging areas, to confirm the presence or absence of habitat suitable for giant garter snake. All suitable habitat will be mapped in the field using a GPS with submeter accuracy and will be used to update the land cover mapping. Updated maps with exclusion buffers for listed species will be provided to all Proposed Action personnel. • Geotechnical activities will not be conducted in giant garter snake upland habitat during the active giant garter snake season (April through October) to the maximum extent practicable. • No less than 30 days prior to Proposed Action implementation, Reclamation will submit a request for approval of biologists to conduct monitoring and other activities (see below) associated with the giant garter snake in the areas identified above. • A USFWS-approved biologist will survey work areas within 200 feet of giant garter snake aquatic habitat for snakes no more than 24 hours prior to the start of activities. • Movement of heavy equipment will be confined to existing paved and dirt roads and will avoid suitable upland giant garter snake habitat. • A USFWS-approved biologist will be present during all investigation activities taking place within 200 feet of suitable aquatic habitat. The biologist will visually check for giant garter snake under vehicles and equipment prior to contractors moving them. The biologist will ensure that the contractor caps all materials onsite (e.g., conduits, pipe), precluding wildlife from becoming entrapped. The biologist will check any crevices or cavities in the work area where individuals may be present including stockpiles that have been left for more than 24 hours where cracks/crevices may have formed. • If a giant garter snake is observed by the biologist within the work area, all work will cease until the snake has moved out of the work area on its own. If a giant garter snake does not move out of the work area on its own, the USFWS-approved biologist will have the discretion to relocate the snake to the nearest suitable habitat where it will not be exposed to Proposed Action activities that may result in take. The relocation will be immediate and will be recorded and reported to the USFWS within one business day. • All Proposed Action activities adjacent to suitable giant garter snake aquatic habitat will be conducted within paved roads, farm roads, road shoulders, and similarly disturbed and compacted areas without small mammal burrows or other suitable refugia that could be used by giant garter snake. A USFWS-approved biologist will assess the locations of proposed boreholes to avoid small mammal burrows. The biologist will ensure that the work area along the geophysical line remains clear of snakes and other wildlife during testing. The USFWS-approved biologist will immediately notify the operator to shut down testing if a snake is seen moving into the work area. Testing will resume once the snake has moved out of the work area on its own. • No Electrical Resistance Survey work will be conducted within 200 feet of giant garter snake aquatic habitat to avoid exposing giant garter snakes to electrical current if they are occupying or passing through uplands.
MM Bio-7: California red-legged frog	No work would occur within suitable California red legged frog aquatic habitat. If work needs to be conducted within suitable California red-legged frog upland habitat or dispersal habitat (areas within 1 mile of aquatic breeding habitat during the rainy season, generally October 15 to March 31), the following measures will be implemented to avoid, minimize, and mitigate impacts under the guidance of a USFWS-approved biologist. • Prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping that was done for the Proposed Action BA within the above identified investigation areas and staging areas to confirm the presence or absence of habitat suitable for California red-legged frog. All suitable habitat will be mapped in the field using a GPS with submeter accuracy and will be used to update the land cover mapping. Updated maps with exclusion buffers for listed species will be provided to all Proposed Action personnel. • A qualified biologist will be present during all investigation activities in California red-legged frog upland habitat and dispersal habitat (if work occurs during rainy season, generally October 15 to March 31 when frogs are dispersing) to implement avoidance and minimize measures for the California red-legged frog. The biologist will survey work areas for frogs and for rodent burrows in potential upland habitat before equipment is moved in and

	work begins. Areas with higher potential for California red-legged frog, such as areas with a high density of burrows, will be flagged for avoidance. The biologist will work with the geotechnical crew and geologists to align work such that the minimum number of burrows is affected. • The qualified biologist will inspect all equipment left in a work area overnight to ensure that no frogs are present before work begins. Any California red-legged frogs found within a work area will be avoided and allowed to disperse on their own accord. • The qualified biologist will ensure that the work area along the geophysical lines remains clear of frogs and other wildlife during the ERI. The biological monitor will immediately notify the operator to shut down the ERI equipment if a frog, or other special-status wildlife species, is seen moving into the work area. Testing will resume once the frog has moved out of the work area on its own. • No work will occur in the aforementioned work areas during or 24 hours following a rain event. Following a rain event, no work will proceed until a qualified biologist has inspected the work areas and verified that there are no California red-legged frogs present. A rain event is to be considered precipitation of at least one-quarter inch within a 24-hour period. • Activities within suitable upland/dispersal habitat will occur during daylight hours (from 30 minutes before sunrise to 30 minutes after sunset). Except when necessary for driver or pedestrian safety, artificial lighting at a worksite will be prohibited during the hours of darkness when working in suitable California red-legged frog upland/dispersal habitat. • If work in suitable California-red legged frog dispersal habitat occurs during the rainy season, generally October 15 to March 31, and lasts for more than 1 day, exclusion fencing will be installed around the work area. Fencing will remain within the Proposed Action Area at any location and allow enough room for the movement of equipment and personnel. The fencing will be installed to a depth of 6 inches and be at least 36 inches above grade. The contractor will avoid placing fencing on top of ground squirrel burrows. A qualified biologist will inspect the fencing daily for the presence of California-red legged frogs.
MM Bio-8: Foothill Yellow-legged Frog	All investigations will be sited outside of foothill yellow-legged frog habitat (i.e., intermittent or perennial streams with moderate gradient and rocky substrates). If work occurs within 300 feet of suitable aquatic habitat, a CDFW-approved biological monitor will conduct a pre-activity survey immediately prior to work crews entering the work area and will remain onsite for the duration of the activities within 300 feet of suitable aquatic habitat. If a frog is observed in a work area, it will be allowed to move out of the work area on its own. Any observed foothill yellow-legged frogs will be reported to CDFW within 24 hours.
MM Bio-9: Migratory Birds	The following measures will be implemented to avoid and minimize impacts on nesting migratory birds, including special-status birds, during investigations: • A qualified wildlife biologist with experience with nesting birds will conduct nesting surveys before the start of investigation activities during the breeding season (February 1-August 31). A minimum of two separate surveys will be conducted within 14 days prior to the initiation of work, with the last survey within 24 hours prior to work beginning in a given work area. Surveys will include a search of all suitable nesting habitat in the work area. In addition, a 500-foot radius around the work areas, where accessible, will be surveyed for nesting raptors, and an area within 50 feet of the work area will be surveyed for other nesting birds protected by the Migratory Bird Treaty Act. If no active nests are detected during these surveys, no additional measures are required. • If active nests are found in the survey area, no-disturbance buffers will be established around the nest sites to avoid disturbance or destruction of the nest site until the end of the breeding season (approximately August 31) or until a qualified wildlife biologist determines that the young have fledged and moved out of the Proposed Action Area (this date varies by species). A qualified wildlife biologist will monitor activities in the vicinity of the nests to ensure that activities do not affect nest success. The extent of the buffers will be determined by the biologists in consultation with CDFW and will depend on the level of noise or disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. Suitable buffer distances may vary between species.
MM Bio-10: Bald and Golden Eagles	The following measures will be implemented to avoid, minimize, and mitigate impacts on bald and golden eagles during investigations: • All investigations (surface and subsurface) will be avoided within 0.5 mile of potential bald eagle nests; and 1 mile of potential golden eagle nests during the nesting season (January to August 31).

	• Work within the 0.5 and 1 mile buffers will only occur if the Proposed Action receives an eagle take permit from USFWS. Once the permit is received, the Proposed Action will implement conditions of the permit that are applicable to investigations, including mitigation. Conditions may include participation in an in-lieu fee program for take of eagles or utility line relocation and retrofit.
MM Bio-11: Swainson's Hawk	The following measures will be implemented to avoid, minimize, and mitigate impacts on Swainson's hawk during investigations: • Pre-activity surveys will be conducted by a biologist with experience with Swainson's hawk to identify the presence of potential Swainson's hawk nest trees on and within 0.25 mile of work and staging areas. Surveys will be consistent with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000), or as the methodology is modified based on Proposed Action timing. Survey results will be provided to CDFW by phone or e-mail no less than 5 days prior to commencement of activities, and in a written report within 30 days after commencement of activities. The report will include the location of any known nest trees (occupied within one or more of the last 5 years) present within 0.25 mile of the work footprint. • Investigations will fully avoid Swainson's hawk nests. Investigations will not be conducted within 650 feet of an occupied Swainson's hawk nest. A nest is considered occupied from the time the nest is being constructed until the young leave the nest, or until the nesting attempt fails and the nest is abandoned.
MM Bio-12: Western Burrowing Owl	The following measures will be implemented to avoid, minimize, and mitigate impacts on western burrowing owl during investigations. These measures incorporate survey, avoidance, and minimization guidelines adapted from CDFW's Staff Report on Burrowing Owl Mitigation (CDFG, 2012). • Pre-activity surveys will be conducted with one occurring 14 days prior to all activities, including staging, and another within 24 hours of these activities within and adjacent to areas of suitable habitat. A qualified biologist will survey the Proposed Action Area and record and map all burrowing owl observations and burrows that may be occupied (as indicated by tracks, feathers, egg shell fragments, pellets, prey remains, cast pellets, whitewash, or decoration) on the Proposed Action Area. The surveys will be conducted while walking transects throughout the proposed investigations areas, plus all accessible areas within a 250-foot radius of the proposed investigation areas. Surveys will be conducted between 10:00 a.m. and 2 hours before sunset. • Burrowing owls will be avoided by relocating work areas. If an active burrow is identified near a work area and work cannot be conducted outside of the nesting season (February 1 to August 31), a qualified biologist will establish a no-activity buffer that extends a minimum of 250 feet around the burrow. If burrowing owls are present at the site during the nonbreeding season (September 1 through January 31), a qualified biologist will establish a no-activity zone that extends a minimum of 150 feet around the burrow. • If the appropriate no-activity buffer for breeding or nonbreeding burrowing owls cannot be established, a wildlife biologist experienced in burrowing owl behavior will evaluate site-specific conditions and recommend a smaller buffer that still minimizes the potential to disturb the owls (and still allows reproductive success during the breeding season). The site-specific buffer will be established by taking into consideration the type and extent of the proposed activity occurring near the occupied burrow, the duration and timing of the activity, the sensitivity and habituation of the owls to existing conditions, and the dissimilarity of the proposed activity to background activities. • A biological monitor will be present during all activities occurring within any reduced buffers. If during the breeding season there is any change in owl nesting and foraging behavior as a result of activities, the biological monitor will work with personnel and Authority to provide additional protections to reduce disturbance, such as adding visual and sound curtains. • If monitoring indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in used by owls, the no-activity buffer may be removed.
MM Bio-13: Tricolored Blackbird	The following measures will be implemented to avoid, minimize, and mitigate impacts on tricolored blackbird during investigations: • Prior to initiation of investigations within 1,300 feet of suitable nesting habitat, a biologist with experience surveying for and observing tricolored blackbird will conduct pre-activity surveys to establish use of nesting habitat by tricolored blackbird colonies. Surveys will be conducted, where access allows, during the nesting season (generally March 15 to July 31). Three surveys will be conducted within 15 days prior to activities with one of the surveys within 5 days prior to the start of activities. If active tricolored blackbird nesting colonies are identified, the following avoidance measure will be implemented: • Investigations will fully avoid tricolored blackbird nesting and roosting habitat.

	• To the extent practicable, investigations will not occur within 1,300 feet of an active tricolored blackbird nesting colony (generally March 15 through July 31). Where a buffer distance of 1,300 feet is not practicable, CDFW will be consulted to develop a smaller buffer. The buffer may be reduced in areas with dense trees, buildings, or other habitat features between the activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined by the biological monitor that is experienced with tricolored blackbird. If tricolored blackbirds colonize habitat adjacent to work areas after activities have been initiated, the contractor will reduce disturbance through establishment of buffers and/or sound curtains, as determined by the biological monitor. • Investigations will avoid activities within at least 300 feet from occupied active tricolored blackbird roosting habitat. This minimum buffer may be reduced in areas with dense trees, buildings, or other habitat features between the work activities and the roost, or where there is sufficient topographic relief to protect the roosting site from excessive noise or visual disturbance, or where sound curtains are used, as determined by the biological monitor that is experienced with tricolored blackbird.
MM Bio-14: Bank Swallow	The following measures will be implemented to avoid, minimize, and mitigate impacts on bank swallow during investigations: • Prior to beginning investigations within 500 feet of the Sacramento River during the bank swallow nesting season (April 1 through August 31), a pre-activity survey for bank swallow colonies will be conducted where bank swallow habitat is present within 500 feet of work areas. If no active nesting colonies are present, no further measures are required. • If an active colony is found and work must occur during the nesting season (April 1 through August 31), the Authority will establish a no disturbance buffer (determined by the Authority in consultation with CDFW) around the colony during the breeding season. In addition, a qualified biologist will monitor any active colony within 500 feet of work areas to ensure that activities do not affect nest success.
MM Bio-15: American Badger	The following measures will be implemented to avoid, minimize, and mitigate impacts on American badger during investigations: • A qualified biologist will survey for American badger in work areas, concurrent with the pre-activity survey for burrowing owl. If an active den is located, no investigations will occur within 50 feet of an active American badger den. • A biological monitor will be present during all work within 50 to 100 feet of an active American badger den. The monitor will ensure that activities do not affect the den or substantially disrupt the badger's ability to move freely in and out its den.
MM Bio-16: Special-Status Plant Species	The following measures will be implemented to avoid, minimize, and mitigate impacts on special-status plant species during investigations: • Pre-activity surveys will be conducted for special-status plant species in all investigation and equipment staging areas, as well as areas within 250 feet of investigation and equipment staging areas. The purpose of these surveys will be to verify that the locations of special-status plants identified in previous record searches or surveys are extant, identify any new special-status plant occurrences, and cover any portions of the Proposed Action Area not previously surveyed. During pre-activity surveys, the biologist would also identify any host plants suitable for special-status pollinators (e.g., milkweed, dusty maidens, lupines, medics, phacelias, sages, clarkias, poppies, and wild buckwheats). • All surveys will be conducted by qualified biologists using the using *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018). To the extent feasible, surveys will be conducted during the blooming season, when special-status plant species would be most evident and identifiable. Locations of special- status plants in the Proposed Action Area will be recorded using a GPS unit and flagged. • Where surveys determine that a special-status plant species is present in or adjacent to a proposed investigation area, direct and indirect impacts of the Proposed Action on the species will be avoided through the establishment of 250-foot activity exclusion zones surrounding the periphery of occurrences, within which no ground-disturbing activities shall take place. Activity exclusion zones for special-status plant species will be established according to a 250-foot buffer surrounding the periphery of each special-status plant species occurrence, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no activity-related disturbances will occur within 250 feet of the occurrence. The 250-foot buffer may be reduced based on the nature of the activities, the presence of a biological monitor, and/or other site-specific conditions that would allow work to occur closer.
MM Bio-17: Special-Status Bat Species	The following measures will be implemented to avoid, minimize, and mitigate impacts on special-status bat species during investigations:

	• Pre-activity surveys will be conducted for special-status bat species in all work areas, including staging areas. The biologist shall look for bats and bat sign, including existing roost sites and bat guano deposits, and will listen for roosting bats. If potential roost sites are identified, a project-specific avoidance and minimization plan shall be prepared by a qualified biologist to be reviewed and approved by CDFW prior to the start of Proposed Action investigations. • If vegetation trimming is needed, the biologist will examine the trees to be trimmed to identify suitable bat roosting habitat. Trimming 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). • If a maternity roost is found, the roost will be protected until July 31 or until the qualified biologist has determined 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. The establishment of buffers will be coordinated with CDFW through the preparation of the previously referenced project-specific avoidance and minimization plan.

3.3 Land Use and Agriculture

This section describes the existing land use and agriculture conditions within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action.

3.3.1 Affected Environment

The Proposed Action, located in Glenn, Colusa, and Yolo Counties, lies west of the Sacramento River. Each county is sparsely populated within the Proposed Action Area. Glenn and Colusa Counties' populated centers are located along Interstate 5 (I-5), and toward the eastern sides of the counties along State Route (SR) 45. The populated centers of Yolo County are located along I-5, I-80 and I-505.

Land Use and Agriculture

The Proposed Action Area consists of lands that have varying General Plan land use designations; however, the majority of the proposed investigations occur on lands that are designated by Glenn, Colusa and Yolo Counties as agricultural. Most of the properties within the Antelope Valley are grazing lands that are not actively cultivated.

Glenn County

Glenn County is in the western portion of the Sacramento Valley, north of Colusa County. Glenn County is approximately 849,000 acres in size, with approximately 68 percent in agriculture, 31 percent considered "other land," and less than 1 percent in urban (i.e., residential, commercial, and/or industrial) land uses in 2016 (DOC, 2019a).

In 2016, Glenn County recorded 347,652 acres of Important Farmlands (including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) and an additional 227,081 acres of grazing land. Between 2014 and 2016, Important Farmlands increased slightly by 6,216 acres, and grazing land decreased slightly by 37 acres in Glenn County (DOC, 2016).

Colusa County

Colusa County is in the western portion of the Sacramento Valley. The county is approximately 740,000 acres in size, with approximately 76 percent in agriculture, 23 percent considered "other land," and less than 1 percent in urban (i.e., residential commercial, and/or industrial) land uses in 2010 (DOC, 2019b).

In 2016, Colusa County had 547,088 acres of Important Farmlands (including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) and an additional 15,835 acres of grazing land. Between 2014 and 2016, Important Farmlands decreased by 2,010 acres, and grazing land increased by 1,976 acres in Colusa County (DOC, 2019b).

Yolo County

Yolo County is located in the western portion of the Sacramento Valley and as a whole is generally rural with over 96 percent of the County area designated for agricultural and open space uses. Approximately 603,544 acres are designated for agricultural purposes, and 2,722 acres, or half of one percent of unincorporated County lands are designated as Open Space. The remainder of the County is a mixture of residential, recreation, industrial, commercial, public, mixed and other uses (Yolo County 2009).

Approximately 390,252 acres of land in Yolo County are designated as Important Farmland (including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance). There is an additional 150,339 acres of grazing land in Yolo County (Yolo County 2009).

3.3.2 Environmental Consequences

This section discusses potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on land use and agriculture that could occur as a result of the proposed investigations.

CEQA Significance Criteria

An impact would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area.

Land Use and Agriculture

- Physically divide an established community.
- 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.
- 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 Natural Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act Contract.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Existing conditions and the future No Action are assumed to be similar given the generally rural nature of the area and limited potential for growth and development in Glenn, Colusa, and Yolo Counties. As a result, under the No Action, land and agricultural uses in the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

The effects of the Proposed Action implementation on land use and agriculture are described below. Proposed Action activities would be located on properties within existing rights-of-ways with local and regional public agencies, or on properties with willing landowners that grant access. Effects on land uses would be spread over the entirety of the Proposed Action Area but would be limited to individual investigation locations. Individual investigation areas would be less than 0.025 acre per site. Proposed investigation activities would result in minor, localized and short-term effects immediately surrounding each site and would not affect existing land uses including agricultural uses. No land uses or farmland would be converted as a result of the Proposed Action because each investigation location would be restored to its original conditions once the investigation is complete.

Piezometers would be installed such that no equipment interferes with existing land and agricultural uses (i.e. cattle grazing/movement). Groundwater aquifer monitoring activities would occur where piezometers are installed, as described in Section 2 – Proposed Action Alternatives. Monitoring activities would occur up to four times a year for 10 years. No new ground disturbance would result from the monitoring activities and effects would be minor and localized resulting from overland travel via a single pickup truck that would be required to reach the piezometer locations in remote areas.

CEQA Determination: Proposed Action activities would not divide an existing community, conflict with applicable land use policies, convert agricultural lands to another use, or otherwise adversely affect agricultural uses, including farmland, agricultural zonings and Williamson Act properties in the Proposed Action Area. Therefore for the purposes of CEQA, impacts on land use and agricultural resources would be less than significant.

3.4 Water Resources and Water Quality

This section describes existing water resources and water quality conditions within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action.

3.4.1 Affected Environment

The Proposed Action is located in the Northern Sacramento Valley, within Glenn, Colusa, and Yolo Counties. The Proposed Action Area for surface water includes streams, drainages, and conveyance facilities associated with water supply and floodwater management in the various locations in and around the Sites Valley and adjacent areas in Glenn, Colusa, and Yolo Counties and hydrologically connected surrounding areas. The Proposed Action Area for groundwater includes the Funks Creek and Antelope Creek Basins, and the Colusa and Yolo Subbasins of the Sacramento Valley Groundwater Basin.

Surface Water and Surface Water Quality

Multiple small creeks are located within the Proposed Action Area. These local creeks originate in the eastern foothills of the Coast Range and drain east towards the Sacramento Valley subregion of the Central Valley. The creek located to the north of the inundation area is Hunters Creek and the primary drainages in the inundation area are Funks Creek and Stone Corral Creek. These creeks originate at elevations below the snow line of the Coast Range and consequently do not receive cold snowmelt water. Rather, they respond rapidly to significant rainfall events, flash flooding, and substantial overland flow. Other local creeks are also present in the Proposed Action Area.

Water quality in these streams is directly influenced by the geology of the streams as well as agricultural (mostly cattle grazing) land uses. Surface water quality of the streams supports aquatic and terrestrial habitat. DWR observed aluminum, arsenic, copper, iron, manganese, mercury, nickel, and phosphorus in Funks Creek at the GCID Main Canal station during intermittent water quality sampling. Aluminum, arsenic, copper, iron, manganese, nickel, and phosphorus were observed by DWR in Stone Corral Creek near Sites station during intermittent water quality sampling. DWR has previously observed aluminum, arsenic, cadmium, and iron during intermittent sampling in the Tehama-Colusa Canal downstream of the siphon under Stony Creek during intermittent water quality sampling. DWR also observed aluminum, arsenic, cadmium, copper, iron, mercury, manganese, and phosphorus during intermittent sampling in the Glenn-Colusa Irrigation District Main Canal.

In addition to the aforementioned creeks, the Colusa Basin Drain is located in the Proposed Action Area. This is a human-made channel located in Glenn, Colusa, and Yolo Counties. Although used to convey water for agricultural use, the Colusa Basin Drain is listed as impaired for numerous contaminants, which is the result of agricultural return flows. Water quality constituents of concern include mercury, dissolved oxygen, indicator bacteria, toxicity, salinity, nutrients, pesticides, organic carbon, and sulfates. The Colusa Basin Drain was placed on the Clean Water Act Section 303(d) list of impaired waterbodies because of organophosphate and organochlorine pesticide contamination, including azinphos-methyl (Guthion), carbofuran, dichlorodiphenyltrichloroethane, dieldrin, and Group A Pesticides (SWRCB, 2017). Pesticides diazinon and malathion were delisted from the Section 303(d) list in the 2014–2016 report as these pesticides are being addressed with an action other than the total maximum daily load. The Colusa Basin Drain is also listed on Section 303(d) as contaminated by fecal indicator bacteria, mercury, low dissolved oxygen, and toxicity (SWRCB, 2017). The Knights Landing Ridge Cut and Colusa Basin Drain confluence are listed as contaminated by boron, low dissolved oxygen, and high salinity (SWRCB, 2017; USGS, 2002).

Groundwater and Groundwater Quality

The Colusa Subbasin has a surface area of approximately 918,380 acres (1,434 square miles), and the estimated storage capacity to a depth of 200 feet is approximately 13,025,887 acre-feet (DWR 2006). Groundwater within the Colusa Subbasin generally flows from the recharge areas along the basin margin in the west to the east/southeast toward the Sacramento River. Recent depth to groundwater was generally less than 10 to 20 feet below ground surface across much of the subbasin during spring 2016, and generally 20 to 40 feet below ground surface during fall 2015 (DWR, 2017). The Colusa Subbasin Groundwater Sustainability Plan guides the management and use of groundwater in the Colusa Subbasin in a manner that can be maintained without causing undesirable results, such as reduction of groundwater storage, sea water intrusion, and degraded water quality (Colusa Groundwater Authority 2021).

Groundwater quality in the Proposed Action Area has been classified as fair to good; however, it does have high mineral content. Fifteen wells within the Proposed Action Area were sampled in 2005. Salinity, measured as specific conductance, ranged from 680 to 2,190 micromhos per centimeter, and total dissolved solids (TDS) values ranged from 375 to 1,291 milligrams per liter. Sampling revealed that no Primary Maximum Contaminant Levels (MCLs) were exceeded. Of the 15 wells sampled, Secondary MCLs were exceeded in various wells for TDS, specific conductance, sulfate, pH, manganese, iron, aluminum, and chloride. Agricultural Water Quality Goals from the Food and Agriculture Organization of the United Nations (CVRWQCB, 2011) were exceeded for specific conductance and TDS, sodium, chloride, boron, pH, and selenium.

Groundwater in the area of Funks Reservoir is extremely high in mineral content. The Primary MCL for arsenic was exceeded, and Secondary MCLs were exceeded for chloride, specific conductance, and manganese. TDS Agricultural Water Quality Goals were exceeded for boron, chloride, and manganese. Groundwater sampling along the length of the Tehama-Colusa Canal indicated that the quality of the groundwater along the canal is generally good, with a few impairments. Nitrate values exceeded the Primary MCL from one well. Secondary MCLs were exceeded for specific conductance, iron, TDS, and pH. Agricultural Water Quality Goals were exceeded for specific conductance, boron, TDS, copper, sodium, and pH (DWR, 2007).

3.4.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on water resources and water quality that could occur as a result of the proposed investigations.

CEQA Significance Criteria

An impact on water resources and water quality would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede substantial groundwater management of the basin.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a

manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite.

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

This Proposed Action is not located in a tsunami or seiche zone; therefore, there is no potential for impacts related to tsunamis or seiches.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Under the No Action, water resources and water quality in the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years, and no impacts would occur.

Proposed Action

Proposed Action activities would include subsurface investigation techniques requiring borings primarily in upland areas but, in limited cases, adjacent to water features. The investigations would also require use of water to be trucked in for drill rigs. As discussed in Section 2 – Proposed Action Alternatives, aquifer bail or slug tests would be conducted at select investigation locations where piezometers are installed. Aquifer bail or slug tests consist of evaluating and monitoring water level recharge in specific areas. During a bail test, water is removed and then the water level recharge is monitored as it recovers to its original level. It is estimated that less than 60 gallons of water would be removed during a bail test, and this water would be containerized in a 55-gallon drum and the contents would be tested to determine appropriate disposal. The containerized water would be managed in accordance with RWQCB requirements and disposed of offsite in an area that meets RWQCB requirements. No water is pumped into or out of the piezometer during a slug test.

Surface Water

Three investigation locations are located within Funks Reservoir and one investigation location is located in a potential seasonal wetland. Work in Funks Reservoir is scheduled during the annual dry-down period between January and February 2023 and work within the potential seasonal wetland would be conducted in the summer months under dry working conditions. Surface investigations typically involve various noninvasive or minimally invasive physical methods, and any effects would be localized and negligible. Minor surface grading may be necessary only at investigation areas with moderate to steep slopes, or uneven terrain to stabilize equipment.

Because work would be done during the dry season and ground disturbance would be temporary and localized, these activities would not affect existing drainage patterns in the Proposed Action Area. Vehicular

access to the proposed investigation locations would be primarily provided by existing improved public and private roads. However, drainage crossings for overland access are anticipated and would require the use of clean, contained temporary fill such as steel plates or hard density plastic mats for temporary vehicular access. All other temporary access routes would be located outside of wetlands and other aquatic resources and adhere to specific buffer zones. Drilling and vehicle traffic would result in disturbance to onsite soils within the Proposed Action Area, increasing the potential for soil to enter watercourses. The potential exists for wind and Proposed Action-related water erosion to discharge sediment, and Proposed Action-related contaminants and pollutants could enter watercourses directly as well as through stormwater runoff, which could affect water quality.

Implementation of Standard Protocols and Procedures related to SWPPP and Spill Prevention and Hazardous Materials Management will further avoid and minimize the potential for impacts on surface water resources and quality through the use of BMPs. The Authority and Reclamation will also implement MM Bio-3, as described in Section 3.2 – Biological Resources, related to potentially regulated waters, which would also reduce the potential for impacts on surface waterbodies.

CEQA Determination: Proposed Action activities would not violate water quality standards or waste discharge requirements, substantially degrade surface water quality, alter existing drainage patterns of the area, or obstruct implementation of a water quality control plan in the Proposed Action Area. The Proposed Action does not result in the alteration of the course of a stream or river or addition of impervious surfaces as there will be no investigations in or adjacent to a stream or river and disturbed areas would be returned to previous or better conditions. Therefore, for the purposes of CEQA, any impacts on surface waterbodies would be less than significant.

Groundwater

As described above, aquifer bail tests would result in less than 60 gallons of water to be removed from select piezometers and placed into 55-gallon drums. The estimated storage capacity in the Colusa Subbasin to a depth of 200 feet is approximately 13,025,887 acre-feet (DWR 2006). Given the limited amount of anticipated groundwater to be removed for the proposed aquifer bail tests, no perceptible changes in groundwater drawdown or recharge are anticipated to occur as a result of implementation of the Proposed Action.

Therefore, the Proposed Action would not conflict with the Colusa Subbasin Groundwater Sustainability Plan. Groundwater removed during aquifer bail tests would be containerized, tested, and then disposed of in accordance with RWQCB requirements. The proposed investigations have been sited to avoid known wells, therefore there are no anticipated impacts to groundwater wells or supply in the Proposed Action Area.

CEQA Determination: Proposed Action activities would not substantially degrade groundwater quality, decrease groundwater supplies, or interfere substantially with groundwater recharge such that the project may impede substantial groundwater management of the basin in the Proposed Action Area. Therefore, for the purposes of CEQA, impacts on groundwater resources would be less than significant.

Flooding

Ground disturbance as a result of the proposed investigations would be localized and temporary and would not result in the alteration of drainage patterns in the Proposed Action Area. The Proposed Action would not result in new impervious surfaces that would increase surface runoff or contribute to flooding onsite or offsite. The proposed investigation areas would be restored to original conditions and topography after the investigations are complete, thus existing conditions would not be permanently altered.

CEQA Determination: Proposed Action activities would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows in the Proposed Action Area. Therefore, for the purposes of CEQA, impacts on flooding would be less than significant.

3.5 Geology, Soils, and Paleontology

This section describes the existing geological, soils, and paleontological environment within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action.

3.5.1 Affected Environment

The area of analysis for geology, soils, and paleontology is the Proposed Action Area and also includes an inventory of geological units within 1 mile of the ground-disturbing activities (if farther than the Proposed Action Area). Evaluation is based on published sources and information gathered to date for the Sites Reservoir, as well as other maps, reports, and documents that describe geologic, mineral, soil, and paleontological resources in the Proposed Action Area.

Geology

The Proposed Action Area is situated within the boundary of the northern portions of the Coast Ranges and Great Valley Geomorphic Provinces. In the Proposed Action Area, the Coastal Range foothills surrounding the Antelope Valley consist generally of parallel northwest-trending ridges and valleys with slopes up to approximately 40 percent gradient. The average ground surface gradient in the Sacramento Valley is less than 1 percent.

The topography of the Proposed Action Area varies from west to east. The west side of the Proposed Action Area in the vicinity of Funks Reservoir is characterized by low rolling foothills of the Coast Ranges, and elevations range from approximately 400 to 800 feet above mean sea level (msl) in the hills surrounding Antelope Valley to 200 feet above msl in the Funks Reservoir area. From the Funks Reservoir, the valley gently slopes to the Proposed Action Area's lowest point, which is approximately 30 feet above msl at the eastern edge of the Proposed Action Area, south of Dunnigan.

The Great Valley Geomorphic Province has been filled with a thick (several miles deep) accumulation of alluvial sediments eroded from the adjacent ancestral Sierra Nevada and Klamath Mountain ranges (Wahrhaftig and Birman, 1965). The ridges and valleys of the Coast Ranges were formed by active uplift related to the San Andreas fault/plate boundary system (Norris and Webb, 1990). The valleys between the ridges are filled with a relatively thin (less than 50 feet) accumulation of alluvial soil. The general geologic formations underlying the Proposed Action Area include the following; upper cretaceous marine sedimentary rock of the Great Valley Sequence; quaternary terrace, fan, basin, and stream channel deposits; and tertiary nonmarine sedimentary rock.

Investigation areas within the Antelope Valley portion of the Proposed Action Area are underlain by sedimentary rocks of the Great Valley Sequence. Other investigation areas in the northeastern portion of the Proposed Action Area are located in the Boxer Formation. Investigation areas along a prominent ridge on the east side of the Antelope Valley of the Proposed Action Area formed from the contact between the underlying Boxer Formation and the more resistant Cortina Formation. Other investigation areas within the Antelope Valley include the basal member of the Cortina Formation, the Venado Sandstone. Investigation areas between the proposed Sites Reservoir and the regulating reservoirs are also on the eastern slope of a prominent ridge of the Cortina Formation. The Boxer Formation is also present in this area as well as occasional younger Quaternary alluvial deposits. The investigation areas farther east in the Proposed Action Area are underlain by the younger Quaternary deposits, which are estimated to overlay the Cortina Formation and are bordered by the Tehama Formation. Geologic units underneath and adjacent to this area consist of basin deposits and the Lower Riverbank Formation.

Soils

Floodplains extending along both sides of the Sacramento River slope gently away from the river to the Butte Sink to the east and Colusa Basin to the west. Frequent overflows under natural conditions have deposited loamy soils high in content of silt and fine sand. A levee system combined with Shasta Reservoir upstream

helps to control Sacramento River waters so that floodplains are no longer flooded on a regular basis. The soils on the floodplains along the Sacramento River are fertile and are among the best soils in the Sacramento Valley. West from the floodplains along the Sacramento River, the Colusa Basin extends north and south through the Proposed Action Area. Overflows containing clayey sediments from the Sacramento River and foothill streams regularly filled the Colusa Basin. The basin is mostly leveled for rice production. Salts in the clayey sediments from the foothill streams were deposited in the basin soils, particularly Willows soils; and reclamation of the soils has been ongoing since early in the twentieth century. Most basin soils have been reclaimed to several feet.

Alluvial fans exist along the western side of the Sacramento Valley. They originate at the base of the foothills, at elevations of 200 to 400 feet, and gently descend to the east for several miles to the Colusa Basin. Under natural conditions, streams from the foothills flooded these alluvial fans, depositing fertile loamy soils. The Coast Range foothills have gently sloping clayey soils and some areas of loamy soils overlying the Great Valley Sequence.

Paleontology

Guidelines for paleontological resources assessments (SVP, 2010) call for the inventory of all geological units within 1 mile of the ground-disturbing activities associated with any project to ensure that both surficial geologic units and geologic units that would be encountered in the subsurface are adequately analyzed. These geological units are then evaluated for paleontological sensitivity.

The paleontological sensitivity of a rock unit is qualitatively determined by the likelihood that it would yield identifiable, unique, or scientifically important fossils. The fundamental assumption (SVP, 2010) is that formations would yield fossils of similar quality and quantity to what they have produced in the past. The paleontological sensitivity of any part of the Proposed Action Area depends almost entirely on its geology. No rare or unique occurrences of plant or invertebrate fossils are known to occur in the Proposed Action Area. All geologic units in the Proposed Action Area with plant or invertebrate fossils also contained vertebrate fossils and were therefore considered sensitive (University of California Museum of Paleontology 2020). The Paleontological sensitivity of the geologic units in the Proposed Action Area is summarized in Table 3.5-1.

Table 3.5-1. University of California Museum of Paleontology Vertebrate Fossil Records, by Formation Extent and Proposed Action Area Counties, and Paleontological Sensitivity of Geologic Units in the Proposed Action Area

Map Symbol	Unit and Age	Records Throughout Formation's Extent	Records in Proposed Action Area Counties	Paleontological Sensitivity
Qsc	Stream channel deposits, Holocene	None in the Proposed Action Area	0	None
Qa	Alluvium, Holocene	None in the Proposed Action Area	0	Low
Qb	Basin deposits, undivided, Holocene	None in the Proposed Action Area	0	Low
Qmu and Qml	Modesto Formation, upper and lower member, Pleistocene	27	8—in Yolo County	High
Qru and Qrl	Riverbank Formation, upper and lower members, Pleistocene	350	0	High
Qrb	Red Bluff Formation, Pleistocene	2	2—in Yolo County	High

Tte	Tehama Formation, Pliocene	175	6—in Colusa County,12—in Glenn County, 85—in Tehama County, 70—in Yolo County	High
pTms	Great Valley sequence, general, Cretaceous (see description of geologic unit for assumption regarding pTms in Proposed Action Area)	None for sequence overall, but some formations may be fossil bearing	0	Low to Unknown
Kcy	Great Valley sequence, Cortina Formation, Yolo Member, Upper Cretaceous	0	0	Low
Kcv	Great Valley sequence, Cortina Formation, Venado Member, Upper Cretaceous	0	0	Low
Kb	Great Valley sequence, Boxer Formation, Upper Cretaceous	0	0	Low

Source: University of California Museum of Paleontology 2020.

3.5.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on geology, soils, and paleontology that could occur as a result of the proposed investigations.

Significance Criteria

An impact on geology, soils, and paleontology resources would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42
    - Strong seismic ground shaking
    - Seismic-related ground failure, including liquefaction
    - Landslides
- Result in substantial soil erosion or the loss of topsoil
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse
- 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

- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Under the No Action, geology, soils, and paleontological resources in the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

Geology and Soils

No known active faults are located within the Proposed Action Area. Inactive faults may pass near the proposed investigation locations, such as the Salt Lake Fault on the northern end of the Antelope Valley in the Proposed Action Area. The proposed geotechnical borings could penetrate an inactive fault there, but any faults in the Antelope Valley are buried beneath alluvial soil thicker than the proposed exploration depths. The Proposed Action procedures would involve drilling out small 2 to 10 inches in diameter holes in the ground and subsequent grouting. The amount of water lost during drilling is generally less than 500 gallons, which has an insignificant zone of influence area compared to the length of fault rupture required for a significant earthquake. Additionally, the Proposed Action would not include habitable structures or bridges, and a limited number of crew members would be required at each of the proposed investigation locations.

In most cases, proposed investigation areas would be located to avoid steeply sloped areas. Minimal grading may be required at select Proposed Action locations. Upon completion of each proposed investigation, the areas would be returned to their original conditions. As such, substantial soil erosion or loss of topsoil is not anticipated.

The Proposed Action Area generally does not contain unstable soils, and changes would not be made to the ground that would cause it to become unstable.

CEQA Determination: Proposed Action activities would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure or liquefaction, or landslides in the Proposed Action Area. Proposed Action activities also would not directly cause substantial soil erosion; be located on a geologic unit or soil that is unstable or that would become unstable due to the Proposed Action and thus result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse; be located on expansive soil; or, involve the use of alternative waste water disposal systems and have soils incapable of adequately supporting these systems. Therefore for the purposes of CEQA, impacts on geology, soils, and seismicity would be less than significant.

Paleontological Resources

Several proposed investigations would occur within areas underlain by the low- to moderate-sensitivity Cortina Formation, low-sensitivity Boxer Formation, low-sensitivity Quaternary alluvium, low-sensitivity basin fill and deposits, moderate-sensitivity Riverbank Formation, and moderate-sensitivity Modesto Formation.

Some Proposed Action investigations would require drilling several hundred feet into potentially fossiliferous sediments of the Great Valley Sequence. As summarized in Table 3.5-1, paleontological resources could be encountered inadvertently in the Proposed Action Area during the proposed investigations. However, given the nature of the proposed investigations, relatively minor ground-disturbance and small amounts of spoils that would result from the investigations, coupled with the need for only a few borings within moderate-

sensitivity areas, inadvertent discovery of paleontological resources in the Proposed Action Area is anticipated to be limited.

CEQA Determination: Proposed Action activities could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature in the Proposed Action Area. The Authority and Reclamation would implement MM Geo-1, which would require that a qualified paleontologist be notified if vertebrate or plant fossils are discovered, and that the fossil would be evaluated for its unique properties and protected by extraction, preservation, and curation by a qualified paleontologist. Therefore for the purposes of CEQA, impacts on paleontological resources would be less than significant with mitigation incorporated.

Mitigation

Table 3.5-2. Mitigation Measures for Paleontological Resources

Mitigation Measure Title	Description
MM Geo-1: Consult with Qualified Paleontologist if Paleontological Resources Were Discovered	The proposed investigations have the potential to have impacts on unidentified paleontological resources. If vertebrate or plant fossils are discovered during field activities, the Authority and Reclamation would be notified, and the fossil would be evaluated for its unique properties and protected by extraction, preservation, and curation by a qualified paleontologist.

3.6 Cultural Resources

This section describes existing cultural resources within the Proposed Action Area and the potential for impacts from implementation of the Proposed Action.

3.6.1 Affected Environment

The Proposed Action Area includes previously identified cultural resources, and may include resources that have not yet been identified because of a lack of access to conduct surveys (i.e., some portions of the Proposed Action Area include private lands and land owners have not granted access for surveys to identify cultural resources), or because of environmental conditions that obscure the visibility of such resources.

"Cultural resource" is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. Cultural resources that meet the criteria for listing in the National Register of Historic Places (NRHP) (defined in 36 Code of Federal Regulations 60.4) are called "historic properties." Cultural resources considered in the CEQA guidelines include unique archaeological resources (per California Public Resources Code [PRC] 21083.2) and historical resources (per PRC 21084.1). According to the CEQA guidelines, historical resources are:

- Listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR) (per PRC 5024.1(e));
- Included in a local register of historical resources (per PRC 5020.1(k)) or identified as significant in a historical resource survey meeting the requirements of PRC 5024.1(g); or
- Determined by a lead state agency to be historically significant.

The section considers historic properties, historical resources, and unique archaeological resources. Cultural resources that may be associated with the prehistoric, ethnographic, or historic context of the Proposed Action Area, and may be eligible or potentially eligible for listing in the NRHP or CRHR, consist of the following types: prehistoric archaeological resources; historic-era archaeological resources; historic-era built environment resources; district and landscape resources; traditional cultural properties; and, sacred sites (as defined in Executive Order 13007).

Tribal Cultural Resources are further addressed in Section 3.7 – Tribal Cultural Resources.

Background

The Proposed Action Area lies at the boundary of the North Coast and Central Valley archaeological regions but is almost entirely within the latter region. The known archaeological record for the Proposed Action Area reflects five prehistoric periods for the Proposed Action Areas prehistoric cultural chronology: the Paleo-Indian, Early (or Lower) Archaic, Middle Archaic, Late (or Upper) Archaic, and Emergent periods.

The Proposed Action Area is located in an area historically associated with the traditional territories of Patwin, Nomlaki, and Konkow Maidu speaking people.

The Proposed Action Area is located in the northern frontier of historic-era Spanish and Mexican colonization efforts in western North America. Spanish colonization (1808 to 1822) followed by a brief period of Mexican governing (1822 to 1848) ended with the advent of the California Gold Rush and the ceding of California to the United States. The American Period (1848 to present) is marked by rapid colonization and the development of transcontinental infrastructure that transformed California from a frontier state to one tied closely to the nation's socioeconomic and political developments.

Known Cultural Resources and Sensitivities

This section summarizes cultural resources survey coverage, known cultural resources, and archaeological sensitivities information relative to the proposed investigations.

A desktop evaluation of the entire Proposed Action Area was completed to review existing and available data regarding cultural resources in the Proposed Action Area. In addition, cultural resources field surveys have been completed for approximately 75% of the Proposed Action Area. Surveys have not been conducted at approximately 153 proposed investigation locations as landowners have not granted access to these sites at this time.

A total of 25 cultural resources have been previously recorded adjacent to but outside the Proposed Action Area, and only two previously recorded resources are located within the Proposed Action Area. These 27 resources include six prehistoric (early Native American) archaeological sites, 11 historic (post-contact) archaeological sites, seven multicomponent archaeological sites, and three historic built environment resources. The two resources within the Proposed Action Area are historic built environment resources: the Colusa Drainage Canal and the Central Pacific Railroad. Both resources are unevaluated regarding their eligibility for either the NRHP or the CRHR, but will be treated as if they are eligible for purposes of this analysis. Both the Colusa Drainage Canal and the Central Pacific Railroad are in active use and will not be impacted by the Proposed Action.

Archaeological sensitivity at the proposed investigation locations ranges from very high to very low. The lack of recorded Native American or historic-era resources within the valley plain in previously surveyed portions of the Proposed Action Area attests to the general absence of surface archaeological remains in that portion of the Proposed Action Area. However, not all archaeological sites are clearly visible on the ground surface. This is particularly true of prehistoric sites that may have been created hundreds or thousands of years ago and which have since been buried by alluvium from flooding of rivers and streams or slope wash.

The most sensitive areas (rated high to very high) for buried resources in the Proposed Action Area include the Late Holocene deposits found in the valley plain from the Sacramento River west to about the GCID Main Canal. In contrast, the Proposed Action Area west of the GCID Main Canal, where the low rolling foothills of the Coast Range emerge from the valley plain, has an overall very low sensitivity rating with very localized areas of higher sensitivities. Borings proposed in this location would be situated in the areas characterized by low sensitivities. However, some Holocene deposits have been identified previously in this region along drainages, and so buried cultural resources could be encountered in localized places. The area of Funks Creek to the east and west of Funks Reservoir, as well as other minor drainages nearby, have high and very high sensitivity ratings.

Other proposed investigation locations are less sensitive for the presence of buried cultural resources because they are underlain by geological formations that are of an age that are too old to contain remnants of human occupancy (pre-Late Pleistocene). Nevertheless, any location along a drainage with recent allium has an increased sensitivity for buried archaeological remains.

3.6.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on cultural resources that could occur as a result of the proposed investigations.

Significance Criteria

This section describes the criteria used to identify potential adverse effects on cultural resources. "Adverse effect" here means effects that are significant under CEQA or other relevant state regulatory frameworks and thresholds, and are "adverse" within the meaning of NEPA and Section 106 regulations. Effects on unique archaeological resources and historical resources are considered adverse for the purposes of NEPA, and significant for purposes of CEQA, if the Proposed Action would do any of the following:

- Demolish or materially alter the qualities that justify the resource for inclusion or eligibility for inclusion in the CRHR.
- Demolish or materially alter the qualities that justify the inclusion of the resource in a local register or its identification as an historical resource survey meeting the requirements of California Public Resources Code Section 5024.1(g).
- Demolish or materially impair the characteristics that allow a site to qualify as a unique archaeological resource.
- Alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.
- Disturb any human remains, including those remains interred outside of dedicated cemeteries.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Under the No Action, cultural resources within the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

Built Historic Resources

Proposed Action activities would include surface geologic and geophysical investigations as well as subsurface geotechnical investigations as described in Section 2 – Proposed Action Alternatives. Minor site preparation may be necessary at each investigation location. Vehicle and equipment access and staging (including trucks) and equipment maneuvering would occur on site, all of which have the potential to disturb or destroy built environment resources. A desktop evaluation of the Proposed Action Area was conducted and GIS data was reviewed to avoid siting investigations near known historic resources.

The proposed geotechnical borings, including core removal, would not have the potential to impact built resources because the boreholes are approximately 2 to 10 inches in diameter and would be operated in the ground and would not be operated in a building, structure, or object. As described above, two historic built

environment resources are within the Proposed Action Area, the Colusa Drainage Canal and the Central Pacific Railroad. Both resources are unevaluated regarding their eligibility for either the NRHP or the CRHR, but are treated as if they are eligible for purposes of this analysis. Both the Colusa Drainage Canal and the Central Pacific Railroad are in active use. The Proposed Action would not impact either of these built historic resources. Nonetheless, the potential for the proposed investigations to effect unknown built historic resources in the Proposed Action Area still remains because field verification has not occurred.

CEQA Determination: The proposed investigations could result in an effect to unidentified built historic resources if they are present in the Proposed Action Area. Implementation of MM Gen-1 will require a cultural resource specialist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to built historic resources would be further avoided and minimized, the Authority and Reclamation would implement MM Cul-1 and MM Cul-2. If the proposed investigations still cannot avoid effects to built historic resources, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on built historic resources would be less than significant with mitigation incorporated.

Archaeological Resources

A desktop evaluation of the Proposed Action Area was conducted and GIS data was reviewed to avoid siting investigations near known archaeological resources. However, as described in Section 2 – Proposed Action Alternatives, geotechnical borings would be approximately 20 to 550 feet deep and, thus, would have the potential to disturb deeply buried archaeological sites, if any are present, by removing cultural materials when the core sample is extracted. The hollow stem augers are anticipated to have an 8.5-inch outer diameter, and a 4.25-inch inner diameter, with a 5-foot-long split tube inner barrel for dry core sample collection. No previously recorded archaeological resources are located within the area of potential effect, but previously unidentified archaeological resources could be encountered during Proposed Action implementation because field verification has not occurred.

CEQA Determination: The proposed investigations could result in an effect to unidentified archaeological resources if they are present in the Proposed Action Area. Implementation of MM Gen-1 will require a cultural resource specialist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to archaeological resources would be further avoided and minimized, the Authority and Reclamation would implement MM Cul-1, MM Cul-2, and MM Cul-3, which includes development of a discovery plan that contains requirements regarding the methods and materials for conducting the bores to facilitate archaeological site identification. Furthermore, implementation of MM Cul-4 and MM Cul-5 would build off MM Cul-3 and would require sensitivity training and archaeological monitoring during the proposed investigations. And lastly, implementation of MM Cul-6 would support identification and characterization of deeply buried archaeological sites during geotechnical boring activities. If the proposed investigations still cannot avoid effects to archaeological resources after implementation of these mitigation measures, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on archaeological resources would be less than significant with mitigation incorporated.

Human Remains

No known cemeteries occur within the proposed investigation locations. Nonetheless, human remains, including those interred outside of a dedicated cemetery, such as unmarked family graves, could be encountered during ground-disturbing activities associated with the Proposed Action.

CEQA Determination: The proposed investigations could result in an effect to unidentified human remains if they are present in the Proposed Action Area. Implementation of MM Gen-1 will require a cultural resource specialist to assess the proposed investigation locations at least one week prior to mobilization. In addition, to ensure that impacts to human remains would be further avoided and minimized, the Authority and Reclamation would implement MM Cul-1 through MM Cul-5, which would include development of a

post-discovery review plan, sensitivity training, and archaeological monitoring during ground-disturbing activities.

Furthermore, implementation of MM Cul-7 would require that ground-disturbing activities be immediately halted if human remains are discovered, and preparation and implementation a burial treatment plan would be required. If the proposed investigations still cannot avoid effects to human remains after implementation of these mitigation measures, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, impacts on human remains would be less than significant with mitigation incorporated.

Mitigation

Table 3.6-1. Mitigation Measures for Cultural Resources

Mitigation Measure Title	Description
MM Cul-1: Avoid Impacts on Cultural Resources	Impacts on known historical resources/historic properties, including prehistoric and historic-era archaeological sites, buildings, structures, Traditional Cultural Properties, and human remains will be avoided to the extent feasible. Methods of avoidance during Proposed Action planning shall include relocation of geologic, geotechnical, and geophysical investigation locations to at least 50 feet away from any identified resource dependent upon the resource and the area, prioritizing the use of existing roadways or other previously disturbed locations for the investigations, rerouting of access routes and the installation of protective fencing around resources where appropriate.
MM Cul-2: Pre-activity Pedestrian Survey	Once the geotechnical field investigation sites have been confirmed, built resource surveys and archaeological surveys will be conducted in all work areas to identify whether any new or previously unidentified built historic resources or archaeological sites are present. This activity will be conducted regardless of whether a previous cultural resources survey has covered the area to ensure adequate coverage. All newly identified resources will be recorded on California Department of Parks and Recreation 523-Series forms. If archaeological resources are identified during pre-activity survey, the Authority will ensure that they are avoided to the extent feasible by implementing the measures in MM Cul-1 (Avoid Impacts on Cultural Resources).
MM Cul-3: Prepare a Post-review Discovery Plan	Prior to the start of geotechnical exploration, a Post-review Discovery Plan (Plan) will be prepared by a qualified archaeologist. Not all cultural resources are visible on the ground surface. Protocols for addressing the accidental discovery of archaeological resources or human remains that are not visible on the ground surface during Proposed Action implementation shall be outlined in the Plan. The Plan shall be developed prior to ground disturbance so that all parties are aware of the actions required if buried archaeological resources are encountered during Proposed Action implementation. At a minimum, the Plan shall include protocols and procedures for addressing post-review discoveries including work stoppage at the discovery site and appropriate assessment of the discovery (see MM Cul-6, below), Archaeological Sensitivity Training for Proposed Action personnel, an Archaeological Monitoring Plan, and a Burial Treatment Plan. The Plan will be consistent with 36 CFR 800.13(b)9(3). The Archaeological Sensitivity Training will cover the historical context, resource types (using representative photographs of soils, features or artifacts if appropriate) and legal status of known resources, regulatory protections, penalties for noncompliance, benefits of compliance, as well as the avoidance and minimization measures that the Proposed Action has implemented. The training will be conducted prior to the start of investigations. The Archaeological Monitoring Plan describes qualifications and protocols for monitoring Proposed Action-related ground disturbance, including the following: • Documentation and chain-of-command notifications • Procedures for securing an area where cultural remains are discovered • Procedures for evaluating the nature of the finds • The schedule for notifications and conducting activities associated with evaluating the finds.

	• Protocols for establishing minimum depth of borings when monitoring is no longer needed Specific activities to be monitored include subsurface geotechnical boring. Boring samples will be collected in clear plastic sleeves to allow for inspection of soils contained in the samples. The Burial Treatment Plan describes specific procedures for burial discovery, including documentation and chain-of-command notifications, and procedures for securing an area where burials are discovered.
MM CuI-4: Conduct Archaeological Sensitivity Training	The Authority and Reclamation will be responsible for obtaining the services of a qualified archaeologist to conduct archaeological sensitivity training (see MM CuI-3). Prior to the start of the Proposed Action investigations, a qualified archaeologist who meets the Secretary of the Interior's Standards will conduct a mandatory archaeological sensitivity training (see MM CuI-3) for all personnel involved in the geotechnical and geological investigations about cultural resources sensitivity in the Proposed Action Area and cultural resources that could be encountered during the Proposed Action investigations. Participants will be required to sign a form that states they have received and understand the training. The Authority will maintain the record of training and make it available to the Proposed Action's cultural resources staff and to Bureau of Reclamation, upon request. The Authority-provided cultural monitor will ensure that the new personnel brought onto the Proposed Action team receive the mandatory training before starting work.
MM CuI-5: Conduct Archaeological Monitoring	The Authority and Reclamation will be responsible for obtaining the services of a qualified archaeologist to conduct archaeological monitoring (see MM CuI-3). One qualified archaeological monitor shall monitor ground-disturbing activities associated with the Proposed Action (i.e., subsurface geotechnical boring). Once boring activities reach depths exceeding that which is likely to encounter cultural remains as described and established in the Archaeological Monitoring Plan, monitoring is no longer necessary. One Native American monitor (as appropriate according to Proposed Action consultation with tribes) will also be invited to monitor these same Proposed Action ground disturbing activities. In accordance with CuI-6 (Immediately Halt Ground-disturbing Activities if Cultural Resources Are Discovered and Implement a Post-review Discovery Plan), if any important (potentially eligible) prehistoric or historic-era features, or any human remains, are exposed during investigations, the archaeological monitor shall have the authority to notify the appropriate contractor supervisor to stop work in the vicinity of the find and implement the Post-review Discovery Plan. If human remains are encountered, the archaeological monitor will also initiate CuI-7 (Immediately Halt Ground-disturbing Activities if Human Remains Are Discovered and Implement a Burial Treatment Plan). Resources identified during investigation activities will be treated in accordance with MM CuI-1 (Avoid Impacts on Cultural Resources).
MM CuI-6: Immediately Halt Ground-disturbing Activities if Cultural Resources Are Discovered and Implement the Post-review Discovery Plan Prepared under MM CuI-1	If important (potentially eligible) cultural resources, such as structural features, unusual amounts of bone or shell, flaked or ground stone artifacts, historic-era artifacts, human remains, or architectural remains are encountered during any Proposed Action activities, work shall be suspended in coordination with the appropriate contractor supervisor immediately at the location of the find and within an appropriate radius, with a minimum of 50 feet. The Authority will implement MM CuI-1 (Avoid Impacts on Cultural Resources), and implement the Post-review Discovery Plan prepared under MM CuI-3. As part of the Post-review Discovery Plan, a qualified archaeologist shall conduct a field investigation of the find and recommend avoidance measures deemed necessary for the protection of any cultural resource concluded by the archaeologist to represent an historical resource, unique archaeological resource, or a potential historic property. If necessary, the qualified archaeologist shall recommend additional measures in consultation with the Authority and responsible agencies and, as appropriate, interested parties such as Native American tribes. The Authority and Reclamation, in consultation with responsible agencies, will determine when/if ground-disturbing activities at the geotechnical location may resume. All the activities identified above will be detailed in the Post-review Discovery Plan so that all parties are aware of the actions required if buried archaeological sites are encountered during Proposed Action implementation. Discoveries of human remains shall be treated as described in the following sections for CuI-7 (Immediately Halt Ground-disturbing Activities if Human Remains Are Discovered and Implement a Burial Treatment Plan).

MM Cul-7: Immediately Halt Ground-disturbing Activities if Human Remains Are Discovered and Implement a Burial Treatment Plan	In accordance with relevant provisions of the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the potentially damaging excavation must halt in the area of the remains and the local County Coroner must be notified. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or State lands (Health and Safety Code Section 7050.5(b)). If the Coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission by phone within 24 hours of making that determination (Health and Safety Code Section 7050(c)). Pursuant to the provisions of Public Resources Code Section 5097.98, the Native American Heritage Commission will identify a Most Likely Descendant. The Most Likely Descendant designated by the Native American Heritage Commission will have at least 48 hours to inspect the site and propose treatment and disposition of the remains and any associated grave goods. All the activities identified above shall be detailed in a Burial Treatment Plan (MM Cul-3) developed in consultation with local Native American tribes prior to Proposed Action implementation. If human remains that are not of Native American origin are discovered, disposition of the remains shall be determined in consultation with the coroner or possible descendants, if they can be identified. In the event human remains are discovered on federal lands, the federal land managing agency should be notified immediately, and should the Coroner determine the find may be Native American, then the federal land managing agency must follow the procedures of the Native American Graves Protection and Repatriation Act.

3.7 Tribal Cultural Resources

This section describes existing tribal cultural resources (TCRs) within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action. This section is unique to CEQA and is not required under NEPA.

3.7.1 Affected Environment

The Proposed Action Area is primarily within the ethnographic territory of the Hill and River Patwin and, to a lesser extent, in areas belonging to the Nomlaki. It is at the northern limits of Patwin territory and the southern limits of Nomlaki territory. These peoples settled primarily along streams and rivers and used a broad range of native plants and animals for subsistence, primarily focusing on acorns, fish, and deer. Population density in this region was one of the highest in the state.

The Patwin and Nomlaki are both linguistically classified as part of the Wintuan family of the Penutian language stock. Wintuan is separated linguistically and culturally into three major groups from north to south: the Wintu, Nomlaki, and Patwin.

Today's descendants of the ethnographic Patwin and Nomlaki continue to live in or near the Proposed Action Area. They are represented by the Cachil Dehe Band of Wintun Indians (Colusa Indian Community [CIC]), Yocha Dehe Wintun Nation (Yocha Dehe), Kletsel (Cortina) Band of Wintun Indians, Grindstone Indian Rancheria of Wintun-Wailaki Indians, and Paskenta Band of Nomlaki Indians.

Below the Wintu and Nomlaki lands, portions of the Sacramento River were traditionally held by Maiduan-speaking tribes. The Mechoopda Indian Tribe and the Estom Yumeka Maidu Tribe of the Enterprise Rancheria, both Konkow Maidu Tribes, are close neighbors who have ancestral territory along both sides of the Sacramento River in the southeast corner of Tehama County and the northwest corner of Colusa County. The Konkow Maidu also have ancestral lands that encompass the Feather River below Oroville Dam in Butte County. Konkow Maidu Tribes who lived along the rivers shared many of the same subsistence practices with the Patwin and Nomlaki, as they lived in the same or similar environment.

All of the Native American communities referenced above continue to have strong ties to their ancestral lands and have the potential to identify TCRs within the Proposed Action Area. The Cachil Dehe Band of Wintun Indians adopted a constitution and bylaws on November 23, 1941. At the time, the 80-acre Colusa Rancheria on the Sacramento River in Colusa was home to 45 tribal members. The reservation is now 573

acres and includes the Cachil Dehe Village Complex and Colusa Casino. Along with the casino, agriculture is an important source of tribal revenue and employment; the tribe farms more than 4,000 acres on owned and leased land. The tribe also operates an outdoor adventure enterprise that provides guided hunting and fishing trips (CIC, 2019a, 2019b, 2019c). Tribe members preserve their culture with a community-built traditional roundhouse and a language book published in 2004 (CIC, 2019a).

The Yocha Dehe occupies part of its historic territory in the Capay Valley in Yolo County (Yocha Dehe, n.d.a). The tribe today farms more than a dozen crops on 2,200 acres, of which 250 are certified organic; runs more than 400 head of cattle; and has more than 1,200 acres of tribal land in conservation easements (Yocha Dehe, n.d.b; Yocha Dehe, 2015). Other tribal enterprises include the Cache Creek Casino Resort, which is the largest private employer in Yolo County; and Yocha Dehe Golf Club. The tribe also markets its own brand of wine, extra virgin olive oil, wildflower honey, and organic produce; the olive oil mill also serves other regional growers. Yocha Dehe businesses support education, cultural and environmental stewardship, philanthropy, and community service (Yocha Dehe, 2015).

3.7.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, consultation with Native American tribes, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on TCRs that could occur as a result of the proposed investigations.

Assembly Bill 52 (AB 52), which went into effect on July 1, 2015, also identified a new cultural resource, TCRs. As defined in Section 21074(a) of the PRC, TCRs are: sites, features, places, cultural landscapes, sacred places, objects with cultural value to a California Native American tribe, and a resource determined to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. TCRs are further defined under Section 21074(b) and (c) of the PRC.

AB 52 recognized "that California Native American tribes may have expertise with regard to their tribal history and practices, which concern the tribal cultural resources with which they are traditionally and culturally affiliated. … tribal knowledge about the land and tribal cultural resources at issue should be included in environmental assessments for projects that may have a significant impact on those resources" (AB 52, Section 1[b][4]). Accordingly, AB 52, codified as Public Resources Code (PRC) Section 21084.2, established that "A project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment."

AB 52 (PRC 21080.3.1) directs tribes to request that public agencies notify them of proposed projects in the geographic areas with which they are traditionally or culturally affiliated, and give them the opportunity to consult on those projects' potential impacts to TCRs. CEQA lead agencies that receive such requests must formally notify requesting tribes with project information and an invitation to consult on new projects within 14 days of project initiation. Tribes then have 30 days to respond, and the agency must initiate consultation within 30 days of receiving the request to consult on the project.

Significance Criteria

An impact on TCRs would be considered potentially significant if the Proposed Action would result in:

1. A substantial adverse change in the significance of a tribal cultural resource (as defined in PRC Section 21074) 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 PRC 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 PRC Section

5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Under the No Action, TCRs within the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

For this Proposed Action, the Authority sent AB 52 notification letters (PRC 21080.3.1(d)) to potentially affected Native American tribes identified in Table 3.7-1 on February 7, 2022. The Authority has responded to consultation requests within the timeframe prescribed in AB 52, and consultation will be ongoing. A summary of AB 52 consultations, to date, is provided in Table 3.7-1. The tribes listed in Table 3.7-1 were identified by the Authority to have a traditional and cultural affiliation with the Proposed Action Area. Additionally, these are the same tribes identified by the California Native American Heritage Commission (NAHC) on a list of tribes that have a traditional and cultural affiliation with the proposed Sites Reservoir project area in early 2017[2].

Table 3.7-1. Native American Consultation under AB 52

Tribe	Contact	Notification Letters	Tribal Response as of May, 1, 2022	Consultation Actions as of May 1, 2022
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community of the Colusa Rancheria	Mr. Daniel Gomez, Tribal Chairman	Sent 2/7/22	Responded 2/28/22: Do not have capacity to consult; deferred correspondence to Yocha Dehe Wintun Nation	Notification letter sent (receipt of letter verified) and response letter received
Cortina Indian Rancheria of Wintun Indians of California	Mr. Charlie Wright, Chair	Sent 2/7/22	None	Notification letter sent (receipt of letter verified)
Estom Yumeka Maidu Tribe of the Enterprise Rancheria	Ms. Glenda Nelson, Chairperson	Sent 2/7/22	None	Notification letter sent (receipt of letter verified)
Grindstone Indian Rancheria of Wintun-Wailaki Indians of California	Mr. Ronald Kirk, Chairperson	Sent 2/7/22	None	Notification letter sent (receipt of letter verified)
Mechoopda Indian Tribe of Chico Rancheria	Mr. Dennis Ramirez, Chairperson	Sent 2/7/22	None	Notification letter sent (receipt of letter verified)
Paskenta Band of Nomlaki Indians	Mr. Andrew Alejandre, Chairperson	Sent 2/7/22	None	Notification letter sent (receipt of letter verified)
Yocha Dehe Wintun Nation	Mr. Anthony Roberts, Chairperson	Sent 2/7/22	Responded 3/3/22: the tribe has concerns that the Proposed Action could impact known cultural resources; the tribe recommends including	Notification letter sent and response received; Authority has been coordinating with the tribe to provide tribal monitors during Proposed Action implementation.

- [2] The NAHC was contacted on January 20, 2022 for the Proposed Action to request a contact list in support of AB 52 consultation efforts and a search of the Sacred Lands File for the Project Area. To date, no response from the NAHC has been received.

			cultural monitors during the geotechnical work, and would like to continue to receive updates on the Proposed Action	

Formal consultation on the Proposed Action under AB 52 began on February 7, 2022. The Authority will continue to consult with tribes that have a traditional and cultural affiliation with the Proposed Action Area throughout the course of the proposed investigations and as requested, in accordance with AB 52. As of May 1, 2022, only two tribes have responded under AB 52. Neither tribe has indicated that there are TCRs in the Proposed Action Area. The Yocha Dehe Wintun Nation responded and requested that tribal monitoring occur during Proposed Action implementation. Nonetheless, it is possible that TCRs could be encountered during Proposed Action implementation in areas that have not yet been field verified and/or if the proposed investigations uncover previously unidentified TCRs.

CEQA Determination: As of this writing, it is anticipated that the Proposed Action would not have a significant impact on any known TCRs, however, the proposed investigations could result in an effect to unidentified TCRs if they are present in the Proposed Action Area. Implementation of MM Gen-1 will require a cultural resource specialist to assess the proposed investigation locations at least one week prior to mobilization during the pre-investigation siting survey. If as a result of the pre-investigation siting survey, the Authority determines that the Proposed Action may cause a significant impact to a tribal cultural resource, and measures are not otherwise identified during the consultation process, the Authority would implement one or more of the following: MM TCR-1 and MM TCR-2, which are standard measures identified in PRC 21084.3(b) to avoid and reduce potential impacts to TCRs. If the proposed investigations still cannot avoid effects to TCRs after implementation of these mitigation measures, the Authority and Reclamation would implement MM Gen-2. Therefore, for the purposes of CEQA, through continued AB 52 consultation and implementation of the identified mitigation, impacts on TCRs would be less than significant with mitigation incorporated.

Mitigation

Table 3.7-2. Mitigation Measures for Tribal Cultural Resources

Mitigation Measure Title	Description
MM TCR-1: Avoid or Preserve in Place	Avoidance and preservation of the resources in place, including, but not limited to, planning and implementing activities to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
MM TCR-2: Treat Resource with Culturally Appropriate Dignity	Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following: • Protecting the cultural character and integrity of the resource. • Protecting the traditional use of the resource. • Protecting the confidentiality of the resource.
MM TCR-3: Permanent Conservation Easements	Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

3.8 Air Quality, Climate Change, and Greenhouse Gas Emissions

This section describes the existing air and climatic environment within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action.

3.8.1 Affected Environment

The Proposed Action is located within Glenn, Colusa, and Yolo Counties. Air quality in the three counties is regulated by the Glenn County Air Pollution Control District (GCAPCD), Colusa County Air Pollution Control District (CCAPCD), and Yolo Solano Air Quality Management District (YSAQMD), respectively. The effects on air quality are also examined on a regional basis, which includes the larger Sacramento Valley Air Basin (SVAB). These areas encompass the Proposed Action Area related to air quality, climate change, and GHG emissions.

Air Quality

Glenn, Colusa, and Yolo Counties are part of the SVAB. The SVAB's topographic features restrict air movement through and out of the basin. As a result, the northern SVAB is highly susceptible to pollutant accumulation over time. In addition, transport of pollutants into the northern SVAB from the Sacramento Metropolitan Area is primarily influenced by air movement northward. Sources in the Sacramento Metropolitan Area contribute to the region's poorest air quality, which typically occurs during the summer months.

The pollutants introduced into the ambient air by stationary and mobile sources are categorized as primary and/or secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), reactive organic gases (ROG), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead (Pb) are primary air pollutants. ROG and NO_X are criteria pollutant precursors that form secondary criteria air pollutants such as ozone through chemical and photochemical reactions in the atmosphere.

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (USEPA) to establish and maintain the National Ambient Air Quality Standards (NAAQS) for seven criteria air pollutants that have been linked to potential health concerns: Ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb. The California CAA is administered by the California Air Resources Board (ARB) at the state level and by the air quality management districts and air pollution control districts at the regional and local levels. In California, the ARB has established the California Ambient Air Quality Standards (CAAQS). CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

Table 3.8-1 lists the attainment status for the NAAQS in the three counties. Table 3.8-2 lists the attainment status for the CAAQS in the three counties. Air quality within the Proposed Action Area is regulated by GCAPCD, CCAPCD, and YSAQMD.

Table 3.8-1. Federal Attainment Status for Glenn, Colusa, and Yolo Counties

Pollutant	Glenn	Colusa	Yolo
Ozone (O_3)	Attainment	Attainment	Nonattainment (severe 15 [a])
Particulate matter (PM10)	Attainment	Attainment	Attainment
Particulate matter (PM2.5) (24-hour)	Attainment	Attainment	Nonattainment (moderate) (P)
Particulate matter (PM2.5) (annual)	Attainment	Attainment	Attainment
Carbon monoxide (CO)	Attainment	Attainment	Attainment
Nitrogen dioxide (NO_2)	Attainment/ Unclassified	Attainment/ Unclassified	Attainment/ Unclassified
Sulfur dioxide (SO_2)	Attainment/ Unclassified	Attainment/ Unclassified	Attainment/ Unclassified

Sources: California Air Resources Board 2021a

[a] Areas classified as severe-15 must attain the NAAQS within 15 years of the effective date of the nonattainment designation. Yolo is severe-15 for the 2008 standard but nonattainment (moderate) for the 2015 standard.

Table 3.8-2. State Attainment Status for Glenn, Colusa, and Yolo Counties

Pollutant	Glenn	Colusa	Yolo
Ozone (O_3)	Attainment	Attainment	Nonattainment
Particulate matter (PM10)	Nonattainment	Nonattainment	Nonattainment
Particulate matter (PM2.5) (24-hour)	N/A	N/A	N/A
Particulate matter (PM2.5) (annual)	Attainment	Attainment	Unclassified
Carbon monoxide (CO)	Attainment	Attainment	Attainment
Nitrogen dioxide (NO_2)	Attainment	Attainment	Attainment
Sulfur dioxide (SO_2)	Attainment	Attainment	Attainment
Sulfates	Attainment	Attainment	Attainment
Pb	Attainment	Attainment	Attainment
Hydrogen Sulfide	Unclassified	Unclassified	Unclassified
Visibility-reducing Particles	Unclassified	Unclassified	Unclassified

Sources: California Air Resources Board 2021a

[a] Areas classified as severe-15 must attain the NAAQS within 15 years of the effective date of the nonattainment designation. Yolo is severe-15 for the 2008 standard but nonattainment (moderate) for the 2015 standard.

Glenn and Colusa Counties are designated as unclassified or attainment for all of the NAAQS (ARB, 2021a). Yolo County is designated as nonattainment for ozone and $PM_{2.5}$ NAAQS and unclassified or attainment for all other NAAQS (ARB, 2021a). Glenn, Colusa, and Yolo Counties are currently designated as nonattainment for PM_{10} for CAAQS (ARB, 2021a). Yolo County is also designated as nonattainment for ozone for the CAAQS (ARB, 2021a).

Under the conformity provisions of the federal CAA, no federal agency can approve or undertake a federal action, or project, unless the project has been demonstrated to conform to the applicable state implementation plan (SIP). These conformity provisions were enacted so that federal agencies would not interfere with efforts to attain the NAAQS. Applicable only in areas designated as nonattainment or maintenance for NAAQS, the General Conformity Rule prohibits any federal action that does not conform to the applicable air quality attainment plan or SIP. The emissions thresholds that trigger requirements of the General Conformity Rule for federal actions emitting nonattainment or maintenance pollutants, or their precursors, are called *de minimis* levels, which are defined in 40 CFR 93.153(b). Glenn and Colusa Counties are

designated as unclassified or attainment for all NAAQS (including PM_{10}), and therefore, the *de minimis* levels are not applicable in Glenn and Colusa Counties. Because Yolo County is designated as nonattainment for ozone and $PM_{2.5}$ NAAQS and General Conformity applies only to federal actions in areas designated as nonattainment or maintenance for any of the NAAQS, the *de minimis* thresholds are applied to this project.

The Federal *de minimis* thresholds that apply to Yolo County are listed below in Table 3.8-3. Because the region is in nonattainment for ozone and $PM_{2.5}$, *de minimis* thresholds for ozone precursors (ROG and NO_X) and $PM_{2.5}$ apply to the Proposed Action.

Table 3.8-3. Federal General Conformity De Minimis Thresholds for Yolo County

Pollutant	Threshold (tons/year)
ROG	25
NO_X	25
$PM_{2.5}$	100

Source: USEPA, 2021a

Global Climate Change/Greenhouse Gas Emissions

Climate variability is a complex phenomenon that has the potential to alter local climatic patterns and meteorology. Increases in anthropogenic GHG emissions have been unequivocally linked to recent warming and climate shifts (Intergovernmental Panel on Climate Change, 2007). Although modeling indicates that climate variability will result globally and regionally, there remains uncertainty about characterizing the precise local climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty in precise predictions, it is widely understood that some degree of climate variability is expected because of past and future GHG emissions.

The key GHGs resulting from human activity are carbon dioxide, methane, nitrous oxide, perfluorinated carbons, sulfur hexafluoride, and hydrofluorocarbons. Unlike criteria air pollutants, which occur locally or regionally, the long atmospheric lifetimes of these GHGs allow them to be well mixed in the atmosphere and transported over distances. The transportation sector represented 37.5 percent of the GHG emissions within the United States in 2019, followed by the electric power sector, which represented 33 percent of the national GHG emissions in 2019 (USEPA, 2021b). Within California, transportation was the largest source of GHG emissions in 2019 (39.7 percent), followed by industrial sources (21.1 percent) (ARB, 2021b).

There is no federal overarching law specifically related to climate variability or the reduction of GHGs. California has adopted statewide legislation addressing various aspects of climate variability and GHG emissions mitigation. Much of this legislation establishes a broad framework for the state's long-term GHG reduction, including Assembly Bill 32 and Senate Bill 32, which outline statewide goals to reduce GHG emissions back to 1990 levels by 2020 and 40 percent below 1990 levels by 2030, respectively.

3.8.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, emissions modeling for the Proposed Action, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on air quality, climate change, and GHGs that could occur as a result of the proposed investigations.

Significance Criteria

An air quality, climate change, or GHG impact would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area.

Air Quality

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

Greenhouse Gases

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

GCAPCD and CCAPCD have not established air quality significance thresholds. YSAQMD published the *Handbook for Assessing and Mitigating Air Quality Impacts* (YSAQMD, 2007), which identifies CEQA thresholds of significance for certain criteria air pollutants. The thresholds of significance adopted by the YSAQMD are presented in Table 3.8-4.

Table 3.8-4. YSAQMD Thresholds of Significance

Pollutant	Construction Threshold	Operational Threshold
ROG	10 tons/year	10 tons/year
NO_X	10 tons/year	10 tons/year
$PM_{2.5}$	80 lbs/day	80 lbs/day

Source: YSAQMD, 2007

The GCAPCD, CCAPCD, and YSAQMD have not established thresholds of significance for GHG emissions.

No Action Alternative

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Existing conditions and the future No Action were assumed to be similar given the generally rural nature of the area and limited potential for growth and development in Glenn, Colusa, and Yolo Counties. As a result, it is anticipated under the No Action, air quality, climate change, and greenhouse gas emissions conditions within the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

A comparison of the projected air emissions during Proposed Action implementation against the YSAQMD thresholds was completed to determine potential air quality impacts under CEQA. Additionally, a comparison of the projected air emissions during Proposed Action implementation against the *de minimis* thresholds for Yolo County was also completed to determine potential effects under NEPA. The results of these evaluations are described below.

Air Quality

Implementation of the Proposed Action would result in minor criteria pollutant emissions from the use of Proposed Action equipment listed in Table 2-2. Emission quantities would vary depending on the number of samples at each investigation area. The proposed field sample collection and testing activities would begin in 2022 and end by the fall of 2024. The duration of field sample collection and testing activities at each location would vary from 0.5 day to 3 weeks, depending on the conditions and activity. The average location would have approximately two drill rigs working over a 5-day period of 12 hour days. Individual investigation sites would constitute less than 0.025 acre of ground disturbance. The majority of investigation areas are in remote locations, outside of the immediate vicinity of nearly all sensitive receptors within the Proposed Action Area. Piezometer monitoring would require use of one pickup truck and related emissions to access the monitoring sites approximately four times a year for up to 10 years. Therefore, this impact analysis is focused on the emissions generated during the individual proposed investigations that would occur between 2022 and 2024, rather than the monitoring activities.

Proposed investigations within Glenn and Colusa counties would result in minor criteria pollutant emissions, similar to those generated within Yolo County (see Table 3.8-5 below). As discussed above, GCAPCD and CCAPCD have not established air quality significance thresholds. Additionally, Glenn and Colusa Counties are designated as unclassified or attainment for all of the NAAQS.

Emissions generated during the proposed investigations within Yolo County were estimated using the California Emissions Estimator Model (CalEEMod) version 2020.4.0. The estimated criteria pollutant emissions within Yolo County are summarized in Table 3.8-5. The detailed CalEEMod output is included as Appendix E.

Table 3.8-5. Criteria Pollutant Emissions – Yolo County

	ROG (tons/year)	NO_x (tons/year)	$PM_{2.5}$ (lbs/day)	$PM_{2.5}$ (tons/year)
Maximum Emissions	0.9	7.3	2.3	0.3
YSAQMD Thresholds	10	10	80	-
Exceeds YSAQMD Thresholds?	**No**	**No**	**No**	**-**
de Minimis Thresholds	25	25	-	100
Exceeds *de Minimis* Thresholds?	**No**	**No**	**-**	**No**

Source: Appendix E

As identified in Table 3.8-5, the criteria pollutant emissions within Yolo County would not exceed YSAQMD thresholds. Also as identified in Table 3.8-5, the annual criteria pollutant emissions within Yolo County would not exceed the General Conformity Rule's *de minimis* thresholds. Based on the emissions modeling, the annual emissions generated during the proposed investigations within Yolo County are well below the SVAB (Yolo County) General Conformity *de minimis* levels. Therefore, Reclamation concludes that further formal General Conformity Determination procedures are not required.

Implementation of Standard Protocols and Procedures related to fugitive dust control will further avoid and minimize the potential for impacts on air quality through the use of water trucks and BMPs.

CEQA Determination: Proposed Action activities would not conflict with or obstruct implementation of the applicable air quality plan; result in a cumulatively considerable net increase of any criteria pollutant for which the Proposed Action region is in nonattainment; expose sensitive receptors to substantial pollutant concentrations; or, result in other emissions or odors adversely affecting a substantial number of people in the Proposed Action Area. Therefore for the purposes of CEQA, impacts on air quality would be less than significant.

Greenhouse Gases/Climate Change

Implementation of the Proposed Action would generate a minor amount of GHG emissions from the use of vehicles and equipment listed in Table 2-2. At any given time, a maximum of three crews per quarter could be conducting investigations.

GHG emissions generated during the proposed investigations within Yolo County were estimated using CalEEMod at a total of 2,120 metric tons of carbon dioxide equivalent (MT CO_2e). Amortized GHG emissions (i.e., total emissions divided by the lifetime of the Proposed Action, assumed to be 30 years) within Yolo County are estimated at 71 MT CO_2e per year (2,120 MT CO_2e divided by 30 years). The detailed CalEEMod output is included as Appendix E. Proposed investigations within Glenn and Colusa counties would result in minor GHG emissions, similar to those generated within Yolo County. As discussed above, GCAPCD, CCAPCD, and YSAQMD have not established greenhouse gases significance thresholds.

As stated in Section 2 – Proposed Action Alternatives, inspection and monitoring of the piezometers would be done four times a year for up to 10 years and would only involve the use of a pickup truck to access the area where the piezometers are located. Therefore, the additional GHG emissions anticipated from implementation of the Proposed Action would represent a small fraction of state, national, and global emissions, and in this context, would have a negligible effect on global climate variability.

CEQA Determination: Proposed Action activities would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs in the Proposed Action Area. Therefore for the purposes of CEQA, impacts on greenhouse gases and climate change would be less than significant.

3.9 Transportation and Traffic

This section describes the existing transportation and traffic-related conditions within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action.

3.9.1 Affected Environment

Proposed Action Access Roads

The Proposed Action Area for the transportation and traffic analysis consists of roadways and highways providing access to the proposed investigation locations within Glenn, Colusa and Yolo Counties. Access roadways for the proposed investigations extend west from I-5 through the Proposed Action Area within the counties of Colusa and Glenn. Access roadways for the proposed investigation locations along the proposed Dunnigan Pipeline are within Yolo County. Table 3.9-1 lists the existing Proposed Action Area roadways.

Table 3.9-1. Existing Conditions Average Daily Traffic

Roadways and Highways	Location	Year 2019 Average Daily Traffic	# of Lanes	Roadway Classification	Maximum Daily Volume Threshold
I-5 north of Glenn-Colusa county line	Glenn and Colusa County	24,000	4	Interstate	79,200
I-5 from SR 20 to Glenn-Colusa county line	Glenn and Colusa County	26,566	4	Interstate	79,200
Road 68 west of I-5	Glenn and Colusa County	230	2	Rural Minor Collector	11,200
Road D north of Glenn-Colusa county line	Glenn and Colusa County	481	2	Rural Local Road	5,500

Road 69 from Road D to end of paved road	Glenn and Colusa County	25	2	Rural Local Road	5,500
Delevan Road west of I-5	Glenn and Colusa County	559	2	Rural Local Road	5,500
McDermott Road north of Maxwell Sites Road	Glenn and Colusa County	407	2	Rural Local Road	5,500
Maxwell Sites Road east of McDermott Road	Glenn and Colusa County	1,617	2	Rural Minor Arterial	15,500
Maxwell Sites Road/McDermott Road to Sites Lodoga Road	Glenn and Colusa County	468	2	Rural Minor Arterial	15,500
Huffmaster Road	Glenn and Colusa County	No Data	2	Rural Local Road	5,500
Sites Lodoga Road	Glenn and Colusa County	468	2	Rural Minor Arterial	15,500
I-5 at Colusa-Yolo county line	Yolo County	31,164	4	Interstate	79,200
County Road 99W south of County Road 8	Yolo County	No Data	2	Rural Minor Collector	11,200
County Road 8	Yolo County	No Data	2	Rural Local Road	5,500
County Road 90B	Yolo County	No Data	2	Rural Local Road	5,500

3.9.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on transportation and traffic that could occur as a result of the proposed investigations.

Significance Criteria

An impact on transportation and traffic would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area:

- Conflict with program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersection) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Existing conditions and the future No Action were assumed to be similar given the generally rural nature of the area and limited potential for growth and development in Glenn, Colusa, and Yolo Counties. As a result, it is anticipated under the No Action, transportation and traffic conditions within the Proposed Action Area would remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

Proposed Action-related vehicle trips would occur on numerous roadways over the course of the Proposed Action, between 2022 and 2024. The evaluation of potential transportation and traffic-related impacts accounts for existing roadway conditions and roadway use and traffic in Glenn, Colusa, and Yolo Counties. The assessment of conditions also looks at traffic operations and capacity. The potential for transportation and traffic-related impacts is influenced by current roadway conditions. Anticipated Proposed Action-related trips and vehicle miles traveled are evaluated qualitatively below in relation to existing roadways volumes. The Proposed Action is not a type of project addressed by CEQA Guidelines section 15064.3(b) and would not be inconsistent with its provisions. Vehicle miles traveled would be the minimum required to complete the Proposed Action.

Proposed Action-related trips would be comprised of worker trips to and from the Proposed Action Area from the greater Sacramento area as part of the mobilization and demobilization efforts. I-5 is identified as the main route for workers from the greater Sacramento area to access the Proposed Action Area and Sites Authority office in Maxwell, which would generally be used as a meeting point for crews. The average distance along I-5 from Sacramento to the Sites Authority office in Maxwell is 70 miles. Proposed Action-related trips would also be comprised of workers commuting and carpooling to investigation sites daily from the Sites Authority office in Maxwell or other population centers in the Proposed Action Area, such as, Willows, Orland, and Williams where they would stay during the week as their crew conducts the proposed investigations. Daily worker commute distances to the proposed investigations areas would vary. A representative distance from the Sites Authority office in Maxwell to the proposed investigations within the Antelope Valley of the Proposed Action Area is 10 miles.

As stated in Section 2 – Proposed Action Alternatives, the duration of field sample collection and testing activities at each location would vary from 0.5 day to 3 weeks, depending on the conditions and activity. Most investigation locations would have approximately two drill rigs working over a 5-day period of 12 hour days. At any given time, a maximum of three crews per quarter could be conducting investigations. Each crew would have up to 16 members. Therefore, with up to three crews there could be approximately 48 worker trips (16 crew members per crew) could occur on any given mobilization or demobilization day per quarter (mobilization and demobilization trips are each one-way). The majority of daily activities would consist of each 16- member crew member traveling from the Sites Authority office in Maxwell to the proposed investigation areas and back. Carpooling would be anticipated once the crew members are in the Proposed Action Area and vicinity. Nonetheless, with up to three crews there could be approximately 96 total worker trips (includes to and from Sites Authority office in Maxwell) per day each quarter. Mobilization and demobilization crew member trips are not anticipated to overlap with the daily crew member trips to the proposed investigation areas.

Estimated daily Proposed Action vehicle miles were also identified for each crew. Using the proposed schedule, the estimated daily Proposed Action vehicle miles were then extrapolated to determine the approximate Proposed Action vehicle miles per quarter and year. Because Glenn, Colusa, and Yolo Counties do not have established vehicle miles traveled thresholds, the estimated Proposed Action vehicle miles traveled were compared to the average daily traffic volumes presented in Table 3.9-1. It is estimated that the Proposed Action vehicle miles would represent less than 5% of the average daily traffic volumes on I-5 in the Proposed Action Area during the mobilization and demobilization phases and would represent less than 1% of the average daily traffic volumes on Proposed Action Area roadways during the weekly investigation activities. Given these estimates it is expected that the roadways providing access to the proposed investigation areas would be minimally affected over the course of the Proposed Action. Traffic levels on roadways would temporarily increase during the Proposed Action, particularly before activities start and after they end each day when crews are traveling to and from investigation locations, resulting in an occasional potential increase in traffic congestion on some roads.

The *Technical Advisory on Evaluating Transportation Impacts in CEQA* published by the Governor's Office of Planning and Research (OPR) in December 2018 provides recommendations regarding vehicle miles traveled

evaluation methodology, significance thresholds and screening thresholds for projects. OPR defines screening thresholds for small projects as follows: "Absent substantial evidence indicating that a project would generate a potentially significant level of vehicle miles traveled, or inconsistency with a Sustainable Communities Strategy or general plan, projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact" (OPR 2018). The Proposed Action is considered a small project given the nature of the proposed investigations. The Proposed Action is anticipated to generate up to 96 daily round-trips when up to three crews are conducting investigations in the Proposed Action Area and thus would result in less than 110 trips per days when applying OPR's screening threshold.

Once drilling is complete, limited operational vehicles would be utilized to inspect the piezometers. Inspection and monitoring of the piezometers would be done four times a year for up to 10 years and would only involve the use of a pickup truck to access the area where the piezometers are located. Therefore, operational vehicle miles traveled would be negligible on the Proposed Action Area roadways.

No permanent road closures are anticipated to be required; however, temporary lane closures may be expected. The potential use of equipment such as oversized or overweight vehicles on roadways near proposed investigation locations could result in unsafe conditions, damage to road surfaces, or temporary lane closures. Applicable county, State, and federal regulations, ordinances, and restrictions would be identified and complied with prior to and during implementation. In addition, the contractor would obtain any necessary roadway approvals prior to implementation and comply with applicable conditions of approval. Furthermore, the Authority and Reclamation would carry out Standard Protocols and Procedures for Traffic Management and Hazards and Access for Emergency Vehicles as part of the Proposed Action.

These Standard Protocols and Procedures would be implemented to minimize potential road and traffic impacts in the Proposed Action Area related to workers accessing the investigation locations and hauling equipment and materials. Community and landowner outreach would be conducted to minimize traffic impacts during active agricultural periods. The Traffic Management Plan would also be coordinated with Glenn, Colusa, and Yolo Counties, as necessary to minimize traffic impacts. The Proposed Action Standard Protocol and Procedures would require that access for emergency vehicles on all roadways in the Proposed Action Area be maintained for the duration of the proposed investigations.

CEQA Determination: Proposed Action activities would not conflict with plans, ordinances, or policies addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities; conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b); substantially increase roadway hazards or incompatible uses; or, result in adequate emergency access in the Proposed Action Area. Therefore for the purposes of CEQA, impacts on transportation and traffic would be less than significant.

3.10 Noise and Vibration

This section describes the existing noise environment within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action. Evaluations of the Proposed Action's potential for noise and vibration impacts on wildlife and fish, are presented in Section 3.2 – Biological Resources.

3.10.1 Affected Environment

Noise is defined as unwanted sound. Levels of sound are measured and expressed in decibels (dB). Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Methods used to measure or quantify sound levels depend on the source, the receiver, and the reason for measurement. The effects of noise on people can be generally categorized into subjective effects of annoyance/nuisance, interference with activities (e.g., speech, sleep, learning), and physiological effects, such as startling and hearing loss. The presence of sensitive receptors (e.g., residences, schools, hospitals) is typically used in the evaluation of current and anticipated noise levels and impacts.

The Proposed Action Area spans portions of Glenn, Colusa, and Yolo Counties and is primarily rural in character, containing a limited number of rural residences and businesses. The noise elements of the three counties govern the regulation of temporary and long-term noise levels.

Ambient noise levels in portions of Colusa County, where the majority of the proposed investigations are located, are defined primarily by traffic on major roadways, including, but not limited to, I-5, SR 16, and SR 20. Agricultural activities, as well as aircraft noise from the Colusa County Airport, also contribute to the noise environment. In addition, there are numerous stationary noise sources (e.g., quarry operations, lumber mills, industrial facilities) dispersed throughout Colusa County (Colusa County, 2012). Ambient noise levels in portions of Glenn County are defined primarily by traffic on major roadways, including, but not limited to, I-5 and SR 162.

Aircraft noise from the Willow-Glenn County Airport also contributes to the noise environment. In addition, agricultural-related noises contribute to the noise environment, and there are numerous stationary noise sources throughout Glenn County (Glenn County, 1993). Ambient noise levels in portions of Yolo County are defined primarily by traffic on major roadways, including but not limited to, I-80, I-5, and SR 113. Aircraft noise from the Yolo County Airport, Watts-Woodland Airport, University Airport, and Borges-Clarksburg Airport, which are located within Yolo County, and the Sacramento International Airport, which is located outside of Yolo County, contributes to the noise environment. There are also numerous stationary sources (e.g., farming, mining, industry and food processing, and construction) in Yolo County (LSA Associates, 2009). The investigation sites are removed from major sources of noise. As such, the sound levels in the three counties are expected to be similar and low given the rural nature of all sites.

Colusa and Glenn Counties have ordinances that exempt most construction-related noise during specific times and days. Glenn County Ordinance 1183 exempts construction site sounds from 7:00 a.m. to 7:00 p.m. daily. Colusa Ordinance 730 exempts construction and maintenance activities that are authorized by valid county permit or business license from the aforementioned noise ordinance from 7:00 a.m. to 7:00 p.m. on weekdays and 8:00 a.m. to 8:00 p.m. on weekends. This exemption applies when one of the following criteria is satisfied: no individual piece of equipment exceeds 83 dBA at a distance of 25 feet, or the noise level at any point outside of the property plane does not exceed 86 dBA. Yolo County does not have a noise ordinance or other noise enforcement code at the present time.

The majority of the proposed investigations are located within Colusa County in what is currently a rural and sparsely populated area. A limited number of rural residences and one paved road (Maxwell Sites Road, which continues west and becomes Sites Lodoga Road) are in the vicinity of the proposed investigation areas. Ambient noise levels in this area are generally low due to the few roads and sparse population. The primary noise sources are periodic rural road traffic noise and noise associated with ranching operations. Residences located within the Antelope Valley portion of the Proposed Action Area are approximately 1 mile from the nearest proposed investigation sites.

The northern portion of the Proposed Action Area is located within Glenn County and no developed road access exists in this area. Road 69 dead-ends 3 miles west of the existing Tehama-Colusa Canal. Ambient noise levels in this area are generally low due to the general lack of roads and associated limited accessibility of the area, as well as small number of residences. Similarly, few residences and receptors are located near the proposed investigations along the proposed Dunnigan Pipeline in Yolo County.

3.10.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on noise that could occur as a result of the proposed investigations.

Significance Criteria

A noise impact would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the Proposed Action Area to excessive noise levels.

There are no private airstrips or airport land use plans within 2 miles of the Proposed Action (all airports mentioned in Section 3.9.1 – Affected Environment are greater than 3 miles from the Proposed Action). Therefore, there is no potential for impacts on such facilities/plans; and this criterion is not discussed further.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Existing conditions and the future No Action were assumed to be similar given the generally rural nature of the area and limited potential for growth and development in Glenn, Colusa, and Yolo Counties. As a result, it is anticipated that under the No Action, noise conditions within the Proposed Action Area would remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

The evaluation of potential noise-related impacts accounted for the presence (or lack) of sensitive receptors within or adjacent to the Proposed Action Area, anticipated equipment and associated typical noise-level generation, and existing local regulatory standards and ordinances. The assessment of noise levels also included reviewing the need for mobile versus stationary noise emission sources and the duration of field sample collection and testing activities at each location, which would vary from 0.5 day to 3 weeks, depending on the conditions and activity. The potential for significant noise-related impacts was in large part influenced by local noise ordinances and standards, including exemptions for temporary construction activities.

Geotechnical field investigation activities are anticipated to be similar in sound level to general construction activities, but more limited in their duration. Table 3.10-1 lists equipment noise levels from Table 1 of the *FHWA Roadway Construction Noise Model User's Guide* (FHWA, 2006) for applicable Proposed Action equipment from Table 2-2. All listed noise levels are L_{max} at a reference distance of 50 feet. The model calculates the total noise level at the receptor by logarithmically summing noise levels from each piece of equipment in use and accounting for the reduction of noise over distance caused by geometric divergence.[3] At farther distances, additional attenuation (e.g., ground effects and atmospheric attenuation) can be substantial, but the model does not account for this additional attenuation. Therefore, the model output should be considered conservatively high at distances beyond a few thousand feet.

- [3] Geometric divergence is the primary mechanism of noise reduction close to a noise source.

Table 3.10-1. Construction Equipment Noise Levels

Equipment Description	Actual Measured L_{max} at 50 feet (dBA)
Auger Drill Rig	84
Backhoe	78
Excavator	81
Generator	81
Generator (<25 kVA, variable message signs)	73
Grader	Not available
Horizontal Boring Hydraulic Jack	82
Pickup Truck	75
Rock Drill	81
Soil Mix Drill Rig	Not available

Notes:
L_{max} = maximum sound pressure level; Source: FHWA, 2006.

Table 3.10-1 indicates that the loudest Proposed Action equipment would emit noise of 84 dBA at 50 feet. Noise at any specific receptor is dominated by the closest and loudest equipment. The types and numbers of construction equipment near any specific receptor location would vary over time. The construction noise estimate was based on assumptions of multiple pieces of loud equipment operating close together near the edge of the construction site. This is believed to be a conservative yet realistic average scenario. Additional assumptions include the following:

- One piece of equipment generating a reference noise level of 85 dBA (at a 50-foot distance with a 40 percent usage factor) located at the edge of the construction site
- Two pieces of equipment each generating reference noise levels of 85 dBA located 50 feet farther away on the construction site
- Two more pieces of equipment each generating reference noise levels of 85 dBA located 100 feet farther away on the construction site

Table 3.10-2 provides construction equipment noise levels at various distances, as calculated using the preceding assumptions. This extrapolation is conservative because it considers only geometric spreading and does not account for absorption from atmospheric particles, physical topography, or vegetation.

Table 3.10-2. Construction Equipment Noise Levels Versus Distance

Distance from the Construction Site Boundary (feet)	L_{eq} Noise Level (dBA)
50	83
100	79
200	74
400	69
800	63
1,600	58
3,200	52
6,400	46

Note:

L_{eq} = equivalent sound pressure level; Source: Data developed using FHWA Roadway Construction Noise Model.

Proposed Action activities would be limited to the times allowed by the applicable county ordinance. Colusa County's ordinance is the most stringent in the Proposed Action Area. Colusa County's exemption for daytime construction applies when the sound level does not exceed 86 dBA at the property plane. Given that the distance from the planned activities in Colusa County to residences exceed 50 feet, the requirement not to exceed 86 dBA at the property plane of a residential property is anticipated to be met. All proposed investigations would be conducted during daylight hours. Hauling and contractor travel would also be limited to the daytime.

CEQA Determination: Proposed Action activities would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies in the Proposed Action Area. Therefore, for the purposes of CEQA, impacts on noise would be less than significant.

Generation of temporary groundborne vibration or noise levels could result from the Proposed Action as the measurement of induced vibration would allow for the necessary geophysical data to be collected. However, it is not expected that the levels of vibration would reach those that are disturbing or damaging given the anticipated distances to the nearest residences or structures. These investigation techniques have a long history of being successfully conducted even in environmentally sensitive areas, including wetlands, endangered plant species areas, bald and golden eagle and spotted owl fledging areas, and endangered frog and tortoise areas, as well as in known archaeologically sensitive areas.

CEQA Determination: Proposed Action activities would not generate excessive groundborne vibration or groundborne noise levels in the Proposed Action Area. Therefore, for the purposes of CEQA, impacts on groundborne vibration and noise levels would be less than significant.

3.11 Hazards, Hazardous Materials, and Wildfire

This section describes the existing hazards, hazardous materials, and wildfire conditions within and adjacent to the Proposed Action Area and the potential for impacts from implementation of the Proposed Action. This evaluation includes circumstances or situations that could cause potential harm to the public and environment in regards to the release of hazardous materials and wildfire risks.

3.11.1 Affected Environment

The Proposed Action Area for hazards, hazardous materials, and wildfire includes the proposed investigation areas and an additional 0.25-mile radius to appropriately assess potential hazardous materials conditions as well as wildfires.

Hazards and Hazardous Materials

Hazardous materials are defined in Section 66260.10, Title 22, of the *California Code of Regulations* as:

A substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of or otherwise managed.

In addition, California Health and Safety Code Section 25501 defines a hazardous material as follows:

Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or environment.

Federal, State, and local regulatory agencies' published databases were reviewed to identify potential hazardous materials issues in the Proposed Action Area. Findings from the database/records reviews were evaluated according to proximity to the proposed investigation areas, anticipated activities, and likelihood of hazardous materials-related exposure.

Most of the Proposed Action Area has historically been or is presently used for agricultural purposes. As a result, soils contaminated with pesticides, herbicides, and other agricultural chemicals, even though properly applied, may be present in the Proposed Action Area. Two existing farms in proximity to the TRR East were listed in the Resource Conservation and Recovery Act (RCRA) and aboveground storage tank (AST) databases. Five farms located along the construction route of Road 68 between I-5 and Road D were also identified in these two databases. There were no listed compliance violations for farms in the Proposed Action Area at the time of the environmental records search.

Current and past commercial and industrial land uses within the Proposed Action Area have the potential to be associated with potential environmental concerns (PECs). Such properties can use and store different hazardous materials or have ASTs or underground storage tanks (USTs). Commercial and industrial land uses often also are associated with the use and storage of heavy equipment, including outdoor storage yards, vehicle and equipment maintenance and fueling activities, and use of other equipment or site features that can be associated with a PEC, such as oil/water separators, grease traps, wastewater treatment systems, and solid waste storage and disposal areas.

A Pacific Gas and Electric Company (PG&E) substation is on Road 49 at 2nd Street, approximately 0.20 mile west of the GCID Main Canal. This substation is listed on the Certified Unified Program Agencies (CUPA) listing for chemical use and storage. No violations were listed at the time of the environmental records search. The PG&E Colusa Generating Station site on McDermott Road is along the construction route; according to the environmental records search, a 55-gallon drum of sodium hydroxide ruptured at this site and spilled onto the pavement. A cleanup was completed on May 17, 2012, and the case was closed. Ritchie Bros. is a commercial auction yard located at 5500 County Road 99W in Dunnigan. This site is listed on various databases (RCRA, AST, CERS). The facility was noted for prior improper chemical storage, monitoring, and hazardous waste reporting. These violations were subsequently addressed, and no violations related to the facility dated after January 22, 2020, were identified in the environmental records search.

Other potential hazardous material concerns in the area include historical salt mining and oil wells. High arsenic levels have been found in the Proposed Action Area. Salt Lake, which is located within the northeastern portion of the Proposed Action Area, has high arsenic levels; however, no borings are proposed in this area. Furthermore, all other proposed investigations would be conducted in dry conditions, including the proposed investigations within the potential seasonal wetland and three borings proposed in Funks Reservoir.

The two Union Pacific Railroad lines (in Willows and Dunnigan) that cross the Proposed Action Area have the potential to be associated with PECs. Railcars frequently hold and transport hazardous materials. Soils along freight railroad lines have typically been affected by heavy metals (e.g., from slag ballast used to set railroad ties), fuel oil and total petroleum hydrocarbons as diesel from locomotives, PCBs from locomotive transformers, and polynuclear aromatics from railroad ties. The presence of contaminated soils along railroad lines can adversely affect the soils and groundwater in areas adjacent to the railroad right-of-way. The nearest proposed investigation to a Union Pacific Railroad line is approximately 700 feet away.

Many roads in the Proposed Action Area have been used by motorized vehicles since at least the 1950s and surface soils could have been affected by aerially deposited lead (ADL) from the historical use of leaded gasoline. The alignment of the underground Dunnigan Pipeline would extend through existing agricultural lands and cross beneath I-5, County Road 99W, Ritchie Bros. auction yard, and the Union Pacific Railroad line. These areas have a high potential for containing ADL given their present and historical uses and borings are proposed in and around these areas. Other roads in the Proposed Action Area are not expected to contain a substantial build-up of ADL.

Wildfire

Wildland fires pose a hazard to rural development, infrastructure, and natural resources throughout the Proposed Action Area. Numerous factors, such as topography, vegetation characteristics, fuel load, and climate contribute to the degree of fire hazard, particularly given the area's extremely dry and hot summers. Within the Proposed Action Area, dry grasses and vegetation in the summer and early fall months pose a hazard. A review of Fire Hazard Severity Zones (CAL FIRE, 2001, 2007a, 2007b) was conducted to determine wildland fire safety hazards for the Proposed Action Area. The Proposed Action Area is primarily located in a moderate fire hazards severity zone (FHSZ).

3.11.2 Environmental Consequences

This section discusses significance criteria and potential impacts associated with the No Action and the Proposed Action. A combination of data, published reports, and a review of the affected environment in the Proposed Action Area was used to evaluate the potential impacts on public health and environmental hazards that could occur as a result of the proposed investigations.

Significance Criteria

An impact on public hazards/health would be considered potentially significant if the Proposed Action would result in any one of the following in the Proposed Action Area:

Hazards and Hazardous Materials

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Wildfire

- Substantially impair an adopted emergency response plan or emergency evacuation plan.
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?
- 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?

Implementation of the Proposed Action would not require work to be conducted within 0.25 mile of a school; therefore, impacts related to emitting hazardous materials near a school would not occur. There are no public airports or private air strips within 2 miles of the Proposed Action; therefore, impacts related to safety hazards or excessive noise for people within an airport land use plan or within two miles of a public airport would not occur. Because no impacts related to these criteria would occur, they are not discussed further.

No Action

Under the No Action, Reclamation and the Authority would not conduct the proposed investigations and surveys. Under the No Action, hazards, hazardous materials, and wildfire conditions within the Proposed Action Area are expected to remain the same as existing conditions over the next two to three years and no impacts would occur.

Proposed Action

Hazards and Hazardous Materials

Equipment required for implementation of the proposed field investigations would require the use of fuels, oils, grease, and lubricants. Maintenance and repair of the equipment would be completed at established offsite locations. Implementation of Standard Protocols and Procedures including Traffic Management and Hazards; Access for Emergency Vehicles; Stormwater Pollution Prevention Plans and BMPs; Erosion Control and Investigation-derived Waste BMPs; Spill Prevention and Hazardous Materials Management; and Minimizing Risk of Exposure to Hazardous Chemicals, Hazardous Materials, and Hazardous Conditions, including preparation of a HSP, would avoid and minimize the potential release of hazardous materials from routine transport, use, or disposal of hazardous materials or through upset or accident conditions. Through implementation of these Standard Protocols and Procedures, the Proposed Action is anticipated to have a less than significant impact related to routine transport, use, or disposal of hazardous materials or reasonably foreseeable upset or accident conditions.

The results of the agency database review indicate that none of the proposed investigation areas would occur on a site that is included on any list of hazardous materials sites, including the list compiled pursuant to Government Code Section 65962.5. It is possible that not all septic tanks, water wells, USTs, or other underground storage structures or conveyance systems and not all hazardous spills within the Proposed Action Area are reported. Therefore, although there would be no impact due to the proposed investigations occurring on a listed hazardous materials site, there is the potential for these activities to occur near unlisted septic tanks, water wells, other underground storage structures, or unreported hazardous spills.

However, if these unanticipated conditions are encountered during the pre-investigations siting surveys (MM Gen-1) then the proposed investigations would be moved to avoid these conditions or would be postponed if they are unable to be moved as required by MM Gen-2. Any hazardous waste discovered during Proposed Action implementation would be handled and disposed of pursuant to Comprehensive Environmental Response, Compensation, and Liability Act requirements and as documented in the Proposed Action HSP.

Proposed Action equipment and materials would be transported on local roads to access the Proposed Action Areas, with many over-sized Proposed Action vehicles also traveling on those roads. As described in Section 3.9 – Transportation and Traffic, this may result in temporary congestion and reduction in travel speeds on Proposed Action Area roadways over the span of the Proposed Action. In addition, while no

closures are anticipated, some lane closures may be necessary during the Proposed Action implementation period for trucks and equipment to enter the roadway. However, the Proposed Action would have limited local use of existing access roads. Furthermore, Standard Protocols and Procedures for Traffic Management and Hazards and Access for Emergency Vehicles would be implemented as part of the Proposed Action to avoid and minimize potential effects on emergency and/or evacuation responses. Implementation of these Standard Protocols and Procedures as part of the Proposed Action would minimize and avoid impacts on emergency responses.

CEQA Determination: Proposed Action activities would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; create a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment; be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5; or, impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan in the Proposed Action Area. Therefore, for the purposes of CEQA, impacts on hazards and hazardous materials would be less than significant.

Wildfire

The vegetation surrounding the Proposed Action Area creates a risk of fire hazard from natural hazards (e.g., lightning strikes) or from human activities. Activities required to implement the Proposed Action would increase the potential exposure of people, structures, infrastructure, and other resources to a potentially significant risk of loss, injury, or death from fire. The proposed field investigation would occur in a rural, largely undeveloped area with trees, grasses, and shrubs during the summer and fall months, which are generally considered a time of high fire hazard in Northern California.

Workers traveling to the investigation sites, and equipment and materials being transported to the sites would increase the risk of fire hazard along their travel route. Operation of vehicles throughout the area, particularly when vegetation adjacent to roads is dry, can increase the fire potential from accidental combustion (e.g., sparks), hot metal (e.g., tail pipes, motors), or traffic accidents. Proposed Action activities at field investigation sites would increase the risk of fire hazard at those locations due to the presence of Proposed Action and worker vehicles and equipment (i.e., combustion engines); the presence of fuels, lubricants, and other flammable substances; and the presence of workers who might smoke onsite. Vegetation pruning, where necessary, would avoid potential fire risks caused by vehicles and equipment.

Standard Protocols and Procedures as described in Section 2 – Proposed Action Alternatives related to fire prevention and suppression at the proposed investigation locations would include proper storage of flammable materials, performing fire prevention and suppression drills daily, keeping firefighting hand tools and equipment on site, and conducting site inspections at the end of each day. Furthermore, a HSP will be prepared and will include an assessment of known hazards and procedures on how to carry out precautionary methods for fire prevention and suppression. Other measures including prohibiting workers from smoking onsite and pruning vegetation as needed to avoid potential ignition from vehicles and equipment would help reduce wildfire risks.

CEQA Determination: Proposed Action activities would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where residences are intermixed with wildlands; substantially impair an adopted emergency response plan or emergency evacuation plan; exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; 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 in the Proposed Action Area. Therefore, for the purposes of CEQA, impacts on wildland fires would be less than significant.

3.12 Cumulative Effects

This section identifies the potential for cumulative impacts by resource/issue area in the context of the Proposed Action Area and surrounding area. Under NEPA, a cumulative impact is an impact on the environment that results from the incremental impact of a particular action when added to other past, present, or reasonably foreseeable future actions, regardless of the entity undertaking such an action (CEQ NEPA Regulations Part 1508, Section 1508.7). Under CEQA, "cumulative impacts refer to two or more effects that when considered together are considerable or which compound or increase other environmental impacts" (State CEQA Guidelines, Section 15355). Given the limited nature of the Proposed Action, the cumulative impact evaluation area includes Glenn, Colusa, and Yolo Counties and the lower Sacramento Valley.

As noted in Section 1 – Introduction/Purpose and Need, the cumulative context in this EA/IS is derived from the extensive data gathering efforts that have been conducted to date for the evaluation of the proposed Sites Reservoir Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement. Relevant past, present, and reasonably foreseeable future project types were reviewed to determine the cumulative setting for consideration in relation to the Proposed Action. Two projects in the area that were evaluated for cumulative impacts include the Maxwell Intertie and the South Willows Residential Development. The Maxwell Intertie Project is located in the area of the proposed investigations. The South Willows Residential Development Project is proposed on the east side of I-5, south of Willows.

However, it should be noted that these two projects and other past, present, and reasonably foreseeable future projects in Glenn, Colusa, and Yolo Counties and the lower Sacramento Valley considered in the cumulative analysis would not occur at the same time as the proposed investigations (between 2022-2024). The long-term monitoring of the piezometers for 10 years could overlap with other past, present, and reasonably foreseeable future projects, including the construction of the proposed Sites Reservoir Project. However, this monitoring as described in Section 2.2.3 – Subsurface Geotechnical Investigations would consist of minor, isolated activities up to four times per year that would not themselves generate impacts and therefore, is not anticipated to contribute to cumulative effects in combination with the proposed Sites Reservoir Project.

All resources analyzed for the Proposed Action were found to either have no impacts, less than significant impacts, or less than significant impacts with mitigation incorporated under CEQA. The following provides an analysis of potential for cumulative effects associated with the same resources.

Biological Resources. Construction and operation of past, present, and reasonably foreseeable projects and the Proposed Action could result in impacts to biological resources but would be required to implement practices to avoid or restore special-status wildlife and botanical species habitat. The Proposed Action includes Standard Protocols and Procedures and mitigation measures that would avoid and minimize the Proposed Action's effects on biological resources. Therefore, the Proposed Action's contribution to cumulative impacts on special-status wildlife and botanical species and habitat, including wetlands, would not be considerable.

Water Resources and Water Quality. Construction and operation of past, present, and reasonably foreseeable projects and the Proposed Action could result in additional impervious surface area, a temporary increase in sediment mobility and loads in nearby surface waters, and stormwater contamination. However, the proposed investigations would be short term and subject to existing regulatory requirements to minimize potential adverse effects. Therefore, the Proposed Action's contribution to cumulative impacts on drainage patterns, surface water hydrology, or water quality would not be considerable.

Land Use and Agriculture. The Proposed Action would not result in substantial changes to land use and agriculture due to the short term and localized effects of the proposed investigations. No land uses of agricultural uses would be changed as a result of the Proposed Action. As such, the Proposed Action's contribution to cumulative impacts on land use and agriculture would not be considerable.

Geology, Soils, and Paleontology. Implementation of the Proposed Action, as well as construction and/or geotechnical investigations for other past, present, and reasonably foreseeable projects could affect geology, soils, and paleontological resources but would be subject to seismic design standards promulgated by State and county building codes for geologic events. The Proposed Action would require that stormwater pollution prevention plans be implemented as applicable to control and prevent erosion or loss of topsoil, and mitigation measures would be implemented to train employees to identify and protect paleontological resources if found. As such, the Proposed Action's contribution to cumulative impacts on geology or paleontological resources would not be considerable.

Cultural and Tribal Cultural Resources. Cultural and TCRs (built environment, archaeological, and traditional cultural properties) are non-renewable resources that cannot be restored to original condition once modified or disturbed. The Proposed Action includes Standard Protocols and Procedures and mitigation measures that would avoid and minimize the Proposed Action's effects on cultural resources and TCRs. As such, the Proposed Action's contribution to cumulative impacts on cultural and TCRs would not be considerable.

Air Quality, Climate Change, and Greenhouse Gas Emissions. Emissions from past, present, and reasonably foreseeable projects contribute to air quality on a cumulative basis. GHG effects are also inherently cumulative. Implementation of the Proposed Action would be short term and impacts would be localized and would not violate any air quality standards that have been adopted to prevent further deterioration of ambient air quality. The additional GHG emissions anticipated from implementation of the Proposed Action would likewise represent a small fraction of state, national, and global emissions. As such, the Proposed Action's contribution to cumulative impacts on air quality, climate change, and greenhouse gas emissions would not be considerable.

Transportation and Traffic. The Proposed Action would not result in substantial changes to transportation and traffic due to the rural nature of the area and anticipated Proposed Action-related truck trips, resulting in no need for changes to existing transportation infrastructure. As such, the Proposed Action's contribution to cumulative impacts on transportation and traffic levels would not be considerable.

Noise. Because noise effects are localized and temporary in nature, it is not likely that a sensitive land use in this area would be affected by anticipated noise from the Proposed Action. As such, the Proposed Action's contribution to cumulative impacts on noise would not be considerable.

Hazards, Hazardous Materials, and Wildfire. Hazards and wildfire risks are present in the Proposed Action Area and could be exacerbated by existing or reasonably foreseeable development. However, the proposed investigations and all potential cumulative project construction activities would be subject to existing regulatory requirements to minimize potential hazardous and wildfire risks. In addition, the Proposed Action includes Standard Protocols and Procedures including spill prevention, hazardous materials management, HSP development, and fire prevention and suppression measures to avoid and minimize the Proposed Action's effects on public health and environmental hazards. As such, the Proposed Action's contribution to cumulative impacts related to potential public hazards and wildfire would not be considerable.

4 Additional NEPA Requirements

Reclamation analyzed the affected environment and determined that the Proposed Action does not have the potential to cause effects to the following resources. A brief explanation for the elimination of these resources from further consideration is provided below.

4.1 Environmental Justice

NEPA requires the analysis of potential effects of a Proposed Action on minority and low-income communities under Environmental Justice. Minority individuals are members of Black, Native American or Native Alaskan, Asian, Native Hawaiian or Pacific Islander, or Hispanic/Latino population groups (Council on Environmental Quality 1997). For this analysis, a minority population was defined to be present in the Proposed Action Area if the minority population of the affected area exceeds 50% of the total population. One block group with an identified minority-based environmental justice population is in Colusa County. The population of this block group is concentrated in the community of Maxwell. There are also two block groups in Yolo County near Dunnigan and the Sacramento River considered to have minority-based environmental justice populations. No minority-based environmental justice populations were identified in Glenn County where the Proposed Action would take place (U.S. Census Bureau 2020).

For the purpose of this analysis, low-income populations are identified as block groups where 20% or more of the population is considered low income (i.e., below the 2018 poverty threshold). There is one block group in Colusa County that has a low-income-based environmental justice population and thus is considered to have an environmental justice community. Population in this block group is concentrated in the communities of Lodoga and Stonyford. No low-income populations were identified in Glenn and Yolo Counties in the areas that the Proposed Action would occur (U.S. Census Bureau 2020).

As discussed previously, the Proposed Action would not have an impact on population or housing. Although disadvantaged communities exist within the Proposed Action area in Colusa and Yolo Counties, due to the localized, limited, and temporary nature of the proposed investigations, coupled with the intent to locate the proposed investigations to avoid potential sensitive resources and receptors, the project would not have a substantial effect on humans either directly or indirectly. Therefore, the Proposed Action is not anticipated to have a disproportionately negative impact on low-income or minority individuals within the Proposed Action Area. In addition, Standard Protocols and Procedures would be included as part of the Proposed Action to limit fugitive dust and vehicular emissions and provide traffic management as appropriate in these communities. Therefore, impacts on low income and minority-based environmental justice populations are not anticipated to result in a disproportionate impact on minority and low-income populations.

4.2 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States. The characterization and application of the United States trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

The federal government, through treaty, statute, or regulation, may take on specific, enforceable fiduciary obligations that give rise to a trust responsibility to federally recognized tribes and individual Indians possessing trust assets. Courts have recognized an enforceable federal fiduciary duty with respect to federal

supervision of Indian money or natural resources, held in trust by the federal government, where specific treaties, statutes, or regulations create such a fiduciary duty.

Reclamation complies with procedures contained in the U.S. Department of the Interior (DOI) Departmental Manual Part 512.2 guidelines, which protect ITAs. Reclamation carries out its activities in a manner that protects trust assets and avoids adverse impacts when possible. When Reclamation cannot avoid adverse impacts, it will provide appropriate mitigation or compensation. Reclamation is responsible for assessing whether the Proposed Action has the potential to affect ITAs.

Reclamation maintains GIS coverage of Indian trust assets for the State of California. Based on review of this GIS coverage, there are no ITAs within or adjacent to the proposed investigation locations. Therefore, the Proposed Action would have no impact on ITAs.

4.3 Socioeconomics

NEPA requires the analysis of potential effects of a Proposed Action on socioeconomics in the Proposed Action Area and regional area. The Authority and Reclamation will hire a contractor to carry out the proposed investigations. As stated in Section 2 – Proposed Action Alternatives, at most three crews will be in the field each quarter of the year over the span of 2022-2024. These crew members will likely travel to the Proposed Action Area and stay locally during the week and then return. Therefore, no long-term needs for new work force would result from the Proposed Action. There may be a short-term, minor benefit to the local economy as a result of crews traveling and staying in the Proposed Action Area during the course of the investigations. Due to the nature and short duration of the proposed investigations, there would be no effect on socioeconomics.

5 CEQA Mandatory Findings of Significance

Under CEQA Guidelines Section 15065, a lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence that any of the following may occur:

- 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 a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory**.**
- The project has possible environmental effects that are individually limited but cumulatively considerable.
- The environmental effects of a project will cause substantial adverse effects on human beings either directly or indirectly.

This section considers the analyses performed in this EA/IS and provides a discussion of the Mandatory Findings of Significance for the Proposed Action.

As discussed in Section 3.2 – Biological Resources, a number of special-status plant and animal species and their habitats are located within the Proposed Action Area. The Proposed Action would not result in any effects to special-status fish species or on designated critical and essential habitat for listed species because no work is proposed to occur within habitat that supports these species. However, there is potential for proposed investigations to disturb other special-status species and their habitats.

Mitigation measures MM Gen-1, MM Gen-2,and MM Bio-1 through MM Bio-17 would reduce, minimize or avoid impacts to special-status species and their habitats by requiring that workers are trained on the

sensitivity of these habitats; by minimizing disturbance to the extent practicable; by identifying sensitive communities with signs, staking, or flagging; by implementing sediment control measures; by stopping work if a potentially listed species is identified in an active work area; and by having a biological monitor in work areas. Additionally, the Proposed Action would not interfere 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. Therefore, under CEQA, impacts to biological resources would be less than significant with mitigation incorporated.

Furthermore, as discussed in Sections 3.1 through 3.11, the proposed investigations may impact several environmental resources, including sensitive resources, biological resources, paleontological resources, cultural resources, and TCRs (see Section 3.1 – Introduction; 3.**2** – Biological Resources; Section 3.5 – Geology, Soils, and Paleontology; Section 3.6 – Cultural Resources; and Section 3.7 – Tribal Cultural Resources*).* Standard Protocols and Procedures and mitigation measures have been proposed as part of the Proposed Action to avoid and minimize potential impacts and to reduce potential impacts to less-than-significant levels. Overall, as detailed in this EA/IS, although potential impacts exist as a result of the Proposed Action, these impacts would not substantially degrade the quality of the environment.

As discussed in Section 3.6 – Cultural Resources, and 3.7 – Tribal Cultural Resources, Proposed Action activities involving ground disturbance have the potential to disturb previously unidentified cultural resources and TCRs located in the Proposed Action Area. Mitigation measures MM Gen-1, MM Gen-2, and MM Cul-1 through MM Cul-7 would reduce impacts on archaeological resources by requiring such measures as cultural resources awareness training, pedestrian surveys, avoidance of previously identified resources, stop work procedures in the event of inadvertent cultural resource discovery, and archeological monitoring during ground-disturbing activities. Impacts on TCRs would be reduced to a less than significant level by implementation of MM Gen-1, MM Gen-2, and MM TRC-1 through MM TCR-3.

In the event of discovery of a tribal cultural resource, mitigation measures would require the avoidance and preservation of the resources in place, including, but not limited to, planning and implementing activities to avoid the resources and protect the cultural and natural context; treating the resource with culturally appropriate dignity, and the establishment of permanent conservation easements. Based on these factors, under CEQA, impacts on cultural and TCRs would be less than significant with mitigation incorporated. The goal of the Proposed Action is to obtain geological, geotechnical, and geophysical data and information needed to support the ongoing engineering evaluations and design development and to assist in the preparation of permit applications for the proposed Sites Reservoir and associated facilities. Impacts would be short-term, temporary and localized and would not result in long-term environmental effects. The cumulative impact analysis, provided in Section 3.12 – Cumulative Effects, indicated that the Proposed Action would not result in environmental effects that are cumulatively considerable.

As documented in Section 3 – Affected Environment and Environmental Consequences of this EA/IS, due to the isolated, localized, limited, and temporary nature of the proposed investigations, coupled with the intent to locate the proposed investigations to avoid potential sensitive resources, the project would not have a substantial effect on humans either directly or indirectly. Standard Protocol and Procedures have been incorporated into the Proposed Action for traffic management; access for emergency vehicles; SWPPP and BMPs; erosion control and investigation-derived waste BMPs; spill prevention and hazardous materials management; minimizing risk of exposure to hazardous chemicals, hazardous materials, and hazardous conditions; minimizing fugitive dust and vehicle exhaust emissions; and fire prevention and suppression. These Standard Protocols and Procedures would further ensure that the project would not have a substantial effect on humans, either directly or indirectly.

6 Consultation and Coordination

Reclamation and the Authority have consulted, or are in the process of consulting, with the U.S. Army Corps of Engineers (USACE), RWQCB, tribes and the State Historic Preservation Office (SHPO), USFWS, and

CDFW. On January 18 and 19, 2022, the Authority met with the USACE and RWQCB, respectively, to discuss the approach for compliance with Sections 404 and 401 of the Clean Water Act (CWA). Through coordination with the USACE, it was determined that the proposed investigations within USACE jurisdiction would qualify under a *Non-Notifying Nationwide Permit 6, Survey Activities*, and no further permitting action is needed with the USACE under CWA Section 404. The Proposed Action is still required to comply with all applicable general conditions identified under Nationwide Permit 6. Given the potential for four investigations to occur within RWQCB regulated areas, the Authority will pursue a Water Quality Certification for the Proposed Action to comply with CWA Section 401. Any investigations that may potentially affect waters of the State would be subject to the Water Quality Certification.

Tribal consultation under Section 106 was initiated by Reclamation with the following tribes on March 3, 2022: Cachil Dehe Band of Wintun Indians of the Colusa Indian Community of the Colusa Rancheria, Cortina Indian Rancheria of Wintun Indians of California, Estom Yumeka Maidu Tribe of the Enterprise Rancheria, Grindstone Indian Rancheria of Wintun-Wailaki Indians of California, Mechoopda Indian Tribe of Chico Rancheria, Paskenta Band of Nomlaki Indians, Shingle Springs Band of Miwok Indians, and Yocha Dehe Wintun Nation. The Authority also initiated consultation under AB 52 with the tribes identified in Table 3.7-1 on February 7, 2022. The National Historic Preservation Act requires federal agencies to consider the effect of federal undertakings on historic properties. Section 106 of the National Historic Preservation Act describes the process for identifying and evaluating historic properties and the requirement to consult. Reclamation made a determination of no historic properties affected for the undertaking pursuant to 36 CFR § 800.4(d)(1). Reclamation initiated consultation with SHPO by letter dated April 11, 2022, with a notification of our determination. SHPO expressed no objection to this determination in a letter dated May 6, 2022.

Section 7 of the ESA requires federal agencies, in consultation with USFWS and the National Marine Fisheries Service (NMFS), to ensure that their actions do not jeopardize the continued existence of endangered or threatened species or result in the destruction or significant modification of the critical habitat of these species. Reclamation, as the lead agency under NEPA and ESA, analyzed the potential effects of the Proposed Action on all ESA-listed species present with in the Action Area. Reclamation determined that no listed species regulated by NMFS would be affected by the Proposed Action, therefore no consultation with NMFS is required. Reclamation determined that ESA-listed species regulated by USFWS may be affected, therefore, Reclamation submitted a supplemental BA to USFWS for use in formal consultation for the geotechnical activities. The supplemental BA was submitted to USFWS on February 15, 2022 and Reclamation is currently in consultation with the USFWS.

The Authority has coordinated with CDFW regarding the Proposed Action. Specifically, the Authority shared the Proposed Action's Standard Protocols and Procedures and mitigation measures to avoid or minimize any permanent impacts to the state's fish and wildlife resources, including state-listed species, and areas under jurisdiction of CDFW Fish and Game Code 1602. It is anticipated at this time that all potential effects to state listed species will be avoided and/or minimized through the Standard Protocols and Procedures and mitigation measures applicable to biological resources.

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Appendix A. Photos

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Photo 1 – Typical activities, equipment, trucks, and crew staffing level anticipated for the proposed investigations. Photo is also characteristic of the Proposed Action Area and surrounding area.

Photo 2 – Representative photo of drill rig in grass field with tarp underneath equipment.

Photo 3 – Representative photo of CPT in grass field

Photo 4 – Representative photo of rotary auger boring.

Photo 5 – Representative photo of boring equipment for rock substrate.

Photo 6 – Representative photo of drill rig crew collecting core samples.

Photo 7 – Representative photo of crew reviewing collected core sample in the field.

Photo 8 – Representative photo of monitors in the field.

Appendix B. Standard Protocols and Procedures and Mitigation Measures Tracking Program

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B.1 Standard Protocols and Procedures and Mitigation Measures Tracking Program

The Authority and Reclamation developed the following Standard Protocols and Procedures and Mitigation Measures Tracking Program to keep a record of all of the Proposed Action commitments that are presented in the Draft EA/IS. The standard protocols and procedures are incorporated into the Proposed Action and will be implemented prior to and throughout the proposed investigations. The standard protocols and procedures represent best management practices, best available technology practices, regulatory requirements, industry safety measures, and fire safety measures that are commonly implemented and incorporated into the Proposed Action. The Authority and Reclamation along with the Proposed Action contractor will be responsible for carrying out these standard protocols and procedures. The standard protocols and procedures differ from the mitigation measures presented in the Draft EA/IS since they are not precipitated from a potential Proposed Action impact. The standard protocols and procedures are provided in Table 1 along with the timing, duration, and responsibilities for implementation.

The mitigation measures for sensitive resources, biological resources, paleontological resources, cultural resources, and tribal cultural resources from the Draft EA/IS are provided in Table 2. This table also identifies the timing, duration, and responsibilities for implementation for each mitigation measure.

Table 1. Standard Protocol and Procedures

Title	Description	Timing	Duration	Responsibility
Stormwater Pollution Prevention Plan , Erosion Control and Investigation-derived Waste BMPs	The Proposed Action may be subject to stormwater permit and dewatering requirements of the federal Clean Water Act National Pollutant Discharge Elimination System program. The Authority and Reclamation may be required to obtain permits through the Central Valley Regional Water Quality Control Board before any ground-disturbing activity occurs. The geotechnical investigation work plan documents will identify BMPs for field activities to prevent and minimize the introduction of investigation-derived waste materials and contaminants into surface waters. BMPs specific to each investigation location will be identified following an initial site visit. In addition, at a minimum, the BMPs identified below will be implemented as necessary during Proposed Action field activities. • Temporary erosion control measures (e.g., silt fencing, weed-free straw bale barriers, fiber rolls, storm drain inlet protection, hydraulic mulch, and stabilized entrances) would be employed for disturbed areas (graded or vegetation completely removed; does not apply to vegetation trimming). • No investigation-derived materials will be left at the investigation sites following completion of work. If no suitable upland disposal location is located nearby (i.e., one that would not result in discharges to sensitive aquatic resources including habitat of listed aquatic or semi-aquatic species), investigation-derived groundwater generated during field activities would be contained onsite within approved containers or tanks to avoid impacts on surface waters. Management of the stored or upland disposed groundwater will be completed in accordance with waste management practices or managed in accordance with Order R5-2016-0076-01 for Limited Threat Discharges to Surface Water or *General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality* 2003- 003-DWQ, as applicable.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Spill Prevention and Hazardous Materials Management	Hazardous materials and hazardous wastes including fuels, oils, grease, and lubricants may be used and stored during the field investigation. These materials would be used, stored, and disposed of in accordance with applicable regulations. Spill prevention and control BMPs would be followed to minimize effects from spills of hazardous or petroleum substances. Spill prevention kits would be located onsite at each investigation point. For fueling and maintenance of equipment, containments would be provided to the degree that any spill would not enter the watershed or riparian vegetation. Equipment would not be serviced within or near waterways or floodplains, unless the equipment stationed in these locations could not be readily relocated (e.g., pumps and generators). Additional BMPs designed to avoid spills from equipment would also be implemented. These would include the following: • Storing hazardous materials in double containment • Disposing all hazardous and nonhazardous products in a proper manner • Monitoring onsite vehicles for fluid leaks and providing regular maintenance to reduce the chance of leakage • Providing containment (a prefabricated temporary containment mat, a temporary earthen berm, or other measure that could provide appropriate containment) of bulk storage tanks having a capacity of more than 55 gallons. In addition, existing federal, State, and local worker safety and emergency response regulations require that if any unforeseen hazardous conditions are discovered, the contractor should coordinate with the appropriate agencies, including Glenn, Colusa, and Yolo Counties, for the safe handling, sampling, transportation, and disposal of encountered materials. The contractor would also be required to comply with California Occupational Safety and Health Administration's worker health and safety standards that ensure safe workplaces and work practices.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Reduce Fugitive Dust from Field Equipment Usage and Driving	Field activities would include the following measures to reduce fugitive dust and vehicle exhaust emissions: • Water would be applied by means of truck(s), hoses, and/or sprinklers as needed to minimize dust emissions. • Haul vehicles would be covered. • All earth-moving activities would be suspended when average wind speeds exceed 25 miles per hour. • All visibly dry, disturbed, unpaved road surface areas of operation would be watered to minimize dust emissions. • Onsite vehicles would be limited to a speed of 15 miles per hour on unpaved roads. • Unpaved haul roads which are in use would be sprayed down at the end of the work shift to form a thin crust. This application of water would be in addition to the minimum rate of application.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Implement Measures to Reduce Equipment and Vehicle Exhaust Emissions	Measures to reduce equipment and vehicle exhaust emissions to be implemented for the Proposed Action would include the following to reduce nitrous oxides, particulate matter less than 10 microns in aerodynamic diameter, and reactive organic gas emissions: • All construction-type equipment would be maintained according to manufacturer's specifications. • Idling times would 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, codified in Title 13, Section 2485 of the *California Code of Regulations*). • During all activities, diesel-fueled portable equipment with maximum power greater than 25 horsepower would be registered under the California Air Resource Board's Statewide Portable Equipment Registration Program.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor

	• All fleets of diesel-fueled off-road vehicles and equipment would comply with emissions standards and requirements pursuant to *California Code of Regulations* Title 13, Section 2449. To the extent feasible, off-road Proposed Action vehicles and equipment with engines certified to the Tier 3 or higher emissions standards would be operated. If off-road Proposed Action vehicles and equipment with engines that meet Tier 3 or 4 standards are not available, the best available emissions control technology would be used. • All diesel-fueled on-road trucks would be operated in compliance with the emission standards in accordance with *California Code of Regulations* Title 13, Section 2025. To the extent feasible, on- road trucks with engines certified to the 2012 model year or newer heavy-duty diesel engine emissions standards would be operated. • To the extent feasible, electric equipment would be operated. • Alternatively-fueled equipment would be used, to the extent feasible, such as compressed natural gas, liquefied natural gas, propane, or biodiesel.			
Traffic Management and Hazards	The following measures would be implemented to reduce roadway and traffic conflicts in and near the Proposed Action Area: • Identify specific haul and access routes with all contractors when multiple sites are under evaluation concurrently, so that Proposed Action-generated traffic would be dispersed. • Install traffic control devices, as specified in California Department of Transportation's Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions, including use of signage to alert motorists of proposed investigations and potential hazards, as well as the use of flaggers when appropriate. • All staging of investigation equipment would be located within existing right-of-way or areas previously approved by property owners.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Access for Emergency Vehicles	Access for emergency vehicles would be maintained on all roadways throughout the Proposed Action Area. Notification to Yolo, Glenn, and Colusa County police, public works, fire departments, and other public service providers will occur prior to Proposed Action implementation.	Prior to and during investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Minimize Risk of Exposure to Hazardous Chemicals, Hazardous Materials, and Hazardous Conditions	Prior to the start of the proposed investigations, the Proposed Action team would evaluate site conditions for the presence of hazardous chemicals, materials, and conditions by reviewing publicly available information and by conducting an initial site visit to observe surface conditions. A health and safety plan (HSP) will then be prepared for the overall investigation. The HSP will include an assessment of known hazards, how to control spills, include the procedures for conducting utility screenings, and include fire hazard precautionary methods to be employed. The HSP also contains a Jobsite Hazard Analysis (JHA) form which will be completed for each work area. The JHA, based on observed conditions and proposed work, will identify potential worksite hazards, observed chemical impacts to soil or groundwater, and will identify areas where chemicals/oils will be onsite associated with field equipment management.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Unexpected Hazardous Materials	If unexpected hazardous materials or hazardous waste-related structures or conditions are encountered, such as unlisted underground storage tanks, septic tanks, or unreported hazardous materials or wastes, State and county standards would be implemented. This may also be included in the HSP described in Standard Protocol and Procedure: Minimize Risk of Exposure to Hazardous Chemicals, Hazardous Materials, and Hazardous Conditions.	Prior to and during investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor
Fire Prevention and Suppression at Investigation Locations	Field activities would include the following measures to prevent wildfires: • Drill site will be kept in neat and clean order. • Flammables will be stored in appropriate containers at all times. • Drilling equipment will have vertical exhaust systems and be diesel powered. • Personnel working or visiting drill sites who smoke will be required to smoke in designated areas and appropriately dispose of any related materials. • Personnel working on site will perform fire prevention and suppression drills at each new drilling location. • Firefighting hand tools and equipment will be available for each crew member. Firefighting equipment will include shovels, axes, and fire rakes; back pack water pumps 5 gallons each – two per site; high pressure water pump and hose; at least 100 gallons of water; fire extinguishers – two 5 pound and one 10 pound. • No welding or cutting torch operations or grinding operations are anticipated at any of the proposed investigation locations. • Site inspections will be performed at the end/shut down of every shift.	Prior to and during investigations	Throughout the investigation period	Authority and Reclamation's representative and primary contractor

Table 2. Mitigation Measures

Title	Description	Timing	Duration	Responsibility
MM Gen-1: Conduct Pre-Investigation Siting Survey	At least one week prior to mobilization for Proposed Action activities at each investigation location, the Proposed Action contractor and staff, along with a qualified biologist, a cultural resources specialist, and a tribal monitor will conduct a pre-investigation siting survey. Following review of the proposed site locations and investigation plan, the team will conduct a coordinated field survey and provide recommendations to the Proposed Action team to assist in finalizing investigation sites and provide findings as to the extent of the ground surface preparations (if any) that would be needed at each location. The team will also confirm the means of access by personnel and equipment, which includes the biologist, tribal and cultural specialist demarcating the overland access route that avoids impacts to any identified sensitive resources during the siting survey. Adjustments in the exact location of the investigation areas and in the application of species/habitat-specific mitigation measures may be required to avoid or minimize impacts to sensitive resources, to avoid potential utility conflicts, or if specific site conditions are different than anticipated. These adjustments will be limited to the vicinity of the general investigation locations shown in Figure 1-2 and will remain compliant with any permit restrictions placed on specific areas in the Proposed Action Area.	At least one week prior to investigations	One day pre-investigation siting survey for each investigation location	Proposed Action contractor and staff, qualified biologist, cultural resources specialist, and a tribal monitor
MM Gen-2: Reprioritize or Postpone proposed investigations if sensitive resources cannot be avoided.	If implementation of MM Gen-1 and species/habitat-specific mitigation measures do not avoid or minimize permanent impacts to sensitive resources, and resource avoidance would require relocation of the investigation location outside of the area where data collection is needed to inform design, then the need for an investigation at that specific location would be re-evaluated as part of the overall Proposed Action investigation plan and, if found to be necessary, the effort would be reprioritized within the Proposed Action schedule to avoid or minimize permanent impacts (e.g., moving investigation to later date in schedule to avoid an active bird nest) or postponed to a subsequent investigation effort that would require separate environmental evaluation and permitting.	At least one week prior to investigations	Determination made after One day pre-investigation siting survey for each investigation location	Proposed Action contractor and staff, qualified biologist, cultural resources specialist, and a tribal monitor
MM Bio-1: Conduct Mandatory Biological Resources Awareness Training	Prior to Proposed Action implementation, a qualified biologist will conduct a mandatory biological resources awareness training for all Proposed Action personnel. A qualified biologist is defined as someone with training, knowledge, and experience with the species this document is concerned with. The training will cover special-status species and their habitats that could be encountered in the Proposed 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, as well as 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. Reclamation will maintain the record of training and make it available to USFWS upon request. The Authority-provided biological monitor will verify that the new personnel brought onto the Proposed Action team receive the mandatory training before starting work.	Prior to investigations	Throughout the investigation period	Proposed Action contractor and staff and qualified biologist
MM Bio-2: General Measures to Avoid and Minimize Effects on Sensitive Biological Resources	General restrictions and guidelines that will be followed by personnel are listed below. The contractor and Authority-provided biological monitor will be responsible for ensuring that crew members adhere to these measures. • Qualified biologists (USFWS-approved for giant garter snake and California red-legged frog, see below) will monitor all terrestrial activities. Any observations of federally listed species will be reported to Reclamation and USFWS within 24 hours. • Personnel driving vehicles will observe the posted speed limit on paved roads and a 15 mile-per-hour speed limit on unpaved roads during travel in the Proposed Action area. • All project personnel will have stop work authority if a potentially listed species is observed within an active work area. • All food-related trash 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 Proposed Action area. • Personnel conducting aquatic surveys for amphibians will follow USFWS-approved decontamination protocols prior to any staff entering a wetland or stream (USFWS, 2005a) (see MM Bio-17 below). • All Proposed Action-related equipment will be maintained to prevent leaks of fuels, lubricants, or other fluids. Daily equipment inspections will include inspections for leaks. • Temporary signs, staking, or flagging will be used to identify sensitive biological resources 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 qualified or approved biologist on a daily basis. • 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 Authority-provided biological monitor, who will immediately report the incident to Reclamation. Reclamation will provide oral notification to the USFWS Sacramento Endangered Species Office within 1 working day. Reclamation will follow up with written notification to USFWS within 5 working days. • Vehicles and equipment left on-site overnight will be thoroughly inspected each day for wildlife (both underneath the vehicle and in open cabs) before they are moved. 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 300 feet of any aquatic habitat. • Work will be restricted to open areas in riparian habitat and other sensitive natural communities, including woodlands. All work will remain outside of the tree canopy. Additionally, the upper 12 inches of topsoil will be restored at drilled work area within these habitats.	Prior to, and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff and qualified biologist,

MM Bio- 3: Waters of the U.S./State	The following measures will be implemented to avoid, minimize, and mitigate impacts on wetlands and waters subject to federal and State jurisdiction: The following measures will be implemented to avoid, minimize, and mitigate impacts on wetlands and waters subject to federal and State jurisdiction: • At least 48 hours prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping within proposed investigation areas and staging areas, including areas within 250 feet where accessible (i.e., where access has been granted by the property owner), to confirm the presence and absence of wetlands and waters. All wetlands and waters not previously identified will be mapped in the field using a global positioning system (GPS) with submeter accuracy and will be used to update the land cover mapping. • To the extent practicable, investigations will not take place in or within 250 feet of wetlands and waters (i.e., ponds, streams, reservoirs), except for the investigation sites within Funks Reservoir and the potential jurisdictional water and for activities identified in the Proposed Action description that are near or adjacent to canals and ditches in the agricultural areas. • If work needs to occur within 250 feet of wetlands and waters that are not also restricted by environmental commitments for special-status wildlife species (see MM Bio-4, 5, and 6), the following measures will be implemented: o Sediment control measures: Prevent transport of sediment from work area; Reduce runoff velocity on exposed slopes; and Reduce offsite sediment tracking. o Management measures for investigation materials: Cover and berm loose stockpiled materials; Store chemicals in watertight containers; and Minimize exposure of work materials to stormwater. o Designate refueling and equipment inspection/maintenance locations at least 300 feet from aquatic habitats. A spill prevention plan will be implemented. o A biological monitor will be onsite during all work within 250 feet of waters and wetlands. o In coordination with the Authority provided biological monitor, disturbed areas will be returned to their original condition, which may include the following: – Restoring original topography to the degree possible. – Placement of erosion control BMPs (e.g., wattles, soil binders, straw mulch, geotextiles) may be used to help stabilize work areas once work is complete. – Hydroseeding with noninvasive plant seed.		Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-4: Valley Elderberry Longhorn Beetle	The following measures will be implemented to avoid, minimize, and mitigate impacts on valley elderberry longhorn beetle throughout the Proposed Action Area. o Pre-activity surveys for elderberry shrubs will be conducted in and adjacent to potential work areas by a qualified biologist familiar with the appearance of valley elderberry longhorn beetle exit holes in elderberry shrubs. Pre-activity surveys will be conducted in accordance with the USFWS's 2017 *Framework for Assessing Impacts to the Valley Elderberry* Longhorn *Beetle (Desmocerus californicus dimorphus)*. Any elderberry shrubs in the Proposed Action Area will be mapped. Those shrubs that are within 300 feet of Proposed Action activities will be identified with flagging and protected with high-visibility fencing (at the edge of the work area) and signs indicating the potential for beetle presence and excluding any Proposed Action activity within 165 feet of the plants. o A qualified biologist will be responsible for ensuring the buffer area fences are maintained throughout Proposed Action implementation. o Gravel roadways, staging areas, and other applicable areas will be sprayed with water as needed to minimize dust moving onto elderberry shrubs.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-5: Vernal Pool Branchiopods	The following measures will be implemented to avoid, minimize, and mitigate impacts on federally listed vernal pool branchiopods. • Prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping that was done for the Proposed Action Biological Assessment within the above identified investigation areas and staging areas, including areas within 250 feet, to confirm the presence or absence of habitat suitable for vernal pool branchiopods. All suitable branchiopod habitat will be mapped in the field using a GPS with submeter accuracy and will be used to update the land cover mapping. Updated maps with exclusion buffers for listed species will be provided to all Proposed Action personnel. • Vehicles and equipment will not travel in identified branchiopod habitat. • Investigations will fully avoid effects on vernal pool branchiopods and their habitat. Full avoidance requires a minimum 250-foot no-disturbance buffer around all suitable habitat potentially supporting vernal pool branchiopods or drainage features feeding or draining these areas. The buffers will be identified with flagging or high- visibility fencing as well as signs identifying it as off limits and protected habitat. • Geophysical activities will not take place within 250 feet of suitable vernal pool branchiopod habitat. All geophysical lines will avoid going through pools that represent potential suitable habitat for these species. • The Authority-provided qualified biologist will ensure that the contractor complies with these avoidance buffers.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist

MM Bio-6: Giant Garter Snake	No work would occur within aquatic habitat for giant garter snake. However, the following measures will be implemented to avoid, minimize, and mitigate impacts on the giant garter snake and its upland habitat. • Prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping that was done for the Proposed Action Biological Assessment within the above identified investigation areas and staging areas, to confirm the presence or absence of habitat suitable for giant garter snake. All suitable habitat will be mapped in the field using a GPS with submeter accuracy and will be used to update the land cover mapping. Updated maps with exclusion buffers for listed species will be provided to all Proposed Action personnel. • Geotechnical activities will not be conducted in giant garter snake upland habitat during the active giant garter snake season (April through October) to the maximum extent practicable. • No less than 30 days prior to Proposed Action implementation, Reclamation will submit a request for approval of biologists to conduct monitoring and other activities (see below) associated with the giant garter snake in the areas identified above. • A USFWS-approved biologist will survey work areas within 200 feet of giant garter snake aquatic habitat for snakes no more than 24 hours prior to the start of activities. • Movement of heavy equipment will be confined to existing paved and dirt roads and will avoid suitable upland giant garter snake habitat. • A USFWS-approved biologist will be present during all investigation activities taking place within 200 feet of suitable aquatic habitat. The biologist will visually check for giant garter snake under vehicles and equipment prior to contractors moving them. The biologist will ensure that the contractor caps all materials onsite (e.g., conduits, pipe), precluding wildlife from becoming entrapped. The biologist will check any crevices or cavities in the work area where individuals may be present including stockpiles that have been left for more than 24 hours where cracks/crevices may have formed. • If a giant garter snake is observed by the biologist within the work area, all work will cease until the snake has moved out of the work area on its own. If a giant garter snake does not move out of the work area on its own, the USFWS-approved biologist will have the discretion to relocate the snake to the nearest suitable habitat where it will not be exposed to Proposed Action activities that may result in take. The relocation will be immediate and will be recorded and reported to the USFWS within one business day. • All Proposed Action activities adjacent to suitable giant garter snake aquatic habitat will be conducted within paved roads, farm roads, road shoulders, and similarly disturbed and compacted areas without small mammal burrows or other suitable refugia that could be used by giant garter snake. A USFWS-approved biologist will assess the locations of proposed bore holes in order to avoid small mammal burrows. The biologist will ensure that the work area along the geophysical line remains clear of snakes and other wildlife during testing. The USFWS-approved biologist will immediately notify the operator to shut down testing if a snake is seen moving into the work area. Testing will resume once the snake has moved out of the work area on its own. • No Electrical Resistance Survey work will be conducted within 200 feet of giant garter snake aquatic habitat to avoid exposing giant garter snakes to electrical current if they are occupying or passing through uplands.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-7: California red-legged frog	No work would occur within suitable California red legged frog aquatic habitat. If work needs to be conducted within suitable California red-legged frog upland habitat or dispersal habitat (areas within 1 mile of aquatic breeding habitat during the rainy season, generally October 15 to March 31), the following measures will be implemented to avoid, minimize, and mitigate impacts under the guidance of a USFWS-approved biologist. • Prior to any ground-disturbing activities, a qualified biologist will ground truth the land cover mapping that was done for the Proposed Action Biological Assessment within the above identified investigation areas and staging areas to confirm the presence or absence of habitat suitable for California red-legged frog. All suitable habitat will be mapped in the field using a GPS with submeter accuracy and will be used to update the land cover mapping. Updated maps with exclusion buffers for listed species will be provided to all Proposed Action personnel. • A qualified biologist will be present during all investigation activities in California red-legged frog upland habitat and dispersal habitat (if work occurs during rainy season, generally October 15 to March 31 when frogs are dispersing) to implement avoidance and minimize measures for the California red-legged frog. The biologist will survey work areas for frogs and for rodent burrows in potential upland habitat before equipment is moved in and work begins. Areas with higher potential for California red-legged frog, such as areas with a high density of burrows, will be flagged for avoidance. The biologist will work with the geotechnical crew and geologists to align work such that the minimum number of burrows is affected. • The qualified biologist will inspect all equipment left in a work area overnight to ensure that no frogs are present before work begins. Any California red-legged frogs found within a work area will be avoided and allowed to disperse on their own accord. • The qualified biologist will ensure that the work area along the geophysical lines remains clear of frogs and other wildlife during the ERI. The biological monitor will immediately notify the operator to shut down the ERI equipment if a frog, or other special-status wildlife species, is seen moving into the work area. Testing will resume once the frog has moved out of the work area on its own. • No work will occur in the aforementioned work areas during or 24 hours following a rain event. Following a rain event, no work will proceed until a qualified biologist has inspected the work areas and verified that there are no California red-legged frogs present. A rain event is to be considered precipitation of at least one-quarter inch within a 24-hour period. • Activities within suitable upland/dispersal habitat will occur during daylight hours (from 30 minutes before sunrise to 30 minutes after sunset). Except when necessary for driver or pedestrian safety, artificial lighting at a worksite will be prohibited during the hours of darkness when working in suitable California red-legged frog upland/dispersal habitat. • If work in suitable California-red legged frog dispersal habitat occurs during the rainy season, generally October 15 to March 31, and lasts for more than 1 day, exclusion fencing will be installed around the work area. Fencing will remain within the Proposed Action Area at any location and allow enough room for the movement of equipment and personnel. The fencing will be installed to a depth of 6 inches and be at least 36 inches above grade. The	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist

	contractor will avoid placing fencing on top of ground squirrel burrows. A qualified biologist will inspect the fencing daily for the presence of California-red legged frogs.			
MM Bio-8: Foothill Yellow-legged Frog	All investigations will be sited outside of foothill yellow-legged frog habitat (i.e., intermittent or perennial streams with moderate gradient and rocky substrates). If work occurs within 300 feet of suitable aquatic habitat, a CDFW-approved biological monitor will conduct a pre-activity survey immediately prior to work crews entering the work area and will remain onsite for the duration of the activities within 300 feet of suitable aquatic habitat. If a frog is observed in a work area, it will be allowed to move out of the work area on its own. Any observed foothill yellow-legged frogs will be reported to CDFW within 24 hours.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-9: Migratory Birds	The following measures will be implemented to avoid and minimize impacts on nesting migratory birds, including special-status birds, during investigations: • A qualified wildlife biologist with experience with nesting birds will conduct nesting surveys before the start of investigation activities during the breeding season (February 1-August 31). A minimum of two separate surveys will be conducted within 14 days prior to the initiation of work, with the last survey within 24 hours prior to work beginning in a given work area. Surveys will include a search of all suitable nesting habitat in the work area. In addition, a 500-foot radius around the work areas, where accessible, will be surveyed for nesting raptors, and an area within 50 feet of the work area will be surveyed for other nesting birds protected by the Migratory Bird Treaty Act. If no active nests are detected during these surveys, no additional measures are required. • If active nests are found in the survey area, no-disturbance buffers will be established around the nest sites to avoid disturbance or destruction of the nest site until the end of the breeding season (approximately August 31) or until a qualified wildlife biologist determines that the young have fledged and moved out of the Proposed Action Area (this date varies by species). A qualified wildlife biologist will monitor activities in the vicinity of the nests to ensure that activities do not affect nest success. The extent of the buffers will be determined by the biologists in consultation with CDFW and will depend on the level of noise or disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. Suitable buffer distances may vary between species.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-10: Bald and Golden Eagles	The following measures will be implemented to avoid, minimize, and mitigate impacts on bald and golden eagles during investigations: • All investigations (surface and subsurface) will be avoided within 0.5 mile of potential bald eagle nests; and 1 mile of golden eagle nests during the nesting season (January to August 31). • Work within the 0.5 and 1 mile buffers will only occur if the Proposed Action receives an eagle take permit from USFWS. Once the permit is received, the Proposed Action will implement conditions of the permit that are applicable to investigations, including mitigation. Conditions may include participation in an in-lieu fee program for take of eagles or utility line relocation and retrofit.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-11: Swainson's Hawk	The following measures will be implemented to avoid, minimize, and mitigate impacts on Swainson's hawk during investigations: • Pre-activity surveys will be conducted by a biologist with experience with Swainson's hawk in order to identify the presence of potential Swainson's hawk nest trees on and within 0.25 mile of work and staging areas. Surveys will be consistent with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000), or as the methodology is modified based on Proposed Action timing. Survey results will be provided to CDFW by phone or e-mail no less than 5 days prior to commencement of activities, and in a written report within 30 days after commencement of activities. The report will include the location of any known nest trees (occupied within one or more of the last 5 years) present within 0.25 mile of the work footprint. • Investigations will fully avoid Swainson's hawk nests. Investigations will not be conducted within 650 feet of an occupied Swainson's hawk nest. A nest is considered occupied from the time the nest is being constructed until the young leave the nest, or until the nesting attempt fails and the nest is abandoned.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist

MM Bio-12: Western Burrowing Owl	The following measures will be implemented to avoid, minimize, and mitigate impacts on western burrowing owl during investigations. These measures incorporate survey, avoidance, and minimization guidelines adapted from CDFW's Staff Report on Burrowing Owl Mitigation (CDFG, 2012). • Pre-activity surveys will be conducted with one occurring 14 days prior to all activities, including staging, and another within 24 hours of these activities within and adjacent to areas of suitable habitat. A qualified biologist will survey the Proposed Action Area and record and map all burrowing owl observations and burrows that may be occupied (as indicated by tracks, feathers, egg shell fragments, pellets, prey remains, cast pellets, whitewash, or decoration) on the Proposed Action Area. The surveys will be conducted while walking transects throughout the proposed investigations areas, plus all accessible areas within a 250-foot radius of the proposed investigation areas. Surveys will be conducted between 10:00 a.m. and 2 hours before sunset. • Burrowing owls will be avoided by relocating work areas. If an active burrow is identified near a work area and work cannot be conducted outside of the nesting season (February 1 to August 31), a qualified biologist will establish a no-activity buffer that extends a minimum of 250 feet around the burrow. If burrowing owls are present at the site during the nonbreeding season (September 1 through January 31), a qualified biologist will establish a no-activity zone that extends a minimum of 150 feet around the burrow. • If the appropriate no-activity buffer for breeding or nonbreeding burrowing owls cannot be established, a wildlife biologist experienced in burrowing owl behavior will evaluate site-specific conditions and recommend a smaller buffer that still minimizes the potential to disturb the owls (and still allows reproductive success during the breeding season). The site-specific buffer will be established by taking into consideration the type and extent of the proposed activity occurring near the occupied burrow, the duration and timing of the activity, the sensitivity and habituation of the owls to existing conditions, and the dissimilarity of the proposed activity to background activities. • A biological monitor will be present during all activities occurring within any reduced buffers. If during the breeding season there is any change in owl nesting and foraging behavior as a result of activities, the biological monitor will work with personnel and Authority to provide additional protections to reduce disturbance, such as adding visual and sound curtains. • If monitoring indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in used by owls, the no-activity buffer may be removed.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-13: Tricolored Blackbird	The following measures will be implemented to avoid, minimize, and mitigate impacts on tricolored blackbird during investigations: • Prior to initiation of investigations within 1,300 feet of suitable nesting habitat, a biologist with experience surveying for and observing tricolored blackbird will conduct pre-activity surveys to establish use of nesting habitat by tricolored blackbird colonies. Surveys will be conducted, where access allows, during the nesting season (generally March 15 to July 31). Three surveys will be conducted within 15 days prior to activities with one of the surveys within 5 days prior to the start of activities. If active tricolored blackbird nesting colonies are identified, the following avoidance measure will be implemented: • Investigations will fully avoid tricolored blackbird nesting and roosting habitat. • To the extent practicable, investigations will not occur within 1,300 feet of an active tricolored blackbird nesting colony (generally March 15 through July 31). Where a buffer distance of 1,300 feet is not practicable, CDFW will be consulted to develop a smaller buffer. The buffer may be reduced in areas with dense trees, buildings, or other habitat features between the activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined by the biological monitor that is experienced with tricolored blackbird. If tricolored blackbirds colonize habitat adjacent to work areas after activities have been initiated, the contractor will reduce disturbance through establishment of buffers and/or sound curtains, as determined by the biological monitor. • Investigations will avoid activities within at least 300 feet from occupied active tricolored blackbird roosting habitat. This minimum buffer may be reduced in areas with dense trees, buildings, or other habitat features between the work activities and the roost, or where there is sufficient topographic relief to protect the roosting site from excessive noise or visual disturbance, or where sound curtains are used, as determined by the biological monitor that is experienced with tricolored blackbird.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-14: Bank Swallow	The following measures will be implemented to avoid, minimize, and mitigate impacts on bank swallow during investigations: • Prior to beginning investigations within 500 feet of the Sacramento River during the bank swallow nesting season (April 1 through August 31), a pre-activity survey for bank swallow colonies will be conducted where bank swallow habitat is present within 500 feet of work areas. If no active nesting colonies are present, no further measures are required. • If an active colony is found and work must occur during the nesting season (April 1 through August 31), the Authority will establish a no disturbance buffer (determined by the Authority in consultation with CDFW) around the colony during the breeding season. In addition, a qualified biologist will monitor any active colony within 500 feet of work areas to ensure that activities do not affect nest success.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-15: American Badger	The following measures will be implemented to avoid, minimize, and mitigate impacts on American badger during investigations: • A qualified biologist will survey for American badger in work areas, concurrent with the pre-activity survey for burrowing owl. If an active den is located, no investigations will occur within 50 feet of an active American badger den. • A biological monitor will be present during all work within 50 to 100 feet of an active American badger den. The monitor will ensure that activities do not affect the den or substantially disrupt the badger's ability to move freely in and out its den.	Prior to and during investigations	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Bio-16: Special-Status Plant Species	The following measures will be implemented to avoid, minimize, and mitigate impacts on special-status plant species during investigations: • Pre-activity surveys will be conducted for special-status plant species in all investigation and equipment staging areas, as well as areas within 250 feet of investigation and equipment staging areas. The purpose of these surveys will be to verify that the locations of special-status plants identified in previous record searches or surveys are extant, identify any new special-status plant occurrences, and cover any portions of the Proposed Action Area not	Prior to and during investigations	Throughout the investigation period, including the pre-	Proposed Action contractor and staff, qualified biologist

	previously surveyed. During pre-activity surveys, the biologist would also identify any host plants suitable for special-status pollinators (e.g., milkweed, dusty maidens, lupines, medics, phacelias, sages, clarkias, poppies, and wild buckwheats). • All surveys will be conducted by qualified biologists using the using *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018). To the extent feasible, surveys will be conducted during the blooming season, when special-status plant species would be most evident and identifiable. Locations of special- status plants in the Proposed Action Area will be recorded using a GPS unit and flagged. • Where surveys determine that a special-status plant species is present in or adjacent to a proposed investigation area, direct and indirect impacts of the Proposed Action on the species will be avoided through the establishment of 250-foot activity exclusion zones surrounding the periphery of occurrences, within which no ground-disturbing activities shall take place. Activity exclusion zones for special-status plant species will be established according to a 250-foot buffer surrounding the periphery of each special-status plant species occurrence, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no activity-related disturbances will occur within 250 feet of the occurrence. The 250-foot buffer may be reduced based on the nature of the activities, the presence of a biological monitor, and/or other site-specific conditions that would allow work to occur closer.		investigation siting survey	
MM Bio-17: Special-Status Bat Species	The following measures will be implemented to avoid, minimize, and mitigate impacts on special-status bat species during investigations: • Pre-activity surveys will be conducted for special-status bat species in all work areas, including staging areas. The biologist shall look for bats and bat sign, including existing roost sites and bat guano deposits, and will listen for roosting bats. If potential roost sites are identified, a project-specific avoidance and minimization plan shall be prepared by a qualified biologist to be reviewed and approved by CDFW prior to the start of Proposed Action investigations. • If vegetation trimming is needed, the biologist will examine the trees to be trimmed to identify suitable bat roosting habitat. Trimming 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). • If a maternity roost is found, the roost will be protected until July 31 or until the qualified biologist has determined 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. The establishment of buffers will be coordinated with CDFW through the preparation of the previously referenced project-specific avoidance and minimization plan.	Throughout the investigation period	Throughout the investigation period, including the pre-investigation siting survey	Proposed Action contractor and staff, qualified biologist
MM Geo-1: Consult with Qualified Paleontologist if Paleontological Resources Were Discovered	The proposed investigations have the potential to have impacts on unidentified paleontological resources. If vertebrate or plant fossils are discovered during field activities, the Authority and Reclamation would be notified, and the fossil would be evaluated for its unique properties and protected by extraction, preservation, and curation by a qualified paleontologist.	Throughout the investigation period if paleontological resources are discovered	Throughout the investigation period	Proposed Action contractor and staff, qualified paleontologist
MM Cul-1: Avoid Impacts on Cultural Resources	Impacts on known historical resources/historic properties, including prehistoric and historic-era archaeological sites, buildings, structures, Traditional Cultural Properties, and human remains will be avoided to the extent feasible. Methods of avoidance during Proposed Action planning shall include relocation of geologic, geotechnical, and geophysical investigation locations to at least 50 feet away from any identified resource dependent upon the resource and the area, prioritizing the use of existing roadways or other previously disturbed locations for the investigations, rerouting of access routes and the installation of protective fencing around resources where appropriate.	Prior to investigations	Throughout the investigation period, including the one day pre-investigation siting survey for each investigation location	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor
MM Cul-2: Pre-activity Pedestrian Survey	Once the geotechnical field investigation sites have been confirmed, built resource surveys and archaeological surveys will be conducted in all work areas to identify whether any new or previously unidentified built historic resources or archaeological sites are present. This activity will be conducted regardless of whether a previous cultural resources survey has covered the area to ensure adequate coverage. All newly identified resources will be recorded on California Department of Parks and Recreation 523-Series forms. If archaeological resources are identified during pre-activity survey, the Authority will ensure that they are avoided to the extent feasible by implementing the measures in MM Cul-1 (Avoid Impacts on Cultural Resources).	At least one week prior to investigations	One day coupled with the pre-investigation siting survey for each investigation location	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor

MM Cul-3: Prepare a Post-review Discovery Plan	Prior to the start of geotechnical exploration, a Post-review Discovery Plan (Plan) will be prepared by a qualified archaeologist. Not all cultural resources are visible on the ground surface. Protocols for addressing the accidental discovery of archaeological resources or human remains that are not visible on the ground surface during Proposed Action implementation shall be outlined in the Plan. The Plan shall be developed prior to ground disturbance so that all parties are aware of the actions required if buried archaeological resources are encountered during Proposed Action implementation. At a minimum, the Plan shall include protocols and procedures for addressing post-review discoveries, Archaeological Sensitivity Training for Proposed Action personnel, an Archaeological Monitoring Plan, and a Burial Treatment Plan. The Plan will be consistent with 36 CFR 800.13(b)9(3). The post review discovery procedures included in the Plan will at a minimum include the process identified under MM Cul-6 below regarding work stoppage at the discovery site and appropriate assessment of the discovery. The Archaeological Sensitivity Training will cover the historical context, resource types (using representative photographs of soils, features or artifacts if appropriate) and legal status of known resources, regulatory protections, penalties for noncompliance, benefits of compliance, as well as the avoidance and minimization measures that the Proposed Action has implemented. The training will be conducted prior to the start of investigations. The Archaeological Monitoring Plan describes qualifications and protocols for monitoring Proposed Action-related ground disturbance, including the following: • Documentation and chain-of-command notifications • Procedures for securing an area where cultural remains are discovered • Procedures for evaluating the nature of the finds • The schedule for notifications and conducting activities associated with evaluating the finds. • Protocols for establishing minimum depth of borings when monitoring is no longer needed Specific activities to be monitored include subsurface geotechnical boring. Boring samples will be collected in clear plastic sleeves to allow for inspection of soils contained in the samples. The Burial Treatment Plan describes specific procedures for burial discovery, including documentation and chain-of-command notifications, and procedures for securing an area where burials are discovered.	Prior to investigations	Throughout the investigation period	Authority and Reclamation's cultural resource specialist
MM Cul-4: Conduct Archaeological Sensitivity Training	The Authority and Reclamation will be responsible for obtaining the services of a qualified archaeologist to conduct archaeological sensitivity training (see MM Cul-3). Prior to the start of the Proposed Action investigations, a qualified archaeologist who meets the Secretary of the Interior's Standards will conduct a mandatory archaeological sensitivity training (see MM Cul-3) for all personnel involved in the geotechnical and geological investigations about cultural resources sensitivity in the Proposed Action Area and cultural resources that could be encountered during the Proposed Action investigations. Participants will be required to sign a form that states they have received and understand the training. The Authority will maintain the record of training and make it available to the Proposed Action's cultural resources staff and to Bureau of Reclamation, upon request. The Authority-provided cultural monitor will ensure that the new personnel brought onto the Proposed Action team receive the mandatory training before starting work.	Prior to investigations	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor
MM Cul-5: Conduct Archaeological Monitoring	The Authority and Reclamation will be responsible for obtaining the services of a qualified archaeologist to conduct archaeological monitoring (see MM Cul-3). One qualified archaeological monitor shall monitor ground-disturbing activities associated with the Proposed Action (i.e., subsurface geotechnical boring). Once boring activities reach depths exceeding that which is likely to encounter cultural remains as described and established in the Archaeological Monitoring Plan, monitoring is no longer necessary. One Native American monitor (as appropriate according to Proposed Action consultation with tribes) will also be invited to monitor these same Proposed Action ground disturbing activities. In accordance with Cul-6 (Immediately Halt Ground-disturbing Activities if Cultural Resources Are Discovered and Implement a Post-review Discovery Plan), if any important (potentially eligible) prehistoric or historic-era features, or any human remains, are exposed during investigations, the archaeological monitor shall have the authority to notify the appropriate contractor supervisor to stop work in the vicinity of the find and implement the Post-review Discovery Plan. If human remains are encountered, the archaeological monitor will also initiate Cul-7 (Immediately Halt Ground-disturbing Activities if Human Remains Are Discovered and Implement a Burial Treatment Plan). Resources identified during investigation activities will be treated in accordance with MM Cul-1 (Avoid Impacts on Cultural Resources).	Throughout the investigation period	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor

MM Cul-6: Immediately Halt Ground-disturbing Activities if Cultural Resources Are Discovered and Implement the Post-review Discovery Plan Prepared under MM Cul-1	If important (potentially eligible) cultural resources, such as structural features, unusual amounts of bone or shell, flaked or ground stone artifacts, historic-era artifacts, human remains, or architectural remains are encountered during any Proposed Action activities, work shall be suspended in coordination with the appropriate contractor supervisor immediately at the location of the find and within an appropriate radius, with a minimum of 50 feet. The Authority will implement MM Cul-1 (Avoid Impacts on Cultural Resources), and implement the Post-review Discovery Plan prepared under MM Cul-3. As part of the Post-review Discovery Plan, a qualified archaeologist shall conduct a field investigation of the find and recommend avoidance measures deemed necessary for the protection of any cultural resource concluded by the archaeologist to represent an historical resource, unique archaeological resource, or a potential historic property. If necessary, the qualified archaeologist shall recommend additional measures in consultation with the Authority and responsible agencies and, as appropriate, interested parties such as Native American tribes. The Authority and Reclamation, in consultation with responsible agencies, will determine when/if ground-disturbing activities at the geotechnical location may resume. All the activities identified above will be detailed in the Post-review Discovery Plan so that all parties are aware of the actions required if buried archaeological sites are encountered during Proposed Action implementation. Discoveries of human remains shall be treated as described in the following sections for Cul-7 (Immediately Halt Ground-disturbing Activities if Human Remains Are Discovered and Implement a Burial Treatment Plan).	Throughout the investigation period if cultural resources are discovered	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor
MM Cul-7: Immediately Halt Ground-disturbing Activities if Human Remains Are Discovered and Implement a Burial Treatment Plan	In accordance with relevant provisions of the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the potentially damaging excavation must halt in the area of the remains and the local County Coroner must be notified. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or State lands (Health and Safety Code Section 7050.5(b)). If the Coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission by phone within 24 hours of making that determination (Health and Safety Code Section 7050(c)). Pursuant to the provisions of Public Resources Code Section 5097.98, the Native American Heritage Commission will identify a Most Likely Descendant. The Most Likely Descendant designated by the Native American Heritage Commission will have at least 48 hours to inspect the site and propose treatment and disposition of the remains and any associated grave goods. All the activities identified above shall be detailed in a Burial Treatment Plan (MM Cul-3) developed in consultation with local Native American tribes prior to Proposed Action implementation. If human remains that are not of Native American origin are discovered, disposition of the remains shall be determined in consultation with the coroner or possible descendants, if they can be identified. In the event human remains are discovered on federal lands, the federal land managing agency should be notified immediately, and should the Coroner determine the find may be Native American, then the federal land managing agency must follow the procedures of the Native American Graves Protection and Repatriation Act.	Throughout the investigation period if human remains are discovered	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor
MM TCR-1: Avoid or Preserve in Place	Avoidance and preservation of the resources in place, including, but not limited to, planning and implementing activities to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.	Throughout the investigation period	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor
MM TCR-2: Treat Resource with Culturally Appropriate Dignity	Treating the resource with culturally appropriate dignity, taking into account the Tribal cultural values and meaning of the resource, including, but not limited to, the following: • Protecting the cultural character and integrity of the resource. • Protecting the traditional use of the resource. • Protecting the confidentiality of the resource.	Throughout the investigation period	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor
MM TCR-3: Permanent Conservation Easements	Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.	Throughout the investigation period	Throughout the investigation period	Proposed Action contractor and staff, cultural resource specialist, and tribal monitor

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Appendix C. Regulatory Permits, Approvals, and Authorizations

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C.1 Introduction

This appendix summarizes the federal (Table C-1), state (Table C-2) and local (Table C-3) permits, approvals and consultation processes that are potentially applicable to the the 2022-2024 Sites Reservoir Geotechnical Investigations and relevant to the environmental impacts evaluated within the resource chapters (i.e., Sections 3.1 through 3.12) in this EA/IS.

The Draft EA/IS was prepared in accordance with the California Environmental Quality Act and the National Environmental Policy Act (NEPA) of 1969 (Pub. L. 91-190), the purpose of which is to, "declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; and to enrich the understanding of the ecological systems and natural resources important to the Nation…" Sec. 2 [42 U.S.C. Section 4321]. The Proposed Action would also comply with Executive Order (E.O) No. 11514, which further calls for the protection and enhancement of environmental quality. As stated in E.O. No 11514, "The Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals."

The following federal regulations are not applicable to the Proposed Action because the Proposed Action will not effect navigable waters, coastal waters, wild and scenic rivers, other streams and waterways, fisheries, or drinking water supplies.

- Rivers and Harbors Act, Sections 9, 10, 14, and 408
- Federal Safe Drinking Water Act
- Wild and Scenic Rivers Act
- Fish and Wildlife Coordination Act
- Marine Mammal Protection Act.

Table C-1. Federal Permits, Approvals, Reviews, and Consultation Requirements

Responsible Agency(ies)	Permit, Approval, Review, or Consultation Requirement	Description and Applicability to the Proposed Action	Authority
U. S. Department of the Interior, Bureau of Reclamation	National Environmental Policy Act Lead Agency	Prepare the EA and issue the Finding of No Significant Impact as the NEPA lead agency within the Department of the Interior. Reclamation will also be responsible for compliance with the following laws, regulations, and executive orders, as applicable: Federal Water Pollution Control Act (CWA), Sections 401, 402, and 404; Federal Clean Air Act; National Historic Preservation Act of 1966, Sections 106 and 110; American Indian Religious Freedom Act; Native American Graves Protection and Repatriation Act; Migratory Bird Treaty Act; Executive Order 13186 (protection of migratory birds); Executive Order 11990 (protection of wetlands); Executive Order 12898 (environmental justice); Executive Order 11988 (floodplain management); Executive Order 13007 (protection of Indian Sacred Sites on federal land).	1 C.F.R. Section 601.5
U.S. Army Corps of Engineers, Sacramento District	Department of the Army Clean Water Act Section 404 permit	Permit related to the discharge of dredged or fill material into waters of the United States. The Proposed Action qualifies for non-notifying Nationwide Permit 6 – Survey Activities.	Clean Water Act Section 404, codified at 33 U.S.C. Section 1344
U.S. Fish and Wildlife Service; National Marine Fisheries Service	Endangered Species Act Section 7 Consultation/Section 10 Incidental Take Permit	Consultation related to determining that any discretionary action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitat. Incidental Take Statement/Incidental Take Permit for any take of listed species. A Supplemental Biological Assessment was prepared and submitted to U.S. Fish and Wildlife on Feb. 25, 2022. Reclamation is currently in consultation with U.S. Fish and Wildlife.	Endangered Species Act Section 7, codified at 16 U.S.C. Section 1536(a)(2), and implementing regulations; Endangered Species Act Section 10, codified at 16 U.S.C. Section 1539

Responsible Agency(ies)	Permit, Approval, Review, or Consultation Requirement	Description and Applicability to the Proposed Action	Authority
U.S. Fish and Wildlife Service	Incidental Eagle Take Permit; Nest Take Permit	Permit for the take of bald and/or golden eagle and their nests. The Proposed Action will apply for an Eagle Take Permit if investigations will occur within the 0.5 mile and 1 mile buffers for the species.	16 U.S.C. Section 668; 50 C.F.R. Section 22.26
The Advisory Council on Historic Preservation; California Office of Historic Preservation	Section 106 consultation	Consultation related to considering the effects of a federal undertaking on historic and cultural resources. Consultation with State Historic Preservation Office was initiated by Reclamation on April 11, 2022 and is currently ongoing.	National Historic Preservation Act, codified at 36 C.F.R. Section 800, and implementing regulations
U. S. Department of the Interior, Bureau of Indian Affairs	Section 106 consultation	Consultation with federally recognized tribes and protection of Indian Trust Assets. Reclamation initiated consultation with federally recognized tribes on March 3, 2022 and consultation is currently ongoing.	25 U.S.C. Section 1a
National Resources Conservation Service	Determine compliance with the Farmland Protection Policy Act	Departments, agencies, independent commissions, and other units of the federal government shall identify the quantity of farmland actually converted by federal programs, and to identify and take into account the adverse effects of federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure that such federal programs, to the extent practicable, are compatible with state, unit of local government, and private programs and policies to protect farmland. The Proposed Action will not convert any farmland.	7 U.S.C. Sections 4201–4209, 7 U.S.C. Section 658

Notes: C.F.R. = Code of Federal Regulations; U.S.C. = U.S. Code;

Table C-2. State Permits, Approvals, Reviews, and Consultation Requirements

Responsible Agency(ies)	Permit, Approval, or Consultation Requirement	Description	Authority
California Department of Fish and Wildlife	Section 2081 Incidental Take Permit	Permit for take of state-listed endangered or threatened species or species proposed for state listing The Proposed Action is not anticipated to require a permit for take for state-listed endangered or threatened species or species proposed for state listing.	California Fish and Game Code Section 2081
California Department of Fish and Wildlife	Fish and Game Code Section 1602, Lake and Streambed Alteration Agreement	Related to any substantial diversion or obstruction of the natural flow of, or substantial change or use of any material from the bed, channel, or bank of, any river, stream, or lake; crossing of streams, rivers, or lakes (also for reservoirs, which interrupt streams) The Proposed Action will require compliance with Fish and Game Code Section 1602 and a Lake and Streambed Alteration Agreement will be obtained.	California Fish and Game Code Section 1602
State Water Resources Control Board; Central Valley Regional Water Quality Control Board	National Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities	Related to all construction and land disturbance discharges when clearing, grading, and excavation result in a land disturbance of 1 or more acres. Permittee files a notice of intent to be covered under the statewide general permit. The Proposed Action will require compliance with the National Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities.	Clean Water Act Section 402
State Water Resources Control Board; Central Valley Regional Water Quality Control Board	Section 401 Water Quality Certification	State certification that the federal permit for discharge of dredged or fill material to waters of the United States does not violate state water quality standards. The Proposed Action will require compliance with Clean Water Act Section 401 and a Water Quality Certification will be obtained.	Clean Water Act Section 401

Responsible Agency(ies)	Permit, Approval, or Consultation Requirement	Description	Authority
Central Valley Flood Protection Board	Minor Alteration Request	Related to encroachment onto/through regulated streams and designated floodways. The Central Valley Flood Protection Board is the nonfederal sponsor agency for 33 U.S.C. Section 408 coordination with USACE Civil Works Division. The Proposed Action will request a minor alteration authorization from the Central Valley Flood Protection Board	23 California Code Regs. Title 23, Div. 1.
Native American Heritage Commission Cachil Dehe Band of Wintun Indians of the Colusa Indian Community of the Colusa Rancheria Cortina Indian Rancheria of Wintun Indians of California Estom Yumeka Maidu Tribe of the Enterprise Rancheria Grindstone Indian Rancheria of Wintun-Wailaki Indians of California Mechoopda Indian Tribe of Chico Rancheria Paskenta Band of Nomlaki Indians* Yocha Dehe Wintun Nation	AB 52 Consultation	Consultation with California Native American Tribes traditionally or culturally affiliated with the geographic area of the proposed project regarding the presence of and potential Project impacts to tribal cultural resources The Authority initiated consultation under AB 52 on February 7, 2022 and consultation is currently ongoing.	California Public Resources Code Section 21080.3.1

Notes: AB = Assembly Bill; WSIP = Water Storage Investment Program.

Table C-3. Local Permits, Approvals, Reviews, and Consultation Requirements

Responsible Agency(ies)	Permit, Approval, or Consultation Requirement	Description	Authority
Colusa, Glenn, and Yolo Counties, Public Works Departments	Encroachment Permit	Related to investigations within local jurisdiction's right-of-way and roadways	County ordinances
Colusa, Glenn, and Yolo Counties, Public Works Departments	Transportation Permit	Related to transport of heavy or oversized loads on county roads	County ordinances

Appendix D. Biological Resources Existing Conditions

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Acronyms and Abbreviations

°C	Celsius
°F	Fahrenheit
CBD	Colusa Basin Drain
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
DWR	California Department of Water Resources
EA/IS	*Sites Project Geotechnical Field Investigations Environmental Assessment/Initial Study*
ERI/ERT	Electrical Resistivity Imaging/Tomography
ESA	federal Endangered Species Act
FR	Federal Register
HCP	Habitat Conservation Plan
mA	milliamps
NCCP	Natural Community Conservation Plan
NMFS	National Marine Fisheries Service
NTU	nephelometric turbidity unit
OHWM	ordinary high water mark
Project	Sites Project Geotechnical Field Investigations
Reclamation	Bureau of Reclamation
TCC	Tehama-Colusa Canal
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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Existing Conditions

Introduction

This chapter provides a summary of the existing conditions for biological resources in the study area. The work areas have been established according to the Standard Protocols and Procedures and Mitigation Measures Tracking Program identified in Appendix B of the EA/IS. The Standard Protocols and Procedures provide for a process for siting work areas to avoid and minimize effects on sensitive biological resources. Therefore, almost all of the biological resources discussed in this chapter do not occur in the work areas. The resources are discussed to provide context for the analysis and to help explain the efforts to avoid and minimize effects on these resources.

Methodology

To identify the biological resources in the study area, ICF reviewed previous survey results from work conducted by the California Department of Fish and Game and the California Department of Water Resources from 1998 to 2004 (CDFG, 2003a, 2003b; DWR, 2000a; Authority and Reclamation, 2021. ICF also queried several databases for information on species, including the California Natural Diversity Database (CNDDB) (California Department of Fish and Wildlife [CDFW], 2021), the California Native Plant Society Inventory of Rare and Endangered Plants (2020), the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation species list (USFWS, 2021), and the National Marine Fisheries Service (NMFS) species list (National Marine Fisheries Service, 2021). These lists are included as Attachment D-1. ICF mapped land cover in and adjacent to the proposed investigation work areas through aerial photo interpretation using Google Earth and National Agricultural Imagery Program imagery and topographic data. Attachment D-2 provides a biological resources mapbook depicting the proposed investigations and habitats within the Project Area.

Natural Communities

This section describes the natural communities that are in and adjacent to the study area. Some natural communities described below occur adjacent to the defined study area in order to consider potential effects on nesting birds associated with the geotechnical and geophysical activities. There are five terrestrial natural communities, four aquatic natural communities, and areas of cropland in and adjacent to the study area. The characteristic plant species present in each natural community are described below. The special-status plant and animal species that have a potential to occur in these communities are presented in *Special-Status Species*.

Annual Grassland

The primary vegetation type in the study area is grassland. Grassland consists of open areas lacking woody vegetation and is characterized by herbaceous vegetation dominated by grasses, although flowering forbs are often a conspicuous component of the plant cover. In the study area, this vegetation type is best classified as annual grassland, because the dominant species are annual grasses introduced from the Mediterranean Basin, such as bromes (*Bromus* spp.) wild oats (*Avena* spp.), barleys (*Hordeum* spp.), and ryegrass (*Festuca perenne*). Annual grassland in the study area is highly diverse and contains

multiple microhabitats, including vernal pools and swales, clay flats, alkaline grassland, alkaline wetland, talus slopes, bunchgrass (*Stipa* spp.) stands, and wildflower fields. Although much of the vegetation cover is composed of nonnative annual grasses, many species of native grasses and forbs are present, and the microhabitats scattered throughout the grassland support special-status plants. Some areas are dominated by invasive plant species, such as yellow star-thistle (*Centaurea solstitialis*).

Oak Woodlands

Oak woodland is also prevalent in the study area, occurring mostly in the western portion in Colusa County. Dominant species include a mix of oak species (*Quercus* spp.) including coast live oak (*Q. agrifolia*), blue oak (*Q. douglasii*), and valley oak (*Q. lobata*). Much of the understory is dominated by annual grasses including bromes, barleys, and ryegrasses as well as wildflower fields. Much of the oak woodland areas are vast and undisturbed located on gently rolling hillsides adjacent to the valley floor.

Riparian Forest, Woodland, and Scrub

Riparian vegetation is found intermittently throughout and adjacent to the study area, generally occurring as narrow strips along streams, and as tree-lined canals Riparian vegetation occurs along Funks Creek, Stone Corral Creek, Antelope Creek, Bird Creek, and other smaller unnamed streams. Dominant tree species in the riparian forest and woodland include Fremont cottonwood (*Populus fremontii*) and willows (*Salix gooddingii, S. laevigata*). Valley oaks are occasionally present. Riparian scrub is dominated by shrubby willows (*S. exigua* and others). The understory of this vegetation type contains various shrub, vine, and herbaceous species. Several nonnative tree species are also present, such as walnuts (*Juglans* spp.), fig (*Ficus carica*), and tree-of-heaven (*Ailanthus altissima*). Most of the patches of riparian habitat within the non-cropland study areas are small, sparse, and degraded by intensive cattle use.

Cropland

Vegetation in the east side of the study area and adjacent to the proposed Dunnigan Pipeline and associated facilities consists primarily of cropland. Cropland encompasses all areas where the native vegetation has been cleared for agriculture, including rice fields, orchards, and row crops. Within the cropland vegetation type, small patches of ruderal (repeatedly disturbed) habitat are present adjacent to the cultivated fields, roads, levees, and other infrastructure.

Freshwater Marsh

Freshwater marsh consists of wetlands dominated by emergent, perennial herbaceous species. In the study area, the dominant species are cattails (*Typha* spp.) and rushes (*Schoenoplectus* spp.), but sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), and shrubby willows are sometimes present. Small patches of freshwater marsh associated with riparian areas, ponds, and ditches are scattered throughout the study area.

Seasonal Wetland

Seasonal wetlands are scattered throughout the annual grasslands in the study area. Seasonal wetlands are inundated by surface water or saturated by groundwater during the winter and spring months. Most of these seasonal wetlands are dry by early summer, and in the study area they are strongly associated with low-lying areas of clay or clay loam soils. Many of the plants found in these wetlands are dry and brown during the summer months, making the wetlands almost indistinguishable from the surrounding annual grasslands. Seasonal wetlands include vernal pools, alkaline wetlands, vernal swales, clay flats, and other

wetlands that have formed because of human activities (e.g., drainages blocked by roads or disturbed areas within heavy clay soils). Dominant plant species include spike rush (*Eleocharis macrostachya*), Mediterranean barley (*Hordeum marinum* subsp, *gussoneanum*), and dock (*Rumex* ssp.).

Many of the vernal pools found within the study area have very low plant species diversity (DWR, 2000a). Pools at the northeastern edge of the study area tend to be larger and have greater plant species diversity. Species typically associated with vernal pools include coyote thistle (*Eryngium castrense*), popcorn flower (*Plagiobothrys* ssp.), and hyssop loosestrife (*Lythrum hyssopifolium*).

Most of the alkaline wetlands in the general study area are also seasonal but are vastly different in plant species composition from vernal pools and other freshwater seasonal wetlands (DWR, 2000a). The annual and perennial species in these areas are tolerant of alkali conditions. Most of these wetlands are dominated by salt grass (*Distichlis spicata*), with various other species including sickle grass (*Parapholis incurva*), alkali heath (*Frankenia salina*), alkali weed (*Cressa truxillensis*), and salt marsh bulrush (*Scirpus maritimus*).

Pond

Ponds in the study area are small reservoirs constructed by placing dams on ephemeral streams to capture and store runoff for livestock use. These ponds are mostly unvegetated, although freshwater marsh is infrequently found at the edges of some ponds. These ponds support almost no native flora, and most of the plants are invasive aquatic species (Authority and Reclamation, 2021). Species typical of this habitat include common cocklebur (*Xanthium strumarium*) and dock species.

Reservoir

Funks Reservoir

Funks Reservoir is located on Funks Creek approximately 7 miles northwest of the town of Maxwell, in Colusa County. Constructed in 1975 by the Bureau of Reclamation (Reclamation), Funks Reservoir is a reregulating reservoir that balances water level operations of the Tehama-Colusa Canal (TCC) upstream and downstream of Funks Creek. It has a designed storage capacity of approximately 2,200 acre-feet and a surface area of 232 acres. The typical summer releases from Funks Reservoir to the lower portions of TCC range from 500 cubic feet per second (cfs) to 1,000 cfs. Total flows of 50 cfs to 200 cfs for off-peak limited agricultural releases are needed from November to February, and sometimes into March, depending on the weather (DWR 2003).

Funks Reservoir is bounded primarily by annual grasslands composed of mostly weedy nonnative species. Very few trees or wetlands occur along the water's edge. Seasonal wetlands occur along drainages above the reservoir water's edge (Authority and Reclamation, 2021).

Waterways

Waterways within the study area consist of streams (ephemeral, intermittent, and perennial), canals, irrigation ditches, and a river. Waterways that could be affected by geotechnical and geophysical field investigations include Funks, Stone Corral, and Antelope Creeks, Funks Reservoir, Colusa Basin Drain (CBD), and numerous unnamed irrigation ditches and ephemeral streams.

Waterways with adjacent riparian and 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 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. Shoreline and shallow water areas provide foraging opportunities for waterfowl, herons, and shorebirds. Riparian vegetation provides cover, nesting, and foraging opportunities for many wildlife species (Mayer and Laudenslayer 1988: 86, 130). Wildlife diversity and use is generally reduced in areas that do not contain riparian vegetation or that are covered with riprap. Wildlife that may use the river or its banks include Western pond turtle (*Emys marmorata*), Western fence lizard (*Sceloporus occidentalis*), which occurs primarily in riprap areas, diving and dabbling ducks, raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*).

Waterways in the study area fall within the Sacramento-San Joaquin Province (Central Valley Subprovince), one of six aquatic zoogeographic provinces in California, as defined by Moyle (2002). The Sacramento-San Joaquin Province is drained by the Sacramento and San Joaquin rivers. Generally, four native fish assemblages can be recognized in Central Valley streams: rainbow trout assemblage, California roach assemblage, pikeminnow-hardhead-sucker assemblage, and deep-bodied fish assemblage (Moyle, 2002). Based on their geographic location, the waterways within the study area are characterized by the deep-bodied fish assemblage and the pikeminnow-hardhead-sucker assemblage. Native fish species common to these two zones include Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), Sacramento hitch (*Lavina exilicauda exilicauda*), Sacramento blackfish (*Orthodon microlepidotus*), hardhead (*Mylopharodon conocephalus*), tule perch (*Hysterocarpus traskii*), speckled dace (*Rhinichthys osculus*), California roach (*Lavinia symmetricus*), and riffle sculpin (*Cottus gulosus*). Introduced species also found in these zones include black bass (largemouth, smallmouth, spotted) (*Micropterus* spp.), sunfish (*Lepomis* spp.), striped bass (*Morone saxatilis*), and American shad (*Alosa sapidissima*). Anadromous species passing through or spawning in these zones include steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tshawytscha*), lamprey (*Lampetra* and *Entosphenus* spp.), and sturgeon (*Acipenser* spp.).

A more detailed description of each of these waterway types is provided below.

Named Creeks

In the study area, several named creeks bisect the landscape and drain the hillsides of the western study area including Funks Creek, Stone Corral Creek, and Antelope Creek. All flow through irrigated pasture, rice fields, and row crop agriculture until they flow into the CBD. These creeks are incised and revetted in some areas and have been straightened and altered by farming practices. Additional information on each of these creeks is provided below. Bird Creek, an ephemeral feature, occurs in Yolo County along the proposed Dunnigan Pipeline and is also described below.

Funks Creek

Funks Creek originates at approximately 850 feet elevation in blue oak savanna in the foothills west of Antelope Valley. It flows southeast as an intermittent natural stream, where it is joined by Grapevine Creek. As it flows through the foothills and Antelope Valley, its banks are generally eroded to near-vertical slopes, the gravel bed is highly disturbed and compacted by cattle, and it is bordered by annual grassland vegetation. Little to no riparian vegetation occurs throughout much of this reach, although occasional cottonwoods, willows, or nonnative species occur along the banks (Authority and Reclamation, 2021).

Along the north end of Antelope Valley, Funks Creek receives underground drainage from Salt Lake. Salt Lake is a 28-acre area of impounded water and seasonal alkaline wetlands formed by warm salt springs that occur upslope.

As Funks Creek cuts through the Golden Gate gap and enters the west side of the Sacramento Valley, the stream channel becomes wider, although flows are still intermittent. The banks and channel have occasional groupings of riparian trees and shrubs. Occasional wetlands occur, mainly small patches of emergent wetland or stock ponds. Approximately 1 mile downstream of the Golden Gate gap, Funks Creek is impounded by Funks Reservoir. This reservoir is fed mainly by waters of the TCC. Downstream of the reservoir, Funks Creek is bordered by agricultural lands, and much of this reach is channelized before emptying into Stone Corral Creek. The banks are bordered by levee roads and are sparsely vegetated with nonnative weedy species. Occasional native or nonnative riparian trees and shrubs occur along the bank, as well as small patches of emergent wetland vegetation. This portion of Funks Creek likely has some flow year round due to leakage from the dam at Funks Reservoir. A large wetland area, fed by waters from agricultural canals and Funks Creek, occurs upstream of the confluence of Funks Creek and Stone Corral Creek.

Upstream of Funks Reservoir, stream habitat in Funks Creek consists of 51 percent flatwater, 35 percent pools, and 14 percent riffles. Based on surveys during January and February 1999, the average habitat unit length is 212 feet for flatwater, 146 feet for pools, and 57 feet for riffles. Substrates range from silt/clay to small cobbles, with gravel the dominant substrate in the upper reaches of Funks Creek and silt/clay dominating substrates in lower reaches above Funks Reservoir. The streambanks consist overwhelmingly of silt and clay. Star-thistle and grasses are the dominant vegetation types along the streambanks. Woody riparian vegetation is sparse and consists of cottonwood, willow, oak, and walnut. Overall, canopy cover averages 5 percent over the stream's length, with most woody riparian vegetation concentrated in the vicinity of Golden Gate gap and the upper reaches of the creek. The portion of Funks Creek immediately upstream of Funks Reservoir supports a thin line of riparian and other associated trees, and very small patches of wetland vegetation within its bed. Instream cover in Funks Creek is composed of undercut banks, instream woody material, terrestrial and aquatic vegetation, boulders and bedrock ledges, and bubble curtain, and averages 27 percent of stream area. Aquatic vegetation and boulders are the dominant cover type. (Brown, 2000.)

Limited information is available on habitat conditions in Funks Creek downstream of Funks Reservoir. However, based on aerial imagery (Google Earth), woody riparian vegetation is intermittent, and the creek is largely unshaded. An approximately 0.7-acre area of riparian habitat occurs downstream of the existing dam. Further downstream, streambanks appear to be vegetated largely with herbaceous species. Because of the flat gradient, stream habitat diversity is low and appears to be dominated by flatwater habitats. It is likely that substrates are dominated by sand and silt/clay because of the generally flat gradient. All work would avoid the bed and banks of Funks Creek.

Stone Corral Creek

Stone Corral Creek is characterized as an intermittent stream with a narrow, slightly incised, channel characterized by riparian vegetion. The headwaters of Stone Corral Creek are located west of the study area in the Coast Range foothills. It flows southeast through the southern portion of the study area near the town of Sites. The new portions of the study area occur in the Stone Corral Creek (HUC 1802010406) and Logan Creek (HUC 1802010405) watersheds. The drainage area of the Stone Corral Creek watershed is 38.2 square miles. The only place where activities are proposed near Stone Corral

Creek is along Maxwell Sites Road in the southern portion of the study area. All work would avoid the bed and banks of Stone Corral Creek.

Antelope Creek

Antelope Creek is characterized as an intermittent stream with a narrow, slightly incised, channel characterized by riparian vegetion. The headwaters of Antelope Creek are also on the western side of the proposed inundation area in the Coast Range foothills, just south of the headwaters of Grapevine Creek. Antelope Creek flows south, then east, and then north through the southern portion of the study area joining Stone Corral Creek near the town of Sites. Antelope Creek crosses into the southern most portion of the study area along Huffmaster Road. One work area is in the vicinity, HM-B-029. All work would avoid the bed and banks of Antelope Creek.

Bird Creek

Bird Creek is characterized as an ephemeral stream with a narrow, slightly incised, channel that is mostly devoid of riparian vegetion. It originates in the Dunnigan Hills west of the study area. Bird Creek crosses into the study area west of I-5 within croplands and continues under I-5 and County Road 99W and ends within croplands just west of the CBD. All work would avoid the bed and banks of Bird Creek.

Colusa Basin Drain

The CBD, a natural drainage feature that parallels the Sacramento River on the west side, intercepts west-side tributaries and agricultural runoff between Stony Creek and Colusa. The CBD drains into the Sacramento River at Knights Landing. The surrounding landscape is dominated by agricultural and rangeland activities; very little of the land is urbanized.

Streams draining the eastern slope of the Inner Coast Range foothills coupled with overflow from the Sacramento River have historically contributed to regular seasonal flooding of the Colusa Basin. Flow in the CBD peaks when runoff from streams to the west during winter storms causes the streams that feed the CBD to swell. CBD flow returns to high levels during late summer in response to the draining of adjacent rice fields.

The CBD provides limited bank cover for fish and other aquatic species; however, small and large instream woody material provides some instream cover. The streambanks are often scoured by high flows. Water quality is characterized by warm and turbid conditions during summer, and turbid and cool conditions during winter. The substrate is composed of mud. Riparian vegetation is limited to individual trees or isolated pockets of woody riparian species. Canopy cover is limited to non-existent (Authority and Reclamation, 2021). All work would avoid the bed and banks of the CBD.

Ephemeral and Intermittent Streams, Canals, and Ditches

Except for the irrigation ditches and canals, all of these waterways are natural channels that drain the west side of the Sacramento River Valley and flow to the Colusa Basin, and subsequently the Sacramento River via the CBD. With the advent of agriculture in the region, most reaches of these waterways were channelized and some were dredged to carry agricultural runoff in addition to natural flows (Brown, 2000). Most irrigation ditches in the study area are earthen channels, while the larger irrigation canals (e.g., TCC and Glenn-Colusa canals) are concrete lined.

Stream flow in these drainages' peaks during winter months in response to runoff during winter storms. Flow returns to high levels in the valley reaches of these streams during late summer when rice fields are drained. During summer, many of the reaches in these streams are dry, except for occasional pools or periods when receiving agricultural drainage or runoff. Water quality in these creeks is reported to be generally poor and high in dissolved minerals (Brown, 2000).

Special-Status Species

For the purpose of this report, special-status species are plant and animals that are legally protected under the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status animal and plants are those species in any of the following categories.

- Species listed or proposed for listing as threatened or endangered under ESA (50 Code of Federal Regulations [CFR] 17.11 [listed animals], 50 CFR 17.12 [listed plants], and various notices in the Federal Register [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (81 FR 87246, December 8, 2021).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations 670.5).
- Species that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA) (State CEQA Guidelines Section 15380).
- Plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
- Plants with a California Rare Plant Rank of 1 or 2 (California Native Plant Society, 2020).
- Wildlife species of special concern to the CDFW, Special Animals List (CDFW, 2021).
- Fish species of special concern to CDFW (Moyle et al., 2015).
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).

Tables 1 and 2 list special-status plant and animal species, respectively, that are known to occur or have the potential to occur in the geographic region (i.e., within 5-miles of the study area for animals and 10-miles for plants). These species were identified based on the CNDDB records search (CDFW, 2021), the California Native Plant Society Inventory of Rare and Endangered Plants (2020), the USFWS Information for Planning and Consultation species list (USFWS, 2021), the NMFS species list (National Marine Fisheries Service, 2021), and species distribution and habitat requirements data.

Table 1. Special-Status Plant Species Identified as Having the Potential to Occur in the Study Area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Adobe lily *Fritillaria pluriflora*	–/–/1B.2	Inner North Coast Ranges, northern Sierra Nevada foothills, and adjacent margins of the Sacramento Valley, from Butte County to Solano County	Adobe clay soil, sometimes serpentine; foothill and valley grasslands, oak woodlands, chaparral; from 195–2,315 feet; blooms February–April	High—oak woodland, grassland, clay soils present; two occurrences within 5 miles of the study area
Adobe navarretia *Navarretia nigelliformis* ssp. *nigelliformis*	–/–/4.2	Great Valley and adjacent foothills	Vernal pools and clay flats; below 3,280 feet; blooms April–June	Moderate —seasonal wetlands present; occurrences of most CRPR 4 species not tracked in CNDDB
Ahart's dwarf rush *Juncus leiospermus* var. *ahartii*	–/–/1B.2	East edge of Sacramento Valley from Butte County to Sacramento County	Vernal pools; from 100–330 feet; blooms March–May	Low—seasonal wetlands present, but most of study area is outside of species' range; one occurrence within 1 mile of the study area
Ahart's paronychia *Paronychia ahartii*	–/–/1B.1	Northern Central Valley	Vernal swales and margins of vernal pools, on rocky soils; from 95–1,675 feet; blooms April–June	Moderate—seasonal wetlands present, but unlikely to include suitable soils; two occurrences within 3 miles of the study area
Awl-leaved navarretia *Navarretia subuligera*	–/–/4.3	Interior North Coast Ranges, northern Sierra Nevada foothills, Sacramento Valley	Rocky, mesic areas in chaparral, cismontane woodland, lower montane coniferous forest; 490–3,610 feet; blooms April–August	Moderate—chaparral, oak woodland, and foothill pine woodland present; occurrences of most CRPR 4 species not tracked in CNDDB
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 15–5,710 feet; blooms May–July	High—seasonal wetlands and clay or alkaline soils present; one occurrence within the conveyance to regulating reservoirs and one occurrence within the study area
Bent-flowered fiddleneck *Amsinckia lunaris*	–/–/1B.2	Inner North Coast Ranges, San Francisco Bay area, west-central Central Valley	Coastal bluff scrub, valley and foothill grasslands, cismontane woodlands; from 10–1,645 feet; blooms March–June	High—grassland present; two occurrences in the study area; two additional occurrences within 1 mile of the inundation area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Big-scale balsamroot *Balsamorhiza macrolepis* var. *macrolepis*	–/–/1B.2	Scattered occurrences in the Coast Ranges and Sierra Nevada foothills	Fields and rocky hillsides, grassland, foothill woodland; 150–5,100 feet; blooms March–June	Low—grassland, oak woodland, and foothill pine woodland present; no occurrences within 5 miles of the study area
Boggs Lake hedge-hyssop *Gratiola heterosepala*	–/E/1B.2	Inner North Coast Ranges, Central Sierra Nevada Foothills, Sacramento Valley and Modoc Plateau: Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano, Sonoma, and Tehama Counties; also Oregon	Clay soils in areas of shallow water, lake margins of swamps and marshes, vernal pool margins; 30–7,790 feet; blooms April–August	Low—seasonal wetland and freshwater marsh present; no occurrences within 5 miles of the study area
Bolander's horkelia *Horkelia bolanderi*	–/–/1B.2	Inner North Coast Ranges in Lake and Colusa Counties	Edges of vernally moist areas in pine forest and oak woodland; from 1,490–2,800 feet; blooms June–August	High—oak woodland and seasonal wetlands present; one occurrence within 2.5 miles of the study area
Brandegee's eriastrum *Eriastrum brandegeeae*	–/–/1B.1	Inner North Coast Ranges, disjunct to Mount Hamilton	Chaparral, oak woodland; 1,395–2,755 feet; blooms May–August	Moderate—chaparral and oak woodland present; occurrences of most CRPR 4 species not tracked in CNDDB
Brazilian watermeal *Wolffia brasiliensis*	–/–/2B.3	Known in California from a few occurrences along the Sacramento River in Butte, Glenn, Sutter, and Yuba Counties; widespread elsewhere in the U.S.	Shallow freshwater in marshes and swamps; 65–330 feet; blooms April–December	Low—freshwater marsh present; no occurrences within 5 miles of the study area
Brewer's milk-vetch *Astragalus breweri*	–/–/4.2	Central and southern North Coast Ranges, northern San Francisco Bay Area	Grasslands, on open slopes, below 2,970 feet; blooms March–June	Moderate—grassland present; occurrences of most CRPR 4 species not tracked in CNDDB
Broad-lobed linanthus *Leptosiphon latisectus*	–/–/4.3	North Coast Ranges	Open grassy areas in broadleaved evergreen forest, on slopes and roadcuts, below 4,920 feet; blooms March–June.	Low—no broadleaved evergreen forest present; occurrences of most CRPR 4 species not tracked in CNDDB

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
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; blooms April–August	High—alkali seasonal wetlands present; two occurrences within 0.5 and 2.6 miles of the study area
Butte County fritillary *Fritillaria eastwoodiae*	–/–/3.2	Sierra Nevada Foothills, from Shasta to El Dorado Counties; also Oregon	Chaparral, cismontane woodland, openings in lower montane coniferous forest, sometimes on serpentine; 165–4,920 feet; blooms March–June	Low—chaparral, oak woodland, and foothill pine forest present, no serpentine, study area is outside of species' range; no occurrences within 5 miles of the study area
Butte County meadowfoam *Limnanthes floccosa* ssp. *californica*	E/E/1B.2	Endemic to Butte County	Vernal pools and swales; 150–3,050 feet; blooms March–May	Low—seasonal wetlands present, but study area is outside of species' range; no occurrences within 5 miles of the 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; blooms March–May	High—alkali seasonal wetlands present; two occurrences within 5 miles of the study area
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	–/–/1B.1	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills	Grasslands in alkali hills; below 500 feet; blooms March–April	Moderate—grassland present, alkali hills unlikely; no occurrences within 5 miles of the study area
Cleveland's milk-vetch *Astragalus clevelandii*	–/–/4.3	Interior North Coast Ranges, High North Coast Ranges	Meadows, seeps, and streambanks, on serpentinite, at 328–4,920 feet; blooms June–September	Low—streams present, but no serpentinite; occurrences of most CRPR 4 species not tracked in CNDDB
Cobb Mountain lupine *Lupinus sericatus*	–/–/1B.2	Inner North Coast Ranges; Colusa, Lake, Napa, and Sonoma Counties	Knobcone pine-oak woodland, on open wooded slopes, in gravelly soils; 900–5,005 feet; blooms March–June	Low—no suitable knobcone pine habitat present; no occurrences within 5 miles of the study area
Colusa grass *Neostapfia colusana*	T/E/1B.1	Merced, Solano, and Yolo Counties	Deep vernal pools; from 15–655 feet; blooms May–September	Low—no deep vernal pools identified during land cover mapping; one occurrence within the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Colusa layia *Layia septentrionalis*	–/–/1B.2	Inner North Coast Ranges	Sandy or serpentine soils, in grasslands and openings in chaparral and foothill woodlands; from 50–3,610 feet; blooms April–May	Moderate—grassland, oak woodland, and chaparral present, suitable soils may not be present; two occurrences within 4 to 5 miles of the study area
Cotula navarretia *Navarretia cotulifolia*	–/–/4.2	Interior North Coast Ranges, Sacramento Valley, San Francisco Bay Area, Interior South Coast Ranges	Chaparral, woodlands, grasslands, on heavy clay soils; 15–6,000 feet; blooms May–June	Moderate—grassland, chaparral, oak woodland present, some clay soils; occurrences of most CRPR 4 species not tracked in CNDDB
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; blooms February–June	Moderate—seasonal wetland and alkaline soils present; one occurrence within 2 miles of the study area
Crownscale *Atriplex coronata* var. *cotonata*	–/–/4.2	Southern Sacramento Valley, San Joaquin Valley, Inner South Coast Ranges	Alkali grassland, alkali meadow, alkali scrub; 5–1,940 feet; blooms March–October	Moderate—alkali grassland present; occurrences of most CRPR 4 species not tracked in CNDDB
Deep-scarred cryptantha *Cryptantha excavata*	–/–/1B.1	Southern Inner North Coast Ranges	Steep sandy or gravelly slopes, streambanks, in oak woodland; from 325–1,970 feet; April–May	Moderate—oak woodland present; one historical occurrence within 4 miles of the study area
Diamond-petaled California poppy *Eschscholzia rhombipetala*	–/–/1B.1	Interior foothills of South Coast Ranges from Contra Costa County to Stanislaus County; Carrizo Plain in San Luis Obispo County; historically in Inner North Coast Range	Grassland, chenopod scrub, on clay soils, where grass cover is sparse enough to allow growth of low annuals; below 3,200 feet; blooms March–May	Moderate—grassland present and suitable soils; one historical occurrence within 4 miles of the study area
Dimorphic snapdragon *Antirrhinum subcordatum*	–/–/4.3	Inner North Coast Ranges: Colusa, Glenn, Lake, and Tehama Counties	Chaparral and lower montane coniferous forest, sometimes on serpentinite; from 605–2,625 feet; blooms April–July	High—chaparral present; one occurrence at edge of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Drymaria-like western flax *Hesperolinon drymarioides*	–/–/1B.2	Interior and high North Coast Ranges	Chaparral, McNab cypress forest, on serpentinite, from 1,300–6,560 feet; blooms May–August	Low—chaparral present, but no serpentine soils; six occurrences within 5 miles of the study area
Dwarf downingia *Downingia pusilla*	–/–/2B.2	Central Valley from Tehama County to Fresno County, northern San Francisco Bay area, southern South Coast Ranges	Vernal pools; from 45–3,640 feet; blooms March–May	Moderate—seasonal wetlands present; two occurrences within 4 miles of the study area
Dwarf soaproot *Chlorogalum pomeridianum* var. *minus*	–/–/1B.2	Widely disjunct populations in Tehama, Colusa, Lake, Sonoma, and San Luis Obispo Counties	Openings in chaparral, valley and foothill grasslands; on serpentine outcrops; from 1,000–3,300 feet; blooms May–August	Low—chaparral and grassland present, but no serpentine soils; one occurrence within 4 miles of the study area
Fairy candelabra *Androsace elongata* ssp. *acuta*	–/–/4.2	Scattered locations throughout California, but primarily in east San Francisco Bay, interior South Coast Ranges, San Joaquin Valley, and southwest California	Moss-covered rock outcrops and open areas in adjacent grassland; 490–4,280 feet; blooms March–June	Moderate—grassland and some areas of rock outcrop present; occurrences of most CRPR 4 species not tracked in CNDDB
Ferris' goldfields *Lasthenia ferrisiae*	–/–/4.2	Sacramento Valley, San Joaquin Valley	Vernal pools or wet saline flats; < 2,300 feet; blooms February–May	Moderate—seasonal wetland and potential alkali seasonal wetland present; occurrences of most CRPR 4 species not tracked in CNDDB
Ferris' milk-vetch *Astragalus tener* var. *ferrisiae*	–/–/1B.1	Sacramento Valley	Subalkali flats and flood lands, usually on adobe soil; from 5–245 feet; blooms March–June	Moderate—alkali seasonal wetlands present; one occurrence within 2 miles of the study area
Greene's tuctoria *Tuctoria greenei*	E/R/1B.1	Eastern Central Valley and foothills	Large, deep vernal pools; from 95–3,510 feet; blooms May–June	Low—no large, deep pools identified during land cover mapping; one occurrence within 3 miles of the study area
Hairy Orcutt grass *Orcuttia pilosa*	E/E/1B.1	Scattered locations along east edge of the Central Valley and adjacent foothills, from Tehama County to Merced County	Deep vernal pools; from 150–655 feet; blooms May–August	Low—no large, deep pools identified during land cover mapping; six occurrences within 1 to 4 miles of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Hall's harmonia *Harmonia hallii*	–/–/1B.2	Southern Interior North Coast Ranges	Open areas in serpentine chaparral, at 1,100–3,050 feet; blooms April–June	Low—chaparral present, but no serpentine; no occurrences within 5 miles of the 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; blooms May–October	Moderate—alkali seasonal wetlands present; five occurrences within 5 miles of the study area
Heckard's peppergrass *Lepidium latipes* var. *heckardii*	–/–/1B.2	Yolo and Solano Counties	Annual grassland, on margins of alkali scalds; from 5–655 feet; blooms April–May	Moderate—alkali seasonal wetlands present; one occurrence within 4 miles of the study area
Heller's bush mallow *Malacothamnus helleri*	–/–/4.3	Interior North Coast Ranges	Foothill woodlands, along stream banks and on gravel bars; 1,000–2,090 feet; blooms May–June	Moderate —perennial and intermittent stream and riparian woodland present; occurrences of most CRPR 4 species not tracked in CNDDB
Henderson's bent grass *Agrostis hendersonii*	–/–/3.2	Scattered locations in Central Valley and adjacent foothills	Moist places in grasslands, vernal pools; 230–1,000 feet; blooms April–May	Low —seasonal wetlands present; no occurrences within 5 miles of the study area
Hoary navarretia *Navarretia eriocephala*	–/–/4.3	Sacramento Valley, northern Sierra Nevada Foothills	Seasonally wet clay flats in grassland, oak woodland; below 1,310 feet; blooms May–June	Moderate —seasonal wetlands and oak woodland present; occurrences of most CRPR 4 species not tracked in CNDDB
Hogwallow evax *Hesperevax caulescens*	–/–/4.2	Interior 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; blooms March–June	Moderate—seasonal wetlands and areas of clay soils present; occurrences of most CRPR 4 species not tracked in CNDDB
Hoover's lomatium *Lomatium hooveri*	–/–/4.3	Interior North Coast Ranges	Serpentine chaparral and woodlands, at 980–1,970 feet; blooms April–May	Low—chaparral and woodlands present, but no serpentine; occurrences of most CRPR 4 species not tracked in CNDDB
Hoover's spurge *Euphorbia hooveri*	T/–/1B.2	Central Valley from Tehama County to Tulare County	Large, deep vernal pools; from 80–820 feet; blooms July–August	Low—no large, deep pools identified during land cover mapping; four occurrences within 2 to 48 miles of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Howell's broomrape *Aphyllon valida* ssp. *howellii*	–/–/4.3	Southern High North Coast Ranges, central and southern Interior North Coast Ranges	Chaparral, on volcanic and serpentine substrates, parasitic on *Garrya*, at 660–5,580 feet; blooms June–September	Low—chaparral present, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB
Indian Valley brodiaea *Brodiaea rosea* ssp. *rosea*	–/E/3.1	Colusa, Glenn, Lake, and Tehama Counties	Meadows and other vernally moist areas in serpentine chaparral; from 1,100–4,760 feet; blooms May–June	Low—chaparral present, but no serpentine soils; one occurrence within 4 miles of the study area
Jepson's milk-vetch *Astragalus rattanii* var. *jepsonianus*	–/–/1B.2	Scattered occurrences in the Inner North Coast Ranges, from Tehama County to Napa County	Grasslands and open grassy areas in chaparral, on serpentinite soils, from 970–2,300 feet; blooms April–June	Low—grasslands and chaparral present, but no serpentine soils; one occurrence within 4 miles of the study area
Jepson's navarretia *Navarretia jepsonii*	–/–/4.3	Inner North Coast Ranges	Serpentine grasslands, clay flats, at 490–2,620 feet; blooms April–June	Low—grasslands present, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB
Keck's checkerbloom *Sidalcea keckii*	E/–/1B.1	Southern Inner North Coast Ranges, southern Sierra Nevada foothills	Grasslands, grassy areas within blue oak woodland, on clay soils, sometimes derived from serpentinite; below 2,200 feet; blooms April–May	High—grassland and oak woodland present; one occurrence adjacent to, and one additional occurrence within 4 miles of the study area
Konocti manzanita *Arctostaphylos manzanita* ssp. *elegans*	–/–/1B.3	Klamath Ranges, North Coast Ranges	Chaparral, oak woodland, lower montane coniferous forest, on volcanic soils; from 225–6,000 feet; blooms February–May	Moderate—chaparral and blue oak woodland present; one occurrence within 3 miles of the study area
Legenere *Legenere limosa*	–/–/1B.1	Southern North Coast Ranges, southern Sacramento Valley, northern San Joaquin Valley, San Francisco Bay area	Vernal pools; below 2,885 feet; blooms May–June	Moderate—seasonal wetlands present; three occurrences within 2 to 3 miles of the study area
Little mousetail *Myosurus minimus* ssp. *apus*	–/–/3.1	Central Valley and South Coast from Butte County south to San Diego County; Baja California, Oregon	Valley and foothill grassland, alkaline vernal pools; 65–2,100 feet; blooms March–June	Low—alkali seasonal wetlands present; no occurrences within 5 miles of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Milo Baker's lupine *Lupinus milo-bakeri*	–/T/1B	North Coast Ranges: Colusa and Mendocino County	Along streams, ditches, and roads, in foothill woodlands and grasslands; 1,300–1,410 feet; blooms June–September	Low—streams and roads in woodlands and grasslands present; no occurrences within 5 miles of the study area
Palmate-bracted bird's-beak *Chloropyron palmatum*	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa to Fresno County	Alkali grasslands, chenopod scrub; from 15–510 feet; blooms May–October	Moderate—alkali seasonal wetlands present; three occurrences within 1 to 4 miles of the study area
Pappose tarplant *Centromadia parryi* ssp. *parryi*	–/–/1B.2	Northern San Francisco Bay Area, North Coast Ranges, Sacramento Valley	Coastal prairie, meadows, seeps, coastal salt marsh, annual grassland, below 1,380 feet; blooms July–October.	Low—grassland and alkaline conditions present; no occurrences within 5 miles of the study area
Parry's red tarplant *Centromadia parryi* ssp. *rudis*	–/–/4.2	Inner North Coast Ranges, Sacramento Valley, northern San Joaquin Valley	Alkali meadow and grasslands; 0–330 feet; blooms June–October	Moderate — grasslands present; occurrences of most CRPR 4 species not tracked in CNDDB
Pink creamsacs *Castilleja rubicundula* ssp. *rubicundula*	–/–/1B.2	Foothills of northern Sacramento Valley	Grassland and grassy areas in chaparral and oak woodland, often on serpentinite, from 65–2,985 feet; blooms April–June	Moderate—chaparral, oak woodland, and grasslands present, but no serpentine soils present; two occurrences within 1 to 4 miles of the study area
Porter's navarretia *Navarretia paradoxinota*	–/–/1B.3	Interior North Coast Ranges	Swales and dry streambeds, in serpentine chaparral; 570–2,870 feet; blooms May–July	Low—ephemeral and intermittent streams and chaparral present, but no serpentine soils present; no occurrences within 5 miles of the study area
Purdy's fritillary *Fritillaria purdyi*	–/–/4.3	Northwestern California	Open areas in serpentine chaparral, woodlands, at 1,310–6,890 feet; blooms March–June	Low —chaparral and woodlands present, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Purdy's onion *Allium fimbriatum* var. *purdyi*	–/–/4.3	Central Interior North Coast Ranges	Serpentine outcrops, at 980–1,970 feet; blooms April–June	Low —some outcrops present, but no serpentine; occurrences of most CRPR 4 species not tracked in CNDDB
Rattan's milk-vetch *Astragalus rattanii* var. *rattanii*	–/–/4.3	Northern and central North Coast Ranges	Riverbanks, sandbars, at 160–4,920 feet; blooms April–July	Moderate—streams with sandbars present; occurrences of most CRPR 4 species not tracked in CNDDB
Recurved larkspur *Delphinium recurvatum*	–/–/1B.2	San Joaquin Valley and interior valleys of the South Coast Ranges, from Contra Costa County to Kern County	Subalkaline soils in annual grassland, saltbush scrub; 10–2,590 feet; blooms March–May	Low—alkaline grassland present; no occurrences within 5 miles of the study area
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*	–/–/1B.1	Inner North Coast Ranges, Cascade Range foothills, Modoc Plateau, Sacramento Valley, northern Sierra Nevada foothills	Vernally mesic sites in chaparral, valley and foothill grassland, cismontane woodlands; from 110–3,315 feet; blooms April–June	Moderate—seasonal wetlands present in parts of the study area, two occurrences within 1 to 2 miles of the study area
Red-flowered bird's-foot trefoil *Acmispon rubriflorus*	–/–/1B.1	Inner North Coast Ranges (Colusa, Tehama Counties), Inner South Coast Ranges (Stanislaus County)	Open, grassy areas in oak woodland; from 640–1,605 feet; blooms April–May	High—oak savanna and oak woodland present; one occurrence adjacent to and one occurrence less than 1 mile from the study area
Red Mountain catchfly *Silene campanula* ssp. *campanula*	C/E/1B	North Coast Ranges: Mendocino and Colusa County	On rocky slopes in Jeffrey pine forest and mixed chaparral; soils derived from ultramafic substrates; 1,400–6,840 feet; blooms April–July	Low—chaparral is present, but suitable soils are not likely present; no occurrences within 5 miles of the study area
Redding checkbloom *Sidalcea celata*	–/–/3	Shasta, Siskiyou, and Tehama Counties	Cismontane woodland, sometimes on serpentinite; 445–5,005 feet; blooms April–August	Low—oak woodland present, but study area is outside of species' range; no occurrences within 5 miles of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
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 3–2,740 feet; blooms April–September	Moderate—alkali seasonal wetland present; one occurrence in the study area and three occurrences within 2 to 3 miles of the study area
Sanford's arrowhead *Sagittaria sanfordii*	–/–/1B.2	Scattered locations in Central Valley and Coast Ranges	Freshwater marsh, sloughs, canals, and other slow-moving water habitats; 0–2,135 feet; blooms May–October (November)	Low—freshwater marsh, canals, and ditches present; no occurrences within 5 miles of the study area
Serpentine collomia *Collomia diversifolia*	–/–/4.3	Inner and High North Coast Ranges, northeastern San Francisco Bay Area	Open, rocky to gravelly areas in serpentine chaparral, at 200–2,950 feet; blooms April–July	Low—chaparral present, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB
Serpentine cryptantha *Cryptantha dissita*	–/–/1B.2	Colusa, Lake, Mendocino, Napa, Shasta, Siskiyou, and Sonoma Counties	Chaparral, on serpentinite; 1,295–1,905 feet; blooms April–June	Low—chaparral present, but no serpentine soils; no occurrences within 5 miles of the study area
Serpentine milkweed *Asclepias solanoana*	–/–/4.2	Klamath Ranges, North Coast Ranges	Serpentine outcrops, at 2,300–5,250 feet; blooms June	Low—outcrops present, but no serpentine; occurrences of most CRPR 4 species not tracked in CNDDB
Serpentine sunflower *Helianthus exilus*	–/–/4.2	Klamath Ranges, North Coast Ranges	On streambanks, in gravelly serpentine soils, at 980–4,270 feet; blooms June–October	Low—streams present, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB
Shield-bracted monkeyflower *Erythranthe glaucescens*	–/–/4.3	Southern Cascade Range foothills, northern Sierra Nevada foothills	Serpentine seeps in valley and foothill grassland, chaparral, cismontane woodland, lower montane coniferous forest; 200–4,070 feet; blooms February–August	Low—grassland, chaparral, oak woodland, and foothill pine forest present, potentially with seeps, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Shining navarretia *Navarretia nigelliformis* ssp. *radians*	–/–/1B.2	Foothills of the Inner South Coast Ranges from Merced County to San Luis Obispo County	Mesic areas with heavy clay soils, in swales and clay flats; in oak woodland, grassland; from 650–3,300 feet; blooms May–June	High—grassland and oak woodland with clay soils present; one occurrence in the study area
Sickle-fruited jewelflower *Streptanthus drepanoides*	–/–/4.3	Southernmost Klamath Ranges, high North Coast Ranges, northern interior North Coast Ranges, northern Sierra Nevada Foothills	Chaparral, cismontane woodland, lower montane coniferous forest, on serpentine; 900–5,450 feet; blooms April–June	Low—chaparral, oak woodland, and foothill pine forest present, but no serpentine soils; occurrences of most CRPR 4 species not tracked in CNDDB
Silky cryptantha *Cryptantha crinita*	–/–/1B.2	Cascade Range: Shasta, Tehama and Glenn Counties	Gravel bars and streambanks, within foothill woodlands; from 295–3,675 feet; blooms March–June	Low—gravelly streams present, but most of study area is outside of the species' range; one occurrence within 3 miles of the study area
Slender Orcutt grass *Orcuttia tenuis*	T/E/1B.1	Sierra Nevada and Cascade Range foothills, from Siskiyou County to Sacramento County	Vernal pools, from 100–5,690 m; blooms May–July	Low—seasonal wetlands present; no occurrences within 5 miles of the study area
Small spikerush *Elocharis parvula*	–/–/4.3	North Coast, San Francisco Bay Area, South Coast	Coastal brackish wetlands, below 160 feet; blooms late winter–fall	Low—seasonal wetlands present, some alkaline, but suitable brackish wetland habitat is unlikely; occurrences of most CRPR 4 species not tracked in CNDDB
Snow Mountain buckwheat *Eriogonum nervulosum*	–/–/1B.2	North Coast Ranges, from Colusa to Napa County	Chaparral, serpentine outcrops and barrens; from 1,460–6,900 feet; blooms June–September	Low—chaparral and some rock outcrops present, but no serpentine habitat present; one occurrence within 5 miles of the study area
Stony Creek spurge *Euphorbia ocellata* ssp. *rattanii*	–/–/1B.2	Inner North Coast Ranges in Glenn and Tehama Counties	Sandy or rocky soils, along streambeds or on shale slopes, in chaparral, riparian scrub, or grasslands; from 260–1,900 feet; blooms May–September	Low—grassland, chaparral, and riparian habitat present; no occurrences within 5 miles of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Sylvan microseris *Microseris sylvatica*	–/–/4.2	Scattered locations in California, primarily in the Interior North Coast Ranges, eastern San Francisco Bay, Interior South Coast Ranges, Sierra Nevada Foothills, and Tehachapi mountains	Grassland, oak woodland, open grassy areas in chaparral; below 5,580 feet; blooms April–May	Moderate—chaparral, oak savanna, and oak woodland present; occurrences of most List 4 species not tracked in CNDDB
Tehama navarretia *Navarretia heterandra*	–/–/4.3	Interior North Coast Ranges, Cascade Range foothills, western Sacramento Valley, east San Francisco Bay Area, interior South Coast Ranges, Modoc Plateau	Mesic areas in valley and foothill grasslands, vernal pools; 100–3,320 feet; blooms April–June	Moderate—grasslands and seasonal wetlands present; occurrences of most CRPR 4 species not tracked in CNDDB
Three-fingered morning-glory *Calystegia collina* ssp. *tridactylosa*	–/–/1B.2	Colusa, Lake, and Mendocino Counties	Chaparral and cismontane woodland on serpentinite, rocky, gravelly openings; 0–1,970 feet; blooms April–June	Low—chaparral and oak woodland present, but no serpentinite; no occurrences within 5 miles of the study area
Tracy's clarkia *Clarkia gracilis* ssp. *tracyi*	–/–/4.2	Interior North Coast Ranges	Serpentine chaparral, McNab cypress forest, open areas of meadow or streambanks, at 330–1,640 feet; blooms May–July	Low—grassland and streams present, but no serpentine; occurrences of most CRPR 4 species not tracked in CNDDB
Tracy's eriastrum *Eriastrum tracyi*	–/–/3.2	Inner North Coast Ranges, disjunct to Mount Hamilton	Grassland, open areas in chaparral or oak woodland, on gravelly shale or clay; from 1,030–7,880 feet; blooms June–July	Moderate—grassland, chaparral, and oak woodland, clay soils present; no occurrences within 5 miles of the study area
Tripod eriogonum *Eriogonum tripodum*	–/–/4.2	Interior North Coast Ranges, northern and central Sierra Nevada foothills	Gravelly slopes and flats, often on serpentine, in chaparral, cismontane woodland; 655–5,250 feet	Low—chaparral and oak woodland present, but no serpentine; occurrences of most CRPR 4 species not tracked in CNDDB
Vernal pool smallscale *Atriplex persistens*	–/–/1B.2	Central Valley, from Glenn County to Tulare County	Dry beds of vernal pools, on alkaline soils; from 30–375 feet; blooms June–October	Moderate—alkali seasonal wetlands present; 12 occurrences within 1 to 4 miles of the study area
Water star-grass *Heteranthera dubia*	–/–/2B.2	Scattered locations in northern California	Slow-moving water; below 4,920 feet; blooms July–August	Moderate—streams and ponds present; one occurrence within 5 miles of the study area

Common and Scientific Names	Status[a] Federal/State/ California Rare Plant Rank	Distribution	Habitat Requirements and Blooming Period	Potential for Occurrence[b, c]
Watershield *Brasenia schreberi*	–/–/2B.3	Scattered occurrences in north and central California	Ponds, lake margins, freshwater marshes; 0–7,220 feet; blooms June–September	Low—freshwater marsh and ponds present; no occurrences within 5 miles of the study area
Woolly meadowfoam *Limnanthes floccosa* ssp. *floccosa*	–/–/4.2	Klamath Ranges, Interior North Coast Ranges, Cascade Ranges	Vernal pools and swales; 200–4,380 feet; blooms March–May (June)	Low—vernal pools likely present; no occurrences within 5 miles of the 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; blooms August–September	Low—freshwater marsh habitat present; no occurrences within 5 miles of the study area
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	–/–/2B.1	Scattered locations in the Central Valley and Southern Coast; Texas	On alkaline soils in floodplains, meadows and seeps, marshes and swamps, riparian forest, vernal pools; 15–1,425 feet; blooms May–September	Low—alkali seasonal wetlands and riparian forest present; no occurrences within 5 miles of the study area

Table sources: Unless otherwise referenced above, information was found online from the California Department of Fish and Wildlife 2021 and California Native Plant Society 2020

[a] Status Explanations:

Federal:

– = not listed under the federal Endangered Species Act

C = candidate for listing 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

State:

– = not listed under the California Endangered Species Act

R = listed as rare under the Native Plant Protection Act

E = listed as endangered under the California Endangered Species Act

T = listed as threatened under the California Endangered Species Act

California Rare Plant Rank:

1A = presumed extinct in California

1B = rare, threatened, or endangered in California and elsewhere

2B = rare, threatened, or endangered in California, but more common elsewhere

3 = more information is needed to determine whether assigning a rank is appropriate

4 = plants of limited distribution that are on a watch list

0.1 = seriously endangered in California

0.2 = fairly endangered in California

0.3 = not very endangered in California

[b] Includes all California Natural Diversity Database occurrences within 5 miles of the study area.

[c] Potential for Occurrence in Study Area

High: Known occurrence in the project region or in project area from CNDDB or other documents; suitable habitat and microhabitat conditions are present.

Moderate: Known occurrence in the project region from CNDDB or other documents; suitable habitat is present but suitable microhabitat conditions (generally soil type and/or hydrology) are not present.

Low: Known occurrence or not in the project region from CNDDB or other documents; suitable habitat and microhabitat conditions are unlikely to be present.

Table 2. Special-Status Wildlife Species Identified as Having the Potential to Occur in the Study Area

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Conservancy fairy shrimp	*Branchinecta conservatio*	E/–	Disjunct occurrences in Tehama, Butte, Glenn, Yolo, Solano, Stanislaus, Merced, and Ventura Counties. Large, deep vernal pools with moderately turbid water in annual grasslands; generally, the pools last until June.	Low to moderate. Large vernal pools may be present in the study area. Known occurrence at Sacramento National Wildlife Refuge, approximately 1.5 miles from the study area (California Department of Fish and Wildlife 2021).
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.	Moderate. Vernal pools and other seasonal wetlands present in the study area. Several known occurrences at Sacramento National Wildlife Refuge, approximately 2.75–3.75 miles from the study area (California Department of Fish and Wildlife 2021).
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.	Moderate. Vernal pools and other seasonal wetlands present in the study area. Several known occurrences at Sacramento National Wildlife Refuge, approximately 1.25–3 miles from the study area (California Department of Fish and Wildlife 2021).
Antioch Dunes anthicid beetle	*Anthicus antiochensis*	–/–	Population in Antioch Dunes believed extinct. Present in several localities along the Sacramento River in Glenn, Tehama, Shasta, and Solano Counties, and the Feather River at Nicolas in Sutter County. Loose sand on sand bars and sand dunes (interior), unvegetated sand.	Moderate. Associated with the Sacramento River. Non-specific occurrence from 1989, presumably along the section of the Sacramento River that overlaps the operations study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Sacramento anthicid beetle	*Anthicus sacramento*	–/–	Dune areas at mouth of Sacramento River; western tip of Grand Island, Sacramento County; upper Putah Creek and dunes near Rio Vista, Solano County; Ord Ferry Bridge, Butte County; San Joaquin River from Shasta to San Joaquin Counties; Feather River at Nicolaus. Found in sand slip-faces among willows; associated with riparian and other aquatic habitats, vegetated sand.	Low. Associated with the Sacramento River. Several records for occurrences along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021). No work near Sacramento River.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T/–	Central Valley from Tehama County south to Fresno County; most beetles have been 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.	High. Suitable habitat (elderberry shrubs) present in the study area. Numerous records for occurrences along the Sacramento River within the operations study area (California Department of Fish and Wildlife 2021).
Wilbur Springs minute moss beetle	*Ochthebius recticulus*	–/–	Sulfur Creek, Colusa County Matted vegetation and decaying moss along stream shores and swampy areas.	Low. Study area is outside of species' known range. One geographically non-specific known occurrence (from before 1980) approximately 4.5 miles southeast of the southern extent of the study area (California Department of Fish and Wildlife 2021).
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.	Moderate. Adults may breed and migrate through study area. Caterpillar host plants may be present in annual grassland. No known occurrences reported in the CNDDB (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Blennosperma vernal pool andrenid bee	*Andrena blennospermatis*	–/–	Tehama, Placer, El Dorado, Sacramento, Yolo, Lake, Sonoma, Solano, San Joaquin, and Contra Costa Counties Upland areas near vernal pools.	Low. Suitable habitat may be present surrounding vernal pools. Most of species' known range is outside of study area. No known occurrences in Colusa or Glenn Counties; only two known occurrences in Tehama County, one of which is approximately 3.75 miles northeast of the RBPP (California Department of Fish and Wildlife 2021).
Crotch bumble bee	*Bombus crotchii*	–/CE	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.*	Low to moderate. Suitable habitat in the study area; presence of food plants unknown. One geographically non-specific historical (1956) occurrence within 2 miles of the RBPP (California Department of Fish and Wildlife 2021).
Western bumble bee	*Bombus occidentalis*	–/CE	Historically occurred throughout much of northern California but currently appears to be absent from much of this area. Current known locations are high elevation sites in northern California and a few sites on the northern California coast. Nests underground in squirrel burrows, in mouse nests, and in open west-southwest facing slopes bordered by trees. Visits a wide variety of wildflowers; plant taxa it is most commonly associated with are *Asteraceae*, *Ceanothus*, *Centaurea*, *Chrysothamnus*, *Cirsium*, *Eriogonum*, *Geranium*, *Grindelia*, *Lupinus*, *Melilotus*, *Monardella*, *Rubus*, *Penstemon*, *Solidago*, and *Trifolium.*	Low to moderate. Suitable habitat in the study area; presence of food plants unknown. No known occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
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 adults and juveniles for summer dormancy.	Low to none. Most of the study area is outside of the species' known range. There are no known occurrences in Glenn or Colusa Counties. While there are known extant locations west of Dunnigan within 3–4 miles of the Dunnigan Pipeline (California Department of Fish and Wildlife 2021), no suitable aquatic or upland habitat is present in the Dunnigan Pipeline portion of the study area.
Western spadefoot toad	*Spea hammondii*	–/SSC	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California to western Baja California. Shallow streams with riffles and seasonal wetlands, such as vernal and seasonal pools in annual grasslands and oak woodlands; spends most of its life in burrows.	Low to moderate. Potentially suitable habitat is present in the inundation area. Five known occurrences that are 3–5 miles from the Dunnigan Pipeline (California Department of Fish and Wildlife 2021) but no suitable aquatic or upland habitat is present in the Dunnigan Pipeline portion of the study area.
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.	Low to moderate. Suitable aquatic and upland habitats are present generally west of Funks Reservoir. There are no records for occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Foothill yellow-legged frog (northwest/North Coast clade)	*Rana boylii*	–/SSC	Occurs in the Klamath, Cascade, North Coast, South Coast, Transverse, and Sierra Nevada Ranges up to approximately 6,000 feet. Creeks or rivers in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge. Usually found by riffles with rocks and on sunny banks nearby.	Low. The western portion of the study area is just outside the species' known range. All known occurrences in Glenn and Colusa Counties are at or above 750 feet elevation and the study area is at or below 500 feet elevation. Historical locations along the Sacramento River are extirpated. The nearest known occurrence is 6 miles from the study area (California Department of Fish and Wildlife 2021).
Western pond turtle	*Actinemys marmorata*	–/SSC	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada. Occurs in woodlands, grasslands, and open forests. Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms. Aquatic habitat contains watercress, cattails, water lilies, or other aquatic vegetation. Overwintering habitat consists of mud in stream and pond bottoms or a variety of upland habitats including riparian habitat for basking.	High. Suitable aquatic and upland habitats are present in the study area. Two known occurrences approximately 4 miles northeast of RBPP and 3 miles east at the Sacramento National Wildlife Refuge; several records for occurrences along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Giant gartersnake	*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.	High. Suitable aquatic and upland habitats are present in the study area. Four records for occurrences within the study area. Numerous records for occurrences at Sacramento National Wildlife Refuge and other areas east of the inundation area, as well as around the east end of the Dunnigan Pipeline (California Department of Fish and Wildlife 2021).
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.	High. Suitable nesting and foraging habitats are present in the study area. There are no CNDDB occurrences reported within 5 miles of the study area, but there are numerous eBird observations of northern harrier in the study area (Cornell Lab of Ornithology 2021) and northern harrier was observed by an ICF biologist near Funks Reservoir during January 2021 focused bird surveys for geotechnical boring investigation locations.

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Golden eagle	*Aquila chrysaetos*	–/FP	Occurs in foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as the Central Valley; ranges from sea level to around 11,500 feet. Rolling foothills, mountain ranges, sage-juniper flats, and desert. Nests on cliffs and escarpments or in tall trees overlooking open country. Forages in annual grassland, chaparral, and oak woodland with plentiful medium- and large-sized mammals.	High. Suitable nesting and foraging habitats are present in the study area. There are no CNDDB occurrences reported within 5 miles of the study area but there are numerous eBird observations of individuals in the study area (Cornell Lab of Ornithology 2021).
Bald eagle	*Haliaeetus leucocephalus*	–/E	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, east of the Sierra Nevada south of Mono County, and some rangelands and coastal wetlands.	High. Suitable nesting and foraging habitats are present in the study area. One known occurrence at Sacramento National Wildlife Refuge, approximately 1.5 miles from the study area (California Department of Fish and Wildlife 2021). Several bald eagles observed by an ICF biologist at Funks Reservoir during January 2021 focused bird surveys for geotechnical boring investigation locations.
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 in the operations study area and other locations within the study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
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. One record for a nest site approximately 2.5 miles south of the RBPP and one record for a nest site approximately 3 miles east of the southern end of the inundation area (California Department of Fish and Wildlife 2021).
Mountain plover	*Charadrius montanus*	–/SSC	Does not breed in California; in winter, found in the Central Valley from Colusa County south, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties; parts of Imperial, Riverside, Kern, and Los Angeles Counties. Occupies open plains or rolling hills with short grasses or very sparse vegetation; nearby bodies of water are not needed; may use newly plowed or sprouting grain fields.	Moderate. Suitable winter foraging habitat in the study area. Three records for occurrences of flocks observed during the winter within 5 miles of the Dunnigan Pipeline portion of the study area (California Department of Fish and Wildlife 2021).
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.	Low. Portions of the Sacramento River in the operations study area provide suitable habitat. Numerous records for occurrences along the Sacramento River within the operations study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Western 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.	High. Suitable nesting and foraging habitats are present in the study area. Twelve records for occurrences within 5 miles of the study area and one reported occurrence in the study area (California Department of Fish and Wildlife 2021).
Northern spotted owl	*Strix occidentalis caurina*	T/T	A permanent resident throughout its range; found in the North Coast, Klamath, and western Cascade Range from Del Norte County to Marin County. Dense old-growth or mature forests dominated by conifers with topped trees or oaks available for nesting crevices.	Low to none. Study area is outside of species' known range. No dense old growth or mature conifer forest in study area.

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
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 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.	High. Portions of the Sacramento River in the operations study area provide suitable habitat. Numerous records for occurrences along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021).
Least Bell's vireo	*Vireo bellii pusillus*	E/E	Small populations remain in southern Inyo, southern San Bernardino, Riverside, San Diego, Orange, Los Angeles, Ventura, and Santa Barbara Counties. Found at the San Joaquin River National Wildlife Refuge (San Joaquin and Stanislaus Counties) in 2005. Riparian thickets/dense willows with a well-developed understory either near water or in dry portions of river bottoms; nests along margins of bushes and forages low to the ground; may also be found using mesquite and arrow weed in desert canyons.	Low. Portions of the Sacramento River in the operations study area provide suitable habitat, but the study area is outside of the species' known range and the historical occurrence along the Sacramento River is considered extirpated (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Yellow-breasted chat	*Icteria virens*	–/SSC	Summer resident and migrant in coastal California and Sierra Nevada foothills, east of the Cascade Range in northern California, along the Colorado River, and very locally inland in southern California; numerous in northwestern region of the state. Nests in dense riparian habitats with a well-developed shrub layer and an open canopy, dominated by willows, alders, Oregon ash, tall weeds, blackberry vines, and grapevines.	Moderate. Suitable nesting habitat in the study area. One known occurrence from 1977 that is approximately 4.75 miles southeast of RBPP (California Department of Fish and Wildlife 2021). Several observations recorded in eBird at Sacramento National Wildlife Refuge and in the vicinity of Lodoga Stonyford Road (Cornell Lab of Ornithology 2021).
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 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.	High. Suitable nesting and foraging habitat present in the study area. More than 20 known occurrences within 5 miles of the study area, and two reported occurrences in the study area east of the GCID system improvements area and east of the inundation area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
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.	Moderate. Suitable nesting habitat in the study area. One known occurrence from 1977 that is approximately 3.7 miles southeast of RBPP (California Department of Fish and Wildlife 2021); several observations recorded in eBird within the last few years (Cornell Lab of Ornithology 2021).
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.	Moderate. Suitable nesting habitat in the study area. Records for occurrences along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021).
Western mastiff bat	*Eumops perotis californicus*	–/SSC	Occurs along the western Sierra Nevada primarily at low- to mid-elevations and widely distributed throughout the southern coast ranges; has been detected north to the Oregon border. Broadly distributed in southern California, from the Colorado River to the coast; found along many of the Sierra Nevada river drainages, particularly in the central and southern Sierra Nevada. Uses a wide variety of habitats from desert scrub to montane conifer; roosts and breeds in deep, narrow rock crevices; may also use crevices in trees, buildings, and tunnels Forages in a variety of habitats.	Low. Could migrate through or occasionally occur in the study area but is not anticipated to reside in the study area. One known occurrence from 1994 is approximately 4 miles east of the RBPP (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
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 a variety of land cover types in the study area; most of study area provides suitable foraging habitat. One known occurrence from 1999 within 0.25 mile of RBPP and two occurrences that are approximately 3.5 miles east 4 miles north of the RBPP (California Department of Fish and Wildlife 2021).
Townsend's big-eared bat	*Corynorhinus townsendii*	–/SSC	Occurs throughout California, with the exception of the highest elevations in the Sierra Nevada range. Associated with inland deserts; cool, moist coastal redwood forests; oak woodlands of the coastal ranges and Sierra Nevada foothills; and lower to mid-elevation mixed coniferous-deciduous forests. Roosts primarily in abandoned mines and natural caves, but also roosts in human-made structures and hollow trees.	Moderate. There are no known occurrences reported within 5 miles of the study area, but the species could roost in buildings and other structures in the study area.

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Silver-haired bat	*Lasionycteris noctivagans*	–/–	Occurs throughout portions of California, primarily in the coastal and montane forests from the Oregon border south along the coast to San Francisco Bay, and along the Sierra Nevada and Great Basin region to Inyo County. Has also been recorded in Monterey, Sacramento, Stanislaus, Ventura, and Yolo Counties and during migration may be found throughout the state. Associated with coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark and occasionally under wood piles, in leaf litter, under foundations, and in buildings and mines.	Low to moderate. Could migrate through or occasionally occur in the study area but is not anticipated to reside in the study area. One known occurrence from 1999 within 0.25 mile of RBPP (California Department of Fish and Wildlife 2021).
Western red bat	*Lasiurus blossevillii*	–/SSC	Occurs throughout most of California; associated with forests and woodlands and 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.	Moderate to high. Could roost in a variety of land cover types in the study area; most of study area provides suitable foraging habitat. One known occurrence from 1999 within 0.25 mile of RBPP and one occurrence from 1999 that is approximately 3.5 miles east of RBPP (California Department of Fish and Wildlife 2021).
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 a variety of land cover types in the study area; most of study area provides suitable foraging habitat. Two known occurrences from 1999 that are approximately 0.25 mile and 3.5 miles from the RBPP (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Long-eared myotis	*Myotis evotis*	–/–	Occurs throughout most of California but is thought to avoid the Central Valley and hot deserts. Associated with woodland, forest, and brush habitats, coniferous woodlands and forests seem to be preferred. Roosts under exfoliating tree bark, on the ground, and in hollow trees, tree snags, buildings, bridges, caves, mines, cliff crevices, sinkholes, and rocky outcrops.	Low to moderate. Could migrate through or occasionally occur in the study area but is not anticipated to reside in the study area. One known occurrence from 1999 that is approximately 3.5 miles east of the RBPP (California Department of Fish and Wildlife 2021).
San Joaquin pocket mouse	*Perognathus inornatus inoratus*	–/–	Occurs throughout the San Joaquin Valley and part of the Sacramento Valley. Favors grasslands, savanna, and desert scrub habitats with fine textured soils.	Low. Suitable habitat is present, but study area is on the edge of the subspecies' known range. Two historical (1912 and 1929) occurrences within the inundation area (California Department of Fish and Wildlife 2021).
American badger	*Taxidea taxus*	–/SSC	Throughout California, except for the humid coastal forests of northwestern California in Del Norte and northwestern Humboldt Counties. Occurs in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, and mountain meadows near timberline. Requires sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	Low to moderate. Suitable habitat in the study area. No known occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2021).

Common Name	Scientific Name	Status[a] Federal/State	Range and General Habitat Description	Potential for Occurrence
Ringtail	*Bassariscus astutus*	–/FP	Little information on distribution and abundance. Apparently occurs throughout the state; usually found at elevations from sea level to about 500 feet. Occurs primarily in riparian habitats but may also be found in chaparral, chaparral interspersed with evergreen woodland, oak woodland, and other scrub types with scattered boulder and/or rock outcrops. In the Central Valley, has been found in remnant stands of riparian forests bordering waterways and not associated with valley oak woodland.	Low. No known occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2021). May occur along the Sacramento River but is not anticipated to be present in other portions of the study area.

Table sources: California Department of Fish and Wildlife 2021, U.S. Fish and Wildlife Service 2021, Cornell Lab of Ornithology 2021.

[a] 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

Special-Status Plants

Seventy-three special-status plant species occur in or within 10 miles of the study area, based on previous surveys of the study area (references) and searches of the CNDDB (CDFW, 2021) and Inventory of Rare and Endangered Plants (California Native Plant Society, 2020) (Table 1). Previous surveys of the Sites reservoir study area found very limited occurrences of special-status plants (DWR, 2000a; Authority and Reclamation, 2021); however, some species were not fully mapped or were not recognized as having special status at the time of the surveys. Forty species are not expected to occur in the study area because potential habitat is not present (i.e., no serpentine soils, no chaparral or oak woodland). Twelve species have a low potential to occur because potential habitat is present, but no occurrences are known within 5 miles of the study area. Eleven species would have a moderate potential to occur because potential habitat is present and there are occurrences within 5 miles of the study area. Ten species have a high potential to occur because potential habitat is present and there are documented occurrences within the vicinity of the study area.

Table 1 lists the plant species identified from the sources cited above, their status, distribution and habitat requirements, and their potential to occur in the study area. The determinations provided below take into consideration the likelihood of the species to occur in the general project vicinity, the proximity of potentially suitable habitat adjacent to bore locations and geophysical work areas, and the potential for them to be affected by these activities. Many of these species, in particular those that occur in wetlands, are unlikely to occur in the immediate geotechnical and geophysical work areas because of the Environmental Commitments developed for the Project, which are defined in Appendix A of the EA/IS. Specifically, implementing Environmental Commitment 16 (Special-status Plant Species) would establish exclusion zones from which project activities would be excluded.

Additional information is provided in *Special-Status Plants,* for federally-listed plants and for other special-status plants with high potential to be affected by the Proposed Action.

Federally-listed Plants

Keck's Checkerbloom

Keck's checkerbloom (*Sidalcea keckii*) is federally-listed as endangered (65 FR 7764, February 16, 2000). It has no state listing status. The species was thought to be restricted to three sites in Fresno and Tulare counties at the time of its listing, and critical habitat for the species is located in those counties (68 FR 12875-12880, March 18, 2003). Subsequent taxonomic studies have concluded that the species also occurs in the southern inner North Coast Ranges in Colusa, Napa, Solano, and Yolo counties (Hill 2015). There are 16 occurrences reported in the CNDDB (CDFW, 2021). Keck's checkerbloom grows in grasslands and on grassy slopes in blue oak woodland, generally on clay soils, and sometimes on soils derived from serpentinite (CDFW, 2021). Grasslands in the study area are potential habitats for this species.

Botanical surveys of the Sites Reservoir study area were conducted before Keck's checkerbloom was listed and before it was recognized to occur in northern California. Consequently, these surveys identified all checkerbloom plants in the area as fringed checkerbloom (*Sidalcea diploscypha*) (DWR, 2000), a common species that is similar in appearance to Keck's checkerbloom, so that any potential occurrences of Keck's checkerbloom in the survey area were not mapped. Three occurrences of Keck's checkerbloom are known from the project vicinity; the closest occurrence to any of the geotechnical sites is three to four miles west of the Bridge Pier and Saddle Dam LaGrande test sites.

Palmate-bracted Bird's-beak

Palmate-bracted bird's-beak (*Chloropyron palmatum*) is federally listed as endangered (51 FR 23769, July 1, 1986). It is also state-listed as endangered. No critical habitat has been designated for this species. The species is known from twenty-five occurrences, eight of which are extirpated or possibly extirpated (CDFW, 2021). These occurrences are present at widely separated locations in the Central Valley, ranging from Glenn County to Fresno County. Habitat for the species is iodine bush scrub and alkaline meadow.

Palmate-bracted bird's-beak was not found in the Sites Reservoir study area (DWR, 2000), although ten occurrences are present in the project vicinity within 10 miles (CDFW, 2021). None of the geotechnical work areas are located within iodine bush scrub or alkaline meadow.

Colusa Grass

Colusa grass (*Neostapfia colusana*) is federally-listed as threatened (62 FR 14338, March 26, 1997). It is also state-listed as endangered. Critical habitat for the species was designated in 2006 (71 FR 7248-7257, February 10, 2006). The species is known from 64 occurrences in the Central Valley, ranging from Glenn County to Merced County (CNDDB 2019). Habitat for the species consists of large, deep vernal pools.

Colusa grass was not found in the Sites Reservoir study area (DWR, 2000), and no habitat for the species was observed. One occurrence in the project vicinity is located within five miles of the pipeline Geotech survey sites, but this occurrence is regarded as extirpated (CDFW, 2021). None of the geotechnical work areas are located within vernal pools.

Greene's tuctoria

Greene's tuctoria (*Tuctoria greenei*) is federally-listed as endangered ((62 FR 14338, March 26, 1997). It is also state-listed as rare. Critical habitat for the species was designated in 2006 (71 FR 7301-7313, February 10, 2006). The species is known from 50 occurrences on the Modoc Plateau and in the Central Valley, ranging from Modoc County to Tulare County (CDFW, 2021). Habitat for the species consists of large, deep vernal pools.

Greene's tuctoria was not found in the Sites Reservoir study area (DWR, 2000), and no habitat for the species was observed. One occurrence in the project vicinity is located within ten miles of the pipeline Geotech survey sites, but this occurrence is regarded as possibly extirpated (CDFW, 2021). None of the geotechnical work areas are located within vernal pools.

Hairy Orcutt Grass

Hairy Orcutt grass (*Orcuttia pilosa*) is federally-listed as endangered (62 FR 14338, March 26, 1997). It is also state-listed as endangered. Critical habitat for the species was designated in 2006 (71 FR 7269-7278, February 10, 2006). The species is known from 35 occurrences in the Central Valley, ranging from Tehama County to Madera County (CDFW, 2021). Habitat for the species consists of large, deep vernal pools.

Hairy Orcutt grass was not found in the Sites Reservoir study area (DWR, 2000), and no habitat for the species was observed. Five occurrences in the project vicinity are located within five miles of the study area and one other occurrence within ten miles (CDFW, 2021). None of the geotechnical work areas are located within vernal pools.

Other Special-status Plants

Other special-status plants that not federally listed but are rare and may face some degree of threat. The following species have a high potential to occur in the study area because there are habitats present that may be suitable for the species and because they are known to occur within or near the study area.

Adobe Navarretia

Adobe navarretia (*Navarretia nigelliformis* subsp. *nigelliformis*) has no federal or state listing status but has a California Rare Plant Rank of 4.2. It is known from scattered populations in the South Coast Ranges, Sierra Nevada Foothills, Sacramento Valley, and interior North Coast Ranges. Habitat for the species

includes clay flats and vernal pools on clay soils. Grasslands in the study area are potential habitat for this species.

Adobe Navarretia was recorded on the Sites Reservoir study area species list, but because it was not recognized as a special-status species at the time of the surveys, it was not mapped (DWR, 2000). However, it was collected at multiple locations within the Sites Reservoir study area, including the vicinities of Antelope Valley, Sites, Grapevine Creek, Golden Gate, Road 69, and the TCC (Consortium of California Herbaria, 2019).

Bent-flowered Fiddleneck

Bent-flowered fiddleneck (*Amsinckia lunaris*) has no federal or state listing status but has a California Rare Plant Rank of 1B.2. The species is known from 95 occurrences in the North Coast Ranges and San Francisco Bay Area (CDFW, 2021). Habitat for the species includes grasslands and grassy areas within oak woodlands and coastal bluff scrub. Grasslands in the study area are potential habitat for this species.

Bent-flowered fiddleneck was not observed in the Sites Reservoir study area survey (DWR, 2000), but it was later collected near Sites, in the hills north of Sites-Ladoga Road, in the Antelope Valley, near Stone Corral Creek, and near Grapevine Creek (CDFW, 2021).

Fairy Candelabra

Fairy candelabra (*Androsace elongata* subsp. *acuta*) has no federal or state listing status but has a California Rare Plant Rank of 4.2. It is known from scattered locations throughout California, below 4,000 feet elevations. It grows on moss-covered rock outcrops and open areas in the adjacent grasslands. Grasslands and rock outcrops in the study area are potential habitat for this species.

Bent-flowered fiddleneck was reported to occur in the Sites Reservoir study area (DWR, 2000), and it was collected near Sites, in the hills north of Sites-Ladoga Road, and near Antelope Valley, Stone Corral Creek, and Grapevine Creek (California Consortium of Herbaria, 2019).

Hoary Navarretia

Hoary navarretia (*Navarretia eriocephala*) has no federal or state listing status but has a California Rare Plant Rank of 4.2. It occurs in the Sierra Nevada Foothills and inner North Coast Ranges, where it grows in vernally moist areas in grasslands and oak woodlands. Grasslands in the study area are potential habitat for this species.

Hoary navarretia was reported to occur in the Sites Reservoir study area (DWR, 2000), and it has been collected near Sites and the Antelope Valley (California Consortium of Herbaria, 2019).

Parry's Rough Tarplant

Parry's rough tarplant (*Centromadia parryi* subsp. *rudis*) has no federal or state listing status but has a California Rare Plant Rank of 4.2. It occurs at lower elevations in the North Coast Ranges, in the Sacramento Valley, and in the northern San Joaquin Valley. It grows in seasonal alkaline wetlands.

Parry's rough tarplant was not observed in the Sites Reservoir study area (DWR, 2000), but it was later collected between Funks Reservoir and the TCC (California Consortium of Herbaria, 2019). None of the geotechnical work areas are located within alkaline wetlands.

Red-flowered Bird's-foot Trefoil

Red-flowered bird's-foot trefoil (*Acmispon rubriflorus*) has no federal or state listing status but has a California Rare Plant Rank of 1B.2. It is known from only eight scattered occurrences in the Cascade Range Foothills, inner North Coast Ranges, and the south San Francisco Bay Area. Habitat for the species is in grasslands and in grassy areas within oak woodlands. Grasslands in the study area are potential habitat for this species.

Red-flowered bird's-foot trefoil was not observed in the Sites Reservoir study area (DWR, 2000), but it was later collected in areas near Sites, Antelope Valley, Grapevine Creek, and Sites-Ladoga Road (CDFW, 2021).

Shining Navarretia

Shining navarretia (*Navarretia nigelliformis* subsp. radians) has no federal or state listing status but has a California Rare Plant Rank of 1B.2. It occurs primarily in the South Coast Ranges but has been reported from other widely scattered locations in the San Joaquin Valley, San Francisco Bay Area, and interior North Coast Ranges. It occurs in moist areas with heavy clay soils, including wetland swales and clay flats in grasslands and oak woodlands. Grasslands in the study area are potential habitat for this species.

Shining navarretia was not observed in the Sites Reservoir study area (DWR, 2000), but it was later collected along Sites-Ladoga Road between Sites and Grapevine Creek (CDFW, 2021).

Special-Status Animals

Forty-two special-status animal species occur in or within 5 miles of the study area, based on previous surveys of the study area (CDFG, 2003a, 2003b; DWR, 2003), a query of the USFWS Information for Planning and Consultation database (USFWS, 2021), and searches of the CNDDB (CDFW, 2021) (Table 2). Previous amphibian, avian, call back, mammal, and elderberry surveys of the Sites Reservoir study area found very limited occurrences of special-status animals.; however, not all of the parcels within the reservoir footprint were surveyed (CDFG, 2003a, 2003b; DWR, 2003). Seven species are not expected to occur in the study area because potential habitat is not present (i.e., no estuarine habitat, no suitable nesting and foraging habitat). Seven species have a low potential to occur because potential habitat is present, but no occurrences are known within 5 miles of the study area. Thirteen species have a moderate potential to occur because potential habitat is present and there are occurrences within 5 miles of the study area. Twenty-three species have a high potential to occur, because potential habitat is present and there are documented occurrences within the study area.

Table 2 lists the species identified from the sources cited above, their status, distribution and habitat requirements, and their potential to occur in the study area. The determinations on the potential for species to occur in the study area in Table 2 take into consideration the likelihood of the species to occur in the general project vicinity, the proximity of potentially suitable habitat adjacent to bore locations and geophysical work areas, and the potential for the species to be affected by these activities.

Additional information is provided in *Special-Status Animals,* for federally-listed animals and for other special-status animals with high potential to be affected by the Proposed Action.

Special-Status Fish

Based on the species list, the following special-status fish species are known to occur in the vicinity of the study area. These include:

- Southern Distinct Population Segment of North American Green Sturgeon
- Sacramento River Winter-Run Chinook Salmon
- Central Valley Spring-Run Chinook Salmon
- Central Valley Fall- and Late Fall-Run Chinook Salmon
- Central Valley Steelhead
- White Sturgeon
- Hardhead
- Sacramento Splittail
- Sacramento Hitch
- Pacific Lamprey
- Western River Lamprey

However, as work would not occur within water or the bank of aquatic resources, fish species are not discussed further in this report.

Special-Status Wildlife

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle is federally listed as threatened. The presumed historical range and current range of the species extends throughout the Central Valley. The range extends approximately from Shasta County south to Fresno County, including the valley floor and associated lower foothills (USFWS 2017). The majority of valley elderberry longhorn beetle have been documented below 500 feet (152 meters) in elevation (USFWS, 2017).

Valley elderberry longhorn beetle is dependent on its host plant, elderberry shrubs, which is a common component of riparian corridors and adjacent upland areas (non-riparian vegetative communities) in the Central Valley (Barr 1991). Elderberry shrubs can be found on historic floodplain terraces above the river, on levees, and areas where subsurface flow provides water to elderberry roots (U.S. Fish Wildlife Service 2017). In non-riparian settings, elderberry shrubs can occur singly or in clumps in valley oak and blue oak woodlands and annual grasslands (U.S. Fish Wildlife Service, 2017).

The species has four life stages: egg, larva, pupa, and adult. Females deposit eggs on or adjacent to the host elderberry. Eggs hatch within a few days of being deposited. Larvae emerge and bore into the wood of the elderberry, creating a long feeding gallery in the pith of the stem. The larvae feed on the elderberry pith for 1 to 2 years. When a larva is ready to pupate, it chews an exit hole to the outside of the stem and then plugs it with frass (wood shavings). The larva then retreats into the feeding gallery and constructs a

pupal chamber from the wood and frass. The larvae metamorphose between December and April; the pupal stage lasts about one month. The adult remains in the chamber for several weeks after metamorphosis and then emerges from the chamber through the exit hole. Adults emerge between mid-March and mid-June, the flowering season of the elderberry. Adults feed on elderberry leaves and mate within the elderberry canopy (Talley et al. 2006).

Elderberry shrubs are present throughout the Sites Reservoir study area, some with exit holes, but none occur within the study area (DWR, 2000b). Seven CNDDB occurrences for valley elderberry longhorn beetle occur within 5 miles of the study area (CDFW, 2021).

Conservancy Fairy Shrimp

Conservancy fairy shrimp is federally listed as endangered. Currently, the species is found in 10 populations in – Butte, Tehama, Glenn, Placer, Yolo, Solano, Stanislaus, Merced, and Ventura counties (USFWS, 2012).

Conservancy fairy shrimp primarily occurs in large turbid vernal pools (playa pools) that stay inundated for much longer than typical vernal pools, often into summer (Eriksen and Belk 1999, USFWS 2012). Conservancy fairy shrimp has been found in vernal pools on a variety of landforms, geologic formations, and soil types (U.S. Fish and Wildlife, 2005) and within a wide elevation range (16 to 5,577 feet) (Eriksen and Belk, 1999). Conservancy fairy shrimp rarely co-occurs with vernal pool fairy shrimp and California fairy shrimp (*Linderiella occidentalis*) and generally greatly outnumbers these species when they do co-occur (Eriksen and Belk, 1999).

Similar to other vernal pool branchiopods, Conservancy fairy shrimp is adapted to the environmental conditions of its ephemeral vernal pool habitats. These adaptations include the ability of fairy shrimp cysts to remain dormant in the soil when vernal pool habitats are dry. Fairy shrimp are also able to complete their lifecycle (from cyst hatching to reproducing) within the relatively short time period when vernal pools are inundated with water (USFWS, 2005). Differences in the rate of maturation and reproduction of vernal pool branchiopods are thought to be the result of variations in water temperature (Helm, 1998).

Suitable habitat for Conservancy fairy shrimp is present within the Sites Reservoir study area but not within 250 feet of the proposed investigations. One CNDDB occurrence has been reported within 5 miles of the study area (CDFW, 2021). The majority of geotechnical locations are located in annual grasslands or oak woodlands with the exception of one located within an area mapped as a potential seasonal wetland and an additional 39 within 250 feet of other potetential seasonal wetlands. Of the 100 geophysical survey lines, approximately 15 cross over the same general area of the 39 subsurface work areas affecting the same potential seasonal wetlands. Based on Google Earth and National Agriculture Imagery Program aerial imagery review over the last 35 years across all seasons at these locations, none of the mapped seasonal wetlands had prolonged inundation, a habitat requirement to support vernal pool branchiopods. Of the 39 subsurface work areas within 250 feet of potential seasonal wetlands, approximately 14 are proposed along existing roadways, six have already been confirmed during the 2020 field effort conducted in the winter and early spring months as unsuitable for vernal pool branchiopods due to the lack of inundation, and two are located on opposite hillsides where surface flows would drain away from potential seasonal wetlands. Thus, 56 percent of the proposed work areas would have no effect on local surface hydrology of potential seasonal wetlands mapped in the vicinity. The majority of the potential wetland areas mapped are gently or moderately sloping based on the review of topography maps of the region (NAIP, 2010) and therefore likely to undergo flash flow conditions after precipitation

leaving the ground surface saturated for prolonged periods during the wet season, but not inundated. In addition, multiple features have existing stock ponds within them (both up- and down-stream of the work areas) further indicating that these features have an altered hydrology regime currently that would decrease the likelihood of prolonged inundation downstream. With saturated and moist soils, ephemeral wetland vegetation is typically present and can be seen on aerial imagery in the late winter and spring months only during 2010 (NAIP, 2010) and 2016 (Google Earth, 2016). From this review, it is concluded that the seasonal wetlands mapped would be unlikely to support vernal pool branchiopods and therefore it is assumed that these locations are not in or within 250 feet of vernal pool branchiopod occupied habtiat.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp is federally listed as threatened. The species is currently found in fragmented habitats across the Central Valley of California from Shasta County to Tulare and Kings Counties, in the central and southern Coast Ranges from Napa County to Los Angeles County, and inland in western Riverside County, California (USFWS 2005, 2007a). The historical distribution of vernal pool fairy shrimp likely matched the historical distribution of vernal pools in California's Central Valley and southern Oregon. Although the current range is similar to the historic range, remaining populations are much more fragmented and isolated than prior to widespread agricultural conversion (USFWS, 2005).

Vernal pool fairy shrimp commonly inhabit vernal pools or vernal pool-like habitats, typically in grassland landscapes. Most commonly, vernal pool fairy shrimp are found in vernal pools or vernal swales in unplowed grasslands (Eng et al. 1990). The chemical composition of the habitat and temperature variations resulting from pools filling at different times, and the distribution of pools along altitudinal and longitudinal gradients are the most important factors in determining the distribution of different species fairy shrimp (including vernal pool fairy shrimp), or their appearance from year to year (Eng et al. 1990; USFWS 2007a). Vernal pool fairy shrimp sometimes occur in other wetlands that provide habitat characteristics similar to those of vernal pools; these other wetlands include alkaline rain pools, rock outcrop pools, and some disturbed and constructed sites, including tire ruts, ditches, and puddles (59 FR 48136–48153, September 16, 1994; Eriksen and Belk 1999; Helm 1998; USFWS 2007a). Occupied habitats range in size from 6-square-foot puddles to pools exceeding 24 acres (Eriksen and Belk, 1999). Vernal pool fairy shrimp is not found in riverine, marine, or other permanent waters (USFWS, 2007a). Suitable pools must stay inundated long enough for the shrimp to complete their life cycle.

Vernal pool fairy shrimp matures very quickly and is able to have multiple clutches of eggs per lifespan (Eriksen and Belk, 1999). In a study using large plastic pools to simulate natural vernal pools, Helm (1998) found that vernal pool fairy shrimp reached maturity in an average of 18 days following hatching and reproduced an average of 40 days after hatching. Differences in the rate of maturation and reproduction of vernal pool branchiopods are thought to be the result of variations in water temperature (Helm, 1998).

As noted above for Conservancy fairy shrimp, suitable habitat for vernal pool fairy shrimp is present within the Sites Reservoir study area but not within 250 feet of the proposed investigations. One CNDDB occurrence is within 5 miles of the study area (CDFW, 2021).

Vernal Pool Tadpole Shrimp

Vernal pool tadpole shrimp is federally listed as endangered. The historical range of vernal pool tadpole shrimp likely consisted of the Central Valley and Central Coast regions of California (USFWS, 2005).

Currently, vernal pool tadpole shrimp occurs sporadically in the Central Valley from Shasta County to northwestern Tulare County and San Francisco Bay area (USFWS 2007b; 2005). The greatest number of vernal pool tadpole shrimp occurrences is in Sacramento County (USFWS, 2007b).

Vernal pool tadpole shrimp occurs in a variety of seasonal habitats, including vernal pools and other seasonal pools, ponded clay flats, roadside ditches, and stock ponds (Helm 1998; Rogers 2001). Habitats where vernal pool tadpole shrimp have been observed range in size from small (less than 25 square feet), clear, vegetated vernal pools to large (more than 80 acres) winter lakes (Helm 1998). Vernal pool tadpole shrimp produce cysts (eggs) that lie in the soil until the next winter rains trigger the eggs to hatch (USFWS, 2007b).

In the laboratory, vernal pool tadpole shrimp eggs collected from dry pond sediments at the end of summer hatched in 17 days (Ahl, 1991). In a study using large plastic pools to simulate natural vernal pools, Helm (1998) found that vernal pool tadpole shrimp reached maturity in an average of 38 days following hatching and reproduced an average of 54 days after hatching (Helm, 1998). Differences in water temperature, which strongly effects the growth rates of aquatic invertebrates, may cause variation in rates of growth and maturation (USFWS, 2005). Vernal pool tadpole shrimp can produce additional eggs during the wet season that hatch without going through a dormant period (Ahl, 1991).

While vernal pool tadpole shrimp is adapted seasonal habitats, it has a relatively long lifespan compared to other large branchiopods (USFWS, 2005). In Helm's study (1998), vernal pool tadpole shrimp lived an average of 143 days. The long lifespan of vernal pool tadpole shrimp is attributed to its ability to tolerate drying pool conditions and warm water (Helm, 1998). Vernal pool tadpole shrimp feed on both living organisms, such as fairy shrimp and other invertebrates, and on detritus (USFWS, 2007c).

As noted above for Conservancy fairy shrimp, suitable habitat for vernal pool tadpole shrimp is present within the Sites Reservoir study area but not within 250 feet of the proposed investigations. One CNDDB occurrence for tadpole shrimp is within 2 miles of the study area. There are five CNDDB occurrences within 5 miles of the study area (CDFW, 2021).

Monarch Butterfly

Monarch butterfly is a candidate for listing under the federal Endangered Species Act. 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).Generally, the migratory and breeding habitat for this species consists of all areas with the required habitat, including milkweeds, 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).

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, Russian olive, locusts, pines, and eucalyptus are used as roosting sites (U.S. Fish and Wildlife Service 2019).

There are no recorded CNDDB occurrences of monarch butterfly within 5 miles of the study area (California Department of Fish and Wildlife 2021), but this species is considered present in most of California. Potentially suitable monarch butterfly habitat consists of annual grassland, blue oak woodland, chamise chaparral, ditch, ephemeral stream, foothill pine, forested wetland, freshwater marsh, hayfield (includes alfalfa), intermittent stream, managed wetland, mixed chaparral, oak savanna, ornamental woodland, perennial stream, pond, reservoir, ruderal, scrub-shrub wetland, seasonal wetland, and upland riparian land cover types. Proposed investigations occur within or close proximity to suitable habitat, including, but not limited to annual grassland, blue oak woodland, seasonal wetland, and upland riparian habitat.

Crotch Bumble Bee and Western Bumble Bee

Crotch bumble bee and western bumble bee (are candidates for state listing as endangered. In California, Crotch bumble bee historically occurred on the Pacific Coast and in the western desert, Central Valley, and adjacent foothills (Williams et al. 2014:114–116, 132). The known range of western bumble bee extends throughout California, although populations from Central California to the southern British Columbia border have declined sharply since the late 1990s, particularly from lower elevation sites (Williams et al. 2014:116, Hatfield et al. 2015b). Western bumble bee populations are currently largely restricted to high elevation sites in the Sierra Nevada (The Xerces Society for Invertebrate Conservation 2018:6).

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).

Western bumble bee habitat varies widely and includes open grassy areas, urban parks and gardens, chaparral and scrub lands, and mountain meadows (Williams et al. 2014:116). The western bumblebee is a generalist forager that is most commonly associated with taxa such as Asteraceae, Ceanothus, Centaurea, Chrysothamnus, Cirsium, Eriogonum, Geranium, Grindelia, Lupinus, Melilotus, Monardella, Rubus, Penstemon, Solidago, and Trifolium (Williams et al. 2014:116, The Xerces Society for Invertebrate Conservation 2018:34).

Nest sites vary by species and available habitat. Nests may be located underground in abandoned holes made by ground squirrels, mice, and rats; abandoned bird nests; in tufts of grass; or in empty cavities. Woody cover, or other sheltered areas also provide sites for bumble bees to build nests (e.g., downed wood, rock walls, brush piles) (The Xerces Society for Invertebrate Conservation 2018:30). Crotch bumble bees are known to nest underground (The Xerces Society for Invertebrate Conservation 2018:32), and western bumble bees are known to nest mostly underground but have been documented nesting above ground (The Xerces Society for Invertebrate Conservation 2018:34).

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).

There are no CNDDB records for occurrences of western bumble bee within 5 miles of the study area. Potentially suitable Crotch bumble bee and western bumble bee habitat consists of annual grassland, chamise chaparral, mixed chaparral, oak savanna, seasonal wetland, and ruderal areas when they are

adjacent to these land cover types. Proposed investigations occur within or close proximity to suitable habitat, including, but not limited to annual grassland, oak savannah, ruderal areas, and seasonal wetlands.

California Tiger Salamander

California tiger salamander is listed as a federally and state threatened species. The species occurs from Yolo County south to Kern County in the Central Valley, the Sierra Nevada foothills from Amador County to Tulare County, and from Sonoma County south to Santa Barbara County on the coast.

The species utilizes both aquatic and terrestrial habitat and spend the vast majority of its life underground. Adult California tiger salamander migrate from underground refuge to aquatic breeding habitat during rainy nights, typically from November through April, although migrating adults have been observed in October and in May (Trenham et al. 2000). Metamorphosed juveniles generally leave breeding ponds in late spring to early summer (May to July) and move to terrestrial refuge sites (Trenham et al. 2000); timing of movement is based on local environmental conditions. Breeding habitat includes ponds (natural and man-made), vernal pools, and other seasonal or permanent water bodies that are typically inundated during winter rains and hold water for a minimum of 12 weeks during an average rainfall year (California Department of Fish and Game, 2010). The larval stage of the California tiger salamander lasts 3 to 6 months, with metamorphosis taking place in late spring or early summer (Petranka, 1998). California tiger salamander can be found in permanent ponds, but permanent aquatic sites are less likely to be used for breeding unless they lack fish predators or breeding bullfrog populations (Jennings and Hayes 1994; Shaffer et al. 1993). The species is not known to breed in streams or rivers, however breeding populations have been reported in ditches with seasonal wetlands and in slow-moving swales and creeks near other suitable breeding habitat (Seymour and Westphal 1994; Alvarez et al. 2013). California tiger salamanders also require dry-season refuge sites in the vicinity of breeding sites (generally within 1 mile) (Jennings and Hayes, 1994). California ground squirrel burrows are important refuge sites for adults and juveniles, but the species is also known to use pocket gopher burrows (Loredo et al. 1996; Trenham and Shaffer 2005). Upland habitat surrounding known California tiger salamander breeding pools are typically characterized by grassland, oak savanna or oak woodland. California tiger salamander have been reported to migrate up to 1.3 miles (2.2 kilometers) between breeding ponds and upland habitat (Orloff, 2007). Searcy and Shaffer (2011) estimated average migration distances to be 1,844 feet (562 meters) with an estimate that 95% of the population occurred within 1.16 miles (1.86 kilometers) of the breeding pond.

The Sites Reservoir Project study area is outside of the species' known range and there are no CNDDB occurrences within 5 miles of the inundation area (CDFW, 2021). California tiger salamanders were not detected within the Sites Reservoir study area during previous surveys (Brown and Yip, 2000; CDFG, 2003a). The nearest record to the proposed reservoir for the species is in Yolo County, west of the proposed Dunnigan Pipeline (CDFW, 2021). Although the Dunnigan Pipeline would be in Yolo County, impacts would be east of the known California tiger salamander population, and suitable habitat for the species does not occur in the pipeline vicinity. Therefore, it is unlikely for California tiger salamander to occur in the study area.

Foothill Yellow-legged Frog

Foothill yellow-legged frog is designated as a California species of special concern in the Northwest/North Coast clade. The species occurs throughout the North and South Coast Ranges, south

to the Transverse Range, across most of northern California to the west slope of the Cascade Range, and south through the foothills of the Sierra Nevada to Kern County (Stebbins and McGinnis, 2012). There are isolated populations in southern California (Stebbins and McGinnis, 2012). The species can occur from elevations from sea level to 6,000 feet above sea level (Stebbins, 2003).

Foothill yellow-legged frog inhabits forest streams and rivers with sunny, sandy, and rocky banks, deep pools, and shallow riffles (Stebbins and McGinnis, 2012). Foothill yellow-legged frogs are active during the day and are typically found basking on the shore or on rocks in streams (Stebbins and McGinnis, 2012). The species breeds from mid-March to early June, usually after the high winter and early spring flows have subsided and less sediment is being transported (Stebbins and McGinnis, 2012). Breeding typically occurs in relatively wide and shallow channels with cobble, boulder, and gravel substrates (Thomson et. al. 2016). Tadpoles have not been found in water colder than 13 °C and prefer temperatures between 16.5 and 22.2 °C (Thomson et. al. 2016). Tadpoles require water for at least 15 weeks to reach metamorphosis, which typically occurs between July and September (Jennings and Hayes, 1994).

Suitable habitat is present along Funks Creek, Stone Corral Cree, and Antelope Creek in the study area. Bird Creek and CBD, in Yolo County, does not provide suitable habitat for the species. Although, no CNDDB occurrences have been reported for foothill yellow-legged frog within 5 miles of the study area (CDFW, 2021), one individual was detected within the Sites Reservoir project footprint (CDFG, 2003a).

California Red-legged Frog

California red-legged frog is listed as a federally threatened species and is a California species of special concern. The historical range of California red-legged frog generally extends south along the coast from the vicinity of Point Reyes National Seashore, Marin County, California, and inland from the vicinity of Redding, Shasta County, California, southward along the interior Coast Ranges and Sierra Nevada foothills to northwestern Baja California, Mexico (Storer 1925; Jennings and Hayes 1985). The current range is generally characterized based on the current known distribution. While California red-legged frog is still locally abundant in portions of the San Francisco Bay area and the central coast, only isolated populations have been documented elsewhere within the species' historical range, including the Sierra Nevada, northern Coast Ranges, and northern Transverse Ranges (USFWS, 2017b). California red-legged frog is believed to be extirpated from the floor of the Central Valley (USFWS, 2002).

California red-legged frog inhabit marshes, streams, lakes, ponds, and other, usually permanent, sources of water that have dense riparian vegetation (Stebbins, 2003). California red-legged frog primarily breeds in ponds and less frequently in pools within streams (Thomson et al. 2016). Breeding occurs from November through April and red-legged frogs typically lay their eggs in clusters around aquatic vegetation (U. S. Fish and Wildlife Service, 2002). Larvae undergo metamorphosis from July to September, 3.5 to 7 months after hatching (66 FR 14626).

California red-legged frogs often disperse from breeding sites to various aquatic, riparian, and upland estivation habitats in the summer (66 FR 14628), however it is common for individuals to remain in the breeding area year-round (66 FR 14628; Bulger et al. 2003; Fellers and Kleeman, 2007). Adults may take refuge during dry periods in rodent holes or leaf litter in riparian habitats (U. S. Fish and Wildlife Service ,). Within riparian areas, microhabitats utilized by California red-legged frogs include blackberry thickets, logjams, and root tangles (Fellers and Kleeman, 2007).

California red-legged frog will travel through a variety of upland habitat types (e.g., grassland, riparian, woodlands) to reach breeding and nonbreeding sites, upland refugia/foraging habitats, or new breeding

locations (Bulger et al. 2003; Fellers and Kleeman, 2007). Frogs typically travel much shorter distances between aquatic and upland refugia/foraging habitats than when dispersing between breeding and non-breeding aquatic habitats Bulger et al. 2003). In one study, 90% of radio-tagged California red-legged frogs that did not make overland movements (i.e., non-migrating frogs) were found within 200 feet (60 meters) of aquatic habitat throughout the year; the farthest movement was 427 feet {130 meters) from water and was in response to summer rain (Bulger et al. 2003). In another study, a radio-tagged California red-legged frog moved at least 0.9 mile (1 kilometer) and up to 1.7 mile (2.8 kilometers) over several months during the breeding season (Fellers and Kleeman, 2007).

Ponds and streams within the Sites Reservoir study area represent potential habitat for California red-legged frogs. Funks Creek, Stone Corral Creek, and Antelope Creek, all which occur within the study area, are considered to provide potential habitat for California red-legged frog. Bird Creek and CBD, in Yolo County, does not provide suitable habitat for the species. There are no CNDDB occurrences for California red-legged frog within 5 miles of the study area (CDFW, 2021). The species was not detected during surveys from 1997 to 2001; however, surveys were not conducted during the breeding period and not all properties were accessible at time of the surveys (Brown and Yip, 2000; CDFG, 2003a).

Western Spadefoot Toad

The western spadefoot toad is a California species of special concern. The species occurs in the Sierra Nevada foothills, the Central Valley, the Coast Ranges, and in the non-desert portions of southern California (USFWS, 2005). The elevational range of the species extends from near sea level to 4460 feet (1363 meter) in the southern Sierra foothills (Jennings and Hayes, 1994).

Western spadefoot toad occurs primarily in lowland habitat such as washes, floodplains of rivers, alluvial fans, playas, and alkali flats but are also found in foothills and mountains (USFWS, 2005). It prefers open areas with sandy or gravelly soils (Jennings and Hayes, 1994). Western spadefoot spend most of their life buried underground in earth-filled burrows and are active for only a short period each year, typically between October and May, depending on rainfall. Some individuals use mammal burrows for refuge. Individuals occasionally emerge during rains at other times of the year. The species uses a variety of permanent and temporary wetlands, including rivers, creeks, pools in intermittent streams, stock ponds, vernal pools, and temporary rain pools; however vernal pools and temporary wetlands may be optimal for breeding due to the absence of predators (USFWS, 2005). Typically, breeding waters are turbid with little or no cover. Surface water must last for at least 30 days to allow for successful transformation of larvae. Upland habitat is generally considered to be areas within 850 feet of suitable aquatic habitat (Baumberger, 2013). Most surface movements by adults are associated with rains or high humidity at night (CDFW, 2000). Recently metamorphosed juveniles seek refuge in the immediate vicinity of breeding ponds for up to several days after transformation and dispersal of post-metamorphic juveniles from breeding ponds often occurs without rainfall (CDFW, 2000).

Suitable aquatic habitat for western spadefoot toad, creeks, ponds, and seasonal wetlands, occurs adjacent to the study area and suitable upland habitat occurs in the annual grasslands portions of the study area. Although no CNDDB occurrences have been reported for the species within 5 miles of the study area (CDFW, 2021), western spadefoot toad was detected in the Sites Reservoir study area during previous surveys (CDFG, 2003a).

Western Pond Turtle

Western pond turtle is a California species of special concern. Western pond turtle occurs throughout much of California, except east of the Sierra-Cascade crest and desert regions (with the exception of the Mojave River and its tributaries) (Zeiner et al. 1988).

Aquatic habitats used by pond turtles include ponds, lakes, marshes, rivers, streams, and irrigation ditches with a muddy or rocky bottom in grassland, woodland, and open forest areas (Stebbins 2003). Pond turtles spend a considerable amount of time basking on rocks, logs, emergent vegetation, mud or sand banks, or human-generated debris (Jennings et al. 1992). Pond turtles move to upland areas adjacent to watercourses to deposit eggs and overwinter (Jennings and Hayes 1994). Turtles have been observed overwintering several hundred meters from aquatic habitat. In the southern portion of their range and along the central coast, pond turtles are active year-round. In the remainder of their range, these turtles typically become active in March and return to overwintering sites by October or November (Jennings et al. 1992)

Suitable habitat for western pond turtle occurs in the study area in Funks Creek, Stone Corral Creek, and Antelope Creek and occurs in streams and ponds adjacent to the study area, as well as upland areas within approximately 300 feet, which could be used for nesting. Bird Creek and CBD also provide suitable habitat. Pond turtles were observed inside the Sites Reservoir study area (CDFG, 2003a). There is one CNDDB occurrence for western pond turtle within 5 miles of the study area (CDFW, 2021).

Giant Gartersnake

Giant gartersnake is listed as a federally and state threatened species. Historically, giant garter snake was found throughout the Central Valley from Butte County in the north to Kern County in the south. Currently, it is known to occur in nine discrete populations in the Sacramento and San Joaquin Valleys, which includes Butte Basin, Colusa Basin, Sutter Basin, American Basin, Yolo Basin, Cosumnes-Mokelumne Basin, Delta Basin, San Joaquin Basin, and Tulare Basin (USFWS, 2017).

Giant gartersnake has specific habitat needs that include summer aquatic habitat for foraging, bankside basking areas with nearby emergent vegetation for cover and thermal regulations, and upland refugia for extended periods of inactivity (USFWS, 2017). The species inhabits agricultural wetlands and other waterways, including irrigation and drainage canals, rice, marshes, sloughs, ponds, small lakes, and low-gradient streams, as well as adjacent upland areas. Perennial wetlands provide the highest quality habitat for giant gartersnake, and rice with interconnected water conveyance structures, serve as an alternative habitat in the absence of higher-quality wetlands (USFWS, 2017). They do not occur in larger rivers and wetlands with sand, gravel, or rock substrates. Giant gartersnake requires permanent water during its active season (early spring through mid-fall) to maintain dense populations of food organisms. The snake also requires herbaceous, emergent vegetation for protective cover and foraging habitat and open areas and grassy banks for basking. In addition, higher elevation upland habitats for cover and refuge from floodwaters are needed during the winter when the snake is inactive. Riparian woodland generally is considered unsuitable habitat because of the lack of basking sites, excessive shade, and lack of prey. Giant gartersnakes begin to search for mates soon after emergence from overwintering sites. Giant gartersnake is generally active from May 1 to October 1 (USFWS, 1997).

Suitable aquatic habitat is present in ditches, canals, freshwater emergent wetlands, and rice fields within and adjacent to the agricultural portions of the study area located east of the Glenn-Colusa Irrigation District Main Canal in Colusa County and east of I-5 in Yolo County along the Dunnigan Pipeline

corridor. Suitable upland habitat includes annual grassland, ruderal areas, and canal banks within 200 feet of suitable aquatic habitat. There are thirty giant gartersnake CNDDB occurrences within 5 miles of the study area, several overlap with the study area near Colusa Basin Drain and the proposed Dunnigan Pipeline (CDFW, 2021).

Golden Eagle

Golden eagle is a California Fully Protected Species. The species is found throughout North America, but more common in western North America. Golden eagle is found throughout California in rolling foothills, mountain areas, sage-juniper flats, and desert (Zeiner et al. eds. 1990).

The species nests on secluded cliffs and escarpments or in tall trees overlooking open country and forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals; however, the species does not nest in the Central Valley (Zeiner et al. eds. 1990). Nesting occurs from late January through August.

Suitable foraging habitat for golden eagle is present in grasslands in the study area. Although, no CNDDB occurrences have been reported for golden eagle within 5 miles of the study area (CDFW, 2021), the species has been observed during avian surveys at Funks Reservoir and the Sites Reservoir study area (DWR, 2000c). A golden eagle was also observed in flight and foraging over the study area on January 31, 2019.

Swainson's Hawk

Swainson's hawk is listed as threatened in California. The species is found in the Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley. The highest nesting density of Swainson's hawk occurs near Davis and Woodland in Yolo County. The majority of Swainson's hawks winter in South America. Swainson's hawk arrives in California in early March to establish nesting territories and breed (California Department of Fish and Game 1994).

Swainson's hawk usually nest in large, mature trees. Most nest sites (87%) in the Central Valley are found in riparian habitats (Estep 1989), primarily because trees are more available there. Swainson's hawks also nest in mature roadside trees and in isolated trees in agricultural fields or pastures. The breeding season is from March through August (Estep 1989). Swainson's hawks forage 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). The species' diet in California mainly consists of small rodents, but birds and insects are also taken.

Suitable nesting habitat is present in the study area in riparian areas and isolated trees in agricultural areas. Suitable foraging habitat exists throughout the study area. There are 25 CNDDB occurrences of Swainson's hawk reported within 5 miles of the study area (CDFW, 2021).

Northern Harrier

The northern harrier is a California species of special concern. The range of northern harrier encompasses all of lowland California, but this species has been observed at high elevations. It breeds in California from sea level up to 5,700 feet in the Central Valley and Sierra Nevada, and up to 3,600 feet in northeastern California (Shuford and Gardali, 2008). The Central Valley region supports the majority of nesting harriers in California. Harriers occur year-round within its breeding range in California. The

species appears to be nomadic, ranging widely within the breeding season and across years (Shuford and Gardali, 2008).

Northern harriers breed and forage in a variety of open (treeless) habitats that provide adequate vegetative cover, and abundance of suitable prey, and scattered hunting, plucking, and lookout perches such as shrubs and fence posts. In California, this species inhabits annual and perennial grasslands, wet meadows, marshes (freshwater, brackish, saltwater), and seasonal and agricultural wetlands. Harriers nests on the ground within a thicket of vegetation, frequently in wet areas including meadows. It forages primarily for small mammals over open habitats, including grassland, tidal salt marsh, and agricultural fields (Shuford and Gardali, 2008).

Suitable nesting and foraging habitat for northern harrier is present in and adjacent to the study area. Although no CNDDB occurrences for northern harrier have been reported within 5 miles of the study area (CDFW, 2021), the species was observed during avian surveys near Funks Reservoir and near cultivated lands within the study area, detection was highest during the winter (DWR, 2000c).

White-tailed Kite

White-tailed kite is a California fully protected species. White-tailed kite is a yearlong resident in coastal and valley lowlands, west of the Sierra Nevada from the head of the Sacramento Valley south to western San Diego County at the Mexico border. The species is found year-round throughout the Sacramento Valley (Zeiner et al. 1990).

White-tailed kites generally inhabit low-elevation grassland, savannah, oak woodland, wetland, agricultural, and riparian habitats. Some large shrubs or trees are required for nesting and for communal roosting sites. Nest trees range from small, isolated shrubs and trees to trees in relatively large stands (Dunk, 1995). White-tailed kites make nests of loosely piled sticks and twigs lined with grass and straw, near the top of dense oaks, willows, and other tree stands. The breeding season lasts from February through October and peaks from May to August. They forage in undisturbed, open grassland, meadows, farmland, and emergent wetlands where voles and mice are common prey species (Zeiner et al. 1990).

Nesting habitat is present along creeks and in isolated trees within grassland and cultivated lands in the study area. Kites were observed during avian surveys in dense, un-grazed grassland and adjacent fallow agricultural lands at Funks Reservoir during the winter, and limited kite observations were made during the avian breeding season within the Sites Reservoir study area (DWR, 2000c). One CNDDB occurrence within 5 miles of the study area (CDFW, 2021).

Mountain Plover

Mountain plover is a California species of special concern (California Department of Fish and Wildlife 2021b). 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).

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).

There are three CNDDB records for occurrences of wintering flocks within 5 miles of the Dunnigan Pipeline portion of the study area (California Department of Fish and Wildlife 2021a). Potentially suitable mountain plover wintering habitat consists of annual grassland, hayfield (includes alfalfa), row crops, and seasonal wetland land cover types.

annual grassland, hayfields, ruderal, disturbed, and developed land cover types.

Bald Eagle

Bald eagle is listed as endangered in California and is also a fully protected species. Bald eagle is a permanent resident and uncommon winter migrant in California (Zeiner et al. 1990). Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County (Zeiner et al. 1990)

The species breeds at coastal areas, rivers, lakes, and reservoirs with forested shorelines or cliffs in northern California. Wintering bald eagles are associated with aquatic areas containing some open water for foraging. Bald eagles nest in trees in mature and old growth forests that have some habitat edge and are somewhat close (within 1.25 miles) to water with suitable foraging opportunities. Although nests can be closer, the average distance of bald eagle nests to human development and disturbance is more than 1,640 feet (Buehler, 2000). In California, the breeding season lasts from about January through July or August (Zeiner et al. 1990). After fledging, young migrate to northern and western Canada before returning to California. California resident breeding pairs remain in California during the winter. Migratory bald eagles from northwestern states and other provinces winter in California and have remained into April. Bald eagles consume a variety of small animals, usually fish or waterfowl, carrion, deer, and cattle.

Suitable nesting and foraging habitat for bald eagle is present in the study area. Sporadic wintering use by adult and immature bald eagles has been documented at Funks Reservoir and in the Sites Reservoir study area, with the highest wintering use at Funks Reservoir (DWR, 2000c). No nesting attempts were observed during previous surveys (DWR, 2000c). One CNDDB occurrence has been reported within 5 miles of the study area (CDFW, 2021).

Western Burrowing Owl

Burrowing owl is a California species of special concern. The species is found throughout California and is a year-round resident in the Central Valley, San Francisco Bay Area, Carrizo Plain, and Imperial Valley (Shuford and Gardali, 2008).

The species occur primarily in level, open low-stature grassland or desert habitats but may also occur in landscapes that are highly altered by human activity, such as ruderal, agricultural, and developed lands

(e.g. on edges of agricultural fields, canal banks, along railroad track berms). Suitable habitat must contain burrows with relatively open, short vegetation and minimal amounts of shrubs or taller vegetation. Burrowing owl most commonly nest and roost in California ground squirrel burrows, but may also use burrows dug by other species, as well as utilize culverts, piles of concrete rubble, and pipes, and other tunnel-like structures (Haug et al. 1993). The breeding season is March to August but can begin as early as Febr,uary. During the breeding season, owls forage near their burrows but have been recorded hunting up to 1.7 miles away (Shuford and Gardali 2008).

The species has been observed in the Sites Reservoir study area (DWR, 2000c). Twelve CNDDB occurrences for burrowing owl are within 5 miles of the study area, one of which is located approximately 1.4 miles east of Funks Reservoir (CDFW, 2021).

Song Sparrow (Modesto population)

The Modesto population of song sparrow is a California species of special concern. Song sparrow is resident throughout California, excluding high elevation locations and most parts of the southern deserts (Zeiner et al. 1990). The Modesto song sparrow is endemic to the north-central portion of the Central Valley, with the highest densities occurring in the Butte Sink area of the Sacramento Valley and the Sacramento-San Joaquin River Delta (Shuford and Gardali, 2008). Song sparrow occurs in low densities at Delevan and Colusa National Wildlife Refuges (Shuford and Gardali, 2008).

This species requires moderately-dense cover for nest sites and occurs in early successional riparian forest, and in permanent and seasonal wetlands with emergent marsh vegetation (i.e., tules [Scirpus spp.] and cattails [*Typha* spp.]). It also nests in riparian thickets of willows, shrubs, vines, tall herbs, and in fresh or saline emergent vegetation (Zeiner et al. 1990) and nests in riparian forest of valley oak with an understory of blackberry and along vegetated irrigation canals and levees. Modesto song sparrow breeds from mid-March to early August. The species is omnivorous, foraging on the ground and in leaf litter for seeds and invertebrates (Shuford and Gardali, 2008).

Suitable foraging habitat is present for Modesto song sparrow in the study area and suitable nesting habitat occurs in areas adjacent to the study area. Two CNDDB occurrences have been reported within 5 miles of the study area (CDFW, 2021).

Tricolored Blackbird

Tricolored blackbird is listed as threatened in California. Tricolored blackbird is a highly colonial species that is largely endemic to California. The species is a permanent resident in the Central Valley from Butte County to Kern County. Also occurs in the surrounding foothills of California. Tricolored blackbird breed in scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano counties. The species is a rare nester in Siskiyou, Modoc, and Lassen counties.

Tricolored blackbird breeding colony sites require open, accessible water; a protected nesting substrate, including either flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony. Tricolored blackbird breeding colonies occur in freshwater marshes dominated by tules and cattails, in Himalayan blackberry, and in silage and grain fields (Beedy and Hamilton, 1997). Breeding habitat must be large enough to support 50 pairs. The breeding season is from late February to early August (Meese et al. 2014). Some individuals will reside in the Central Valley throughout the year, whereas other migrate from their first nesting site in the San Joaquin Valley to a second nesting site located in more Northern regions, such as the Sacramento Valley,

northeast California, and southern Oregon (Beedy and Hamilton 1997).Tricolored blackbird foraging habitats in all seasons include annual grasslands, dry seasonal pools, agricultural fields (such as large tracts of alfalfa with continuous mowing schedules, and recently tilled fields), cattle feedlots, and dairies. Tricolored blackbirds also forage occasionally in riparian scrub habitats and along marsh borders. Weed-free row crops and intensively managed vineyards and orchards do not serve as regular foraging sites. Most tricolored blackbirds forage within 3 miles of their colony sites but commute distances of up to 8 miles have been reported (Beedy and Hamilton 1997).

Suitable nesting and foraging habitat for tricolored blackbird is present the study area in freshwater marsh, annual grasslands, and agricultural areas. The species was observed in the Sites Reservoir study area during the spring, although the observations were sporadic and limited (DWR, 2000c). Thirty-seven CNDDB occurrences within 5 miles of the study area, several of which are in close proximity to the study area (CDFW, 2021).

Yellow-breasted Chat

Yellow-breasted chat is a California species of special concern. An uncommon summer resident and migrant in coastal California and in foothills of the Sierra Nevada. The species is uncommon along the coast of northern California east to Cascade Range and occurs south of Mendocino County. The species can occur up to 4800 feet (1450 meter) in valley foothill riparian, and up to 6500 feet (2050 meter) east of the Sierra Nevada in desert riparian habitats (CDFW, 2005). In migration, the yellow-breasted chat can be found at lower elevations of mountains in riparian habitat.

The species occupies early successional riparian habitats with well-developed shrub layer and an open canopy. Vegetation structure is an important factor in nest-site selection. Nesting habitat is usually restricted to a narrow boarder of streams, creeks, sloughs, and rivers, and seldom forms an extensive track (Shuford and Gardali, 2008). Areas with blackberry, wild grape, and willow, other plants that form a dense tangle are preferred. Chats will nest in non-native vegetation that provide dense shrub layers. Breeds from late April through early August. The yellow-breasted chat is a rare or absent as a breeder in much of the Central Valley and parts of the southern coastal slope but do nest regularly along low- and mid-elevation streams in the Sierra Neva (Shuford and Gardali, 2008). Yellow-breasted chat forage on insects and spiders, wild fruit and berries.

Suitable nesting and foraging habitat is generally absent in the study area. There are no CNDDB occurrences for yellow-breasted chat in the study area (CDFW, 2021). No yellow-breasted chat were observed during avian surveys (DWR, 2000c). Suitable nesting habitat is absent on the west bank of the Sacramento River, but nesting could occur on the east bank of the Sacramento River.

Yellow Warbler

Yellow warbler is a California species of special concern. It is a migrant and summer resident in California from late March through early October. The species is found in coastal and northern California and the Sierra Nevada below approximately 7,000 feet. It is largely extirpated from the Sacramento Valley, Sacramento-San Joaquin River Delta, and San Joaquin Valley region. Yellow warbler nests from Del Norte County east to Modoc plateau and south along the coast to Ventura County, and on western slope of Sierra Nevada.

Yellow warblers are found in riparian vegetation near streams and wet meadows. They are typically found in willows and cottonwoods, and in California they are found in a variety of other riparian shrub and tree species. The breeding season is from April through late July (Shuford and Gardali, 2008). Nests are

generally placed 2–16 feet above the ground in young deciduous trees or in shrubs (Zeiner et al. 1990). They will make several attempts at nesting throughout the season, but typically only produce one group of hatchlings per year (Shuford and Gardali, 2008). A generalist, the yellow warblers will consume a variety of invertebrates.

Suitable yellow warbler nesting and foraging habitat is generally absent in and adjacent to the study area. There is one CNDDB occurrences for yellow warbler within 5 miles of the study area (CDFW, 2021). Yellow warbler was not detected during avian transects in the study area (DWR, 2000c). There is a low potential for the species to occur on the west bank of the Sacramento River, but nesting could occur on the east bank of the Sacramento River.

Bank Swallow

Bank swallow is a California threatened species. It is a neo-tropical migrant that inhabits riparian and other lowland habitats in California west of the deserts in the spring and fall. The species is less common on the coast, and uncommon and local summer resident. When present, bank swallows can occur along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American rivers, in the Owens Valley, and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou counties. Small populations are also located near the coast from San Francisco to Monterey and San Mateo Counties (Zeiner et al. 1990).

Bank swallows nest in burrows in erodible soils on vertical or near-vertical banks and bluffs in lowland areas dominated by rivers, streams, lakes, and oceans. Bank swallows generally dig new burrows each year, especially if the bank or cliff face used for nesting the previous year collapsed from erosion or human activities and no old burrows remain. They breed from April through July and depart for wintering grounds in South America between mid-August and mid-September. Foraging habitats include lakes, ponds, rivers and streams, meadows, fields, pastures, and occasionally forest and woodlands. The bank swallow is an aerial feeder, taking flying or jumping insects from dawn to dusk (Garrison, 1999).

There are fourteen CNDDB records for bank swallow, all along the Sacramento River within 5 miles of the study area. An occurrence within the vicinity of the study area, is located on the eastern bank of the Sacramento River at Mile 154.7-157.3. Bank swallows surveys within the Sites Reservoir study area failed to detect signs of nesting swallows (DWR, 2000c).

Western Red Bat

Western red bat is a California species of special concern. It is found throughout much of California at lower elevations, from Shasta County south to the Mexico border, west of the Sierra Nevada and Cascade crest and deserts. The species winters in western lowlands and coastal regions south of the San Francisco Bay area. During migration (in the spring), the species can be found outside the normal species' range.

Western red bat are primarily associated with riparian and wooded habitats, but also occurs seasonally in urban areas (Brown and Pierson, 1996). Western red bats day roost in the foliage of trees that are often located on the edge of habitats adjacent to streams, fields, or urban areas. They have been found in fruit orchards and sycamore riparian habitats in the Central Valley. This species breeds in August and September, and young are born in May through July (Zeiner et al. 1990). Female may move the young between roost sites. Western red bat forages over a wide variety of habitats including grasslands, shrublands, open woodlands, and forests (Zeiner et al. 1990). The bats forage on a variety of insects with the most important prey item being moths, crickets, beetles, and cicadas.

Suitable roosting and foraging habitat for western red bat is present in the study area. There are two CNDDB records within 5 miles of the study area (CDFW, 2021). A breeding population of western red bats was documented within the Sites Reservoir study area (CDFG, 2003b).

Pallid Bat

Pallid bat is a California species of special concern and is considered. In California, the species occurs throughout the state except for the high Sierra Nevada from Shasta to Kern Counties, and the northwestern corner from Del Norte and western Siskiyou Counties to Mendocino County at low and mid-elevations.

Pallid bat tend to inhabit foothills and lowlands near water throughout California below 6,562 feet (2000 meters). Pallid bats use a wide variety of habitats (e.g., desert, grassland, scrubland, woodland, forest) but are most common in open, dry areas with rock outcrops or cliffs. The species prefers rocky outcrops, cliffs, and crevices for roosting with access to open habitats for foraging. They are a yearlong resident in most of their range and hibernate in winter near their summer roost (Zeiner et al.1990). Day roosting sites include caves, crevices, mines, and occasionally in hollow trees and buildings; roosts must be protective from high temperatures. Night roosts may be in more open sites such as porches and open buildings (Zeiner et al. 1990). Mating takes place from late October to February and maternity colonies form in early April. Young are born from April to July, with most in May to June. Young are capable of flight by July and August. Pallid bats are also very sensitive to roost site disturbance. The bats are opportunistic generalists that eat a variety of arthropod prey; they rarely eat small reptiles, rodents, and plant material.

Suitable roosting and foraging habitat for Pallid bat is present adjacent to the study area. Three CNDDB occurrences have been reported within 5 miles of the study area (CDFW, 2021). The species was observed at Sites Reservoir study area and was the most commonly mist netted bat species during mammal surveys and a breeding population of pallid bats was documented within the general Sites Reservoir study area (CDFG, 2003b).

Spotted Bat

Spotted bat is a California species of special concern. It is a broadly distributed species, but rarely common and rare in California. They have been found at sea level to 10,000 feet (3,000 meter) elevation, occurring from arid low desert habitats to high elevation conifer forests.

Spotted bat have been found in vegetation that range from desert to sub-alpine meadows, woodland, mixed conifer forest, canyon bottoms, riparian areas, fields, and open pasture. Prominent rock features appear to be necessary for roosting. The species appears to be solitary, but occasionally roost or hibernate in small groups. Roost sites are cracks, crevices, and caves, usually high in fractured rock cliffs (Western Bat Working Group 2005). Spotted bats breed in late summer with females pupping in early summer (May or June). Spotted bats primarily forage on moths over water or washes.

Suitable roosting habitat for spotted bat is present adjacent to the study area. There are no CNDDB occurrences for spotted bat within 5 miles of the study area (CDFW, 2021). The species was not observed or caught during mammal surveys within the Sites Reservoir study area (CDFG, 2003b).

Townsend's Big-eared Bat

Townsend's big-eared bat is a California species of special concern. Townsend's big-eared bat occurs throughout California from sea level to 10,900 feet in elevation, but the species' distribution appears to be limited by the availability of cavern-like roost structures. Formerly common in California, but the species is now considered uncommon.

Townsend's big-eared bats are found in all but subalpine and alpine habitats and may be found at any season throughout its range. The species uses a wide variety of habitats from desert to riparian and coastal woodland, but they are found in greatest numbers in mesic habitat with cavern-forming rock or abandoned mines (Western Bat Working Group, 2005). Townsend's big-eared bats roost in dome-like spaces in caves, tunnels, or mines, where they roost hanging in the open from the ceiling. They also have been known to use human-made structures that are cavern-like spaces in abandoned buildings or bridges, and in the basal hollows in large coast redwood trees (Mazurek, 2004). Mating occurs in fall and spring, and pups are born in late spring to early summer (Pierson and Rainey, 1998). Maternity roost size varies and may contain only a few or up to several hundred individuals. Maternity roosts are found in caves, tunnels, mines, and buildings. The species is believed to be relatively sedentary, hibernating in caves and mines near summer maternity roosts, although seasonal movements are not well understood. Townsend's big-eared bats may have hibernated historically in aggregations of thousands of individuals (Pierson and Rainey, 1998). They are highly sensitive to disturbance at roost sites (Brown and Pierson, 1996). Small moths are the principal food of the species, but it will also consume soft-bodied insects.

Potential roosting habitat for Townsend's big-eared bat is present adjacent to the study area. There are no CNDDB occurrences within 5 miles of the study area (CDFW, 2021). The species has not been observed or caught during mammal surveys at the study area (CDFG, 2003b).

Western Mastiff Bat

Western mastiff bat is a California species of special concern. It is found along the west side of the Sierra Nevada Mountains at low to mid-elevations from the southern California border north to a few miles south of the Oregon border (Brown and Pierson 1996; Western Bat Working Group 2005). The western mastiff bat is an uncommon resident in southeastern San Joaquin Valley and Coastal Ranges from Monterey County southward through southern California, from the coast east to the Colorado Desert. The species is uncommon in the Central Valley. The winter range includes western lowlands and coastal regions of the Bay Area.

Mastiff bats are found in a variety of open habitats including desert scrub, chaparral, annual and perennial grasslands, conifer and deciduous woodlands, coastal scrub, montane coniferous forest and urban. Day roosting sites consist of crevices in cliff faces, cracks in boulders, and occasionally buildings (Brown and Pierson, 1996). Tunnels and trees are also used for roosting. They emerge from roost sites just after dark (Western Bat Working Group, 2005b). Western mastiff bats generally roost in groups of less than 100 individuals and young are born in June or July (Brown and Pierson, 1996). They appear to be periodically active during the winter and do not go through extended hibernation (Western Bat Working Group, 2005). Mating generally occur in the spring and pupping may occur from early April through August or September. The species forages in a wide variety of habitats including grasslands, shrublands, open woodland and forests, and croplands. The western mastiff bat feeds on a variety of insects, with moth, crickets, beetles, and cicadas being the most important.

The species roost sites are primarily associated with crevices in cliff faces and boulders, which don't occur in the study area and are limited in the vicinity of the study area. One CNDDB occurrence for western mastiff bat is within 5 miles of the study area (CDFW, 2021). The species was not observed or caught during mammal surveys at the study area (CDFG, 2003b).

American Badger

American badger is a California species of special concern. American badgers occur throughout the state except for the humid coastal forests of northwestern California in Del Norte and Humboldt counties (Zeiner et al. 1990).

American badgers occur in a wide variety of open, arid habitats including shrub, forest, and herbaceous habitat, but most commonly are associated with grasslands, savannas, mountain meadows, and open areas of desert scrub. They require sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground (Williams, 1986). Badgers dig burrows, which are used for cover and reproduction (Zeiner et al. 1990). They frequently reuse old burrows, although some may dig a new den each night, especially in summer (Messick and Hornocker, 1981). Dens area usually located in sandy soil in areas with sparse overstory cover. Mating takes place in the summer and early fall with litters generally born in March and April. Young are born in burrows dug in dry, often sandy, soil. Badgers are carnivorous and eat fossorial rodents (especially ground squirrels and pocket gophers) and some reptiles, insects, eggs, birds, and carrion; their diet shifts seasonally and yearly in response to availability of prey. They are active yearlong, and day and night (Zeiner et al. 1990).

Suitable habitat for American badger is present in the annual grassland within study area. Although, there are no CNDDB occurrences within 5 miles of the study area (CDFW, 2021), the species was observed within Sites Reservoir study area (CDFG, 2003b).

Other Protected and Managed Biological Resources

Game Fish

Based on the species list, the following game fish species are known to occur in the vicinity of the study area. These include:

- Striped Bass
- American Shad
- Black Bass

However, as in-water work would not occur (including the banks of aquatic resources), game fish species are not discussed further in this report

Migratory Birds

Non-special-status migratory birds, including raptors, have the potential to nest in trees, shrubs, and ground vegetation in and adjacent to geotechnical and geophysical work areas. For example, the riparian corridor along Funks, Stone Corral, and Antelope creeks provide suitable nesting habitat for various birds and raptors. Although these species are not considered special-status wildlife species, their occupied nests

and eggs are protected by California Fish and Game Code Sections 3503 and 3503.5 and by the Federal Migratory Bird Treaty Act (see Appendix B, *Regulatory Setting, Permits, and Authorizations* of the EA/IS).

Waters of the U.S./State

Potential waters of the U.S./State occur throughout the study area. These areas consist of freshwater marsh, seasonal wetlands, ponds, Funks Reservoir, and various waterways, including Funks Creek, Stone Corral Creek, Antelope Creek, Bird Creek, and some canals and ditches, and takes into consideration the State Water Resources Control Board's recently adopted wetland definitions (see Appendix B, *Regulatory Setting, Permits, and Authorizations*, in the EA/IS for more detail).

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Attachment D-1: Sensitive Biological Resources

CNDDB Query January 2021

Plant Species

Common Name	Scientific Name
adobe-lily	*Fritillaria pluriflora*
Ahart's dwarf rush	*Juncus leiospermus* var. *ahartii*
Ahart's paronychia	*Paronychia ahartii*
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*
bent-flowered fiddleneck	*Amsinckia lunaris*
Bolander's horkelia	*Horkelia bolanderi*
Brittlescale	*Atriplex depressa*
California alkali grass	*Puccinellia simplex*
caper-fruited tropidocarpum	*Tropidocarpum capparideum*
Colusa grass	*Neostapfia colusana*
Colusa layia	*Layia septentrionalis*
Coulter's goldfields	*Lasthenia glabrata* ssp. *coulteri*
deep-scarred cryptantha	*Cryptantha excavata*
diamond-petaled California poppy	*Eschscholzia rhombipetala*
dimorphic snapdragon	*Antirrhinum subcordatum*
dwarf downingia	*Downingia pusilla*
Ferris' milk-vetch	*Astragalus tener* var. *ferrisiae*
Greene's tuctoria	*Tuctoria greenei*
hairy Orcutt grass	*Orcuttia pilosa*
heartscale	*Atriplex cordulata* var. *cordulata*
Heckard's pepper-grass	*Lepidium latipes* var. *heckardii*
Hoover's spurge	*Euphorbia hooveri*
Keck's checkerbloom	*Sidalcea keckii*
legenere	*Legenere limosa*
palmate-bracted bird's-beak	*Chloropyron palmatum*
pink creamsacs	*Castilleja rubicundula* var. *rubicundula*
Red Bluff dwarf rush	*Juncus leiospermus* var. *leiospermus*
red-flowered bird's-foot trefoil	*Acmispon rubriflorus*
San Joaquin spearscale	*Extriplex joaquinana*
shining navarretia	*Navarretia nigelliformis* ssp. *radians*
silky cryptantha	*Cryptantha crinita*
vernal pool smallscale	*Atriplex persistens*
water star-grass	*Heteranthera dubia*
woolly rose-mallow	*Hibiscus lasiocarpos* var. *occidentalis*

CNDDB Query January 2021

Wildlife Species

Common Name	Scientific Name
American badger	*Taxidea taxus*
Antioch Dunes anthicid beetle	*Anthicus antiochensis*
bald eagle	*Haliaeetus leucocephalus*
bank swallow	*Riparia riparia*
black-crowned night heron	*Nycticorax nycticorax*
Blennosperma vernal pool andrenid bee	*Andrena blennospermatis*
burrowing owl	*Athene cunicularia*
California linderiella	*Linderiella occidentalis*
California tiger salamander	*Ambystoma californiense*
Conservancy fairy shrimp	*Branchinecta conservatio*
Crotch bumble bee	*Bombus crotchii*
foothill yellow-legged frog	*Rana boylii*
giant gartersnake	*Thamnophis gigas*
great blue heron	*Ardea herodias*
great egret	*Ardea alba*
greater sandhill crane	*Antigone canadensis tabida*
hoary bat	*Lasiurus cinereus*
least Bell's vireo	*Vireo bellii pusillus*
long-eared myotis	*Myotis evotis*
Marysville California kangaroo rat	*Dipodomys californicus eximius*
mountain plover	*Charadrius montanus*
North American porcupine	*Erethizon dorsatum*
osprey	*Pandion haliaetus*
pallid bat	*Antrozous pallidus*
prairie falcon	*Falco mexicanus*
San Joaquin pocket mouse	*Perognathus inornatus*
silver-haired bat	*Lasionycteris noctivagans*
snowy egret	*Egretta thula*
Swainson's hawk	*Buteo swainsoni*
tricolored blackbird	*Agelaius tricolor*
valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*
vernal pool fairy shrimp	*Branchinecta lynchi*
vernal pool tadpole shrimp	*Lepidurus packardi*
western mastiff bat	*Eumops perotis californicus*
western pond turtle	*Emys marmorata*
western red bat	*Lasiurus blossevillii*
western spadefoot	*Spea hammondii*
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*

Common Name	Scientific Name
white-faced ibis	*Plegadis chihi*
white-tailed kite	*Elanus leucurus*
Wilbur Springs minute moss beetle	*Ochthebius recticulus*
yellow warbler	*Setophaga petechia*
yellow-breasted chat	*Icteria virens*
Yuma myotis	*Myotis yumanensis*

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: December 08, 2021
Consultation Code: 08ESMF00-2022-SLI-0533
Event Code: 08ESMF00-2022-E-01574
Project Name: Proposed Sites Reservoir Geotechnical Investigation in Colusa and Glenn Counties, California

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the

Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

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 Tracking Number 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

Consultation Code: 08ESMF00-2022-SLI-0533
Event Code: Some(08ESMF00-2022-E-01574)
Project Name: Proposed Sites Reservoir Geotechnical Investigation in Colusa and Glenn Counties, California
Project Type: WATER SUPPLY / DELIVERY
Project Description: The Bureau of Reclamation (Reclamation) and the Sites Project Authority (Authority) are proposing additional geotechnical and geophysical investigations in Glenn, Colusa, and Yolo Counties to further inform the design and construction of the proposed Sites Reservoir and its associated facilities in western Sacramento Valley.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.32457995,-122.34126694124302,14z

Counties: Colusa, Glenn, and Yolo counties, California

Endangered Species Act Species

There is a total of 18 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
Northern Spotted Owl *Strix occidentalis caurina* 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/1123	Threatened
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
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Colusa Grass *Neostapfia colusana* 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/5690	Threatened
Greene's Tuctoria *Tuctoria greenei* 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/1573	Endangered
Hairy Orcutt Grass *Orcuttia pilosa* 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/2262	Endangered
Hoover's Spurge *Chamaesyce hooveri* 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/3019	Threatened
Keck's Checker-mallow *Sidalcea keckii* 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/5704	Endangered
Palmate-bracted Bird's Beak *Cordylanthus palmatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1616	Endangered
Slender Orcutt Grass *Orcuttia tenuis* 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/1063	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

84 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 4012242, 4012232, 4012222, 4012212, 4012223, 4012213, 4012214, 4012221, 4012211, 4012127, 3812271, 3812188, 3812177, 3812178, 3812281, 3812187, 3912117, 3912127, 3912128, 3912126, 3912273, 3912271, 3912272, 3912263, 3912262, 3912261, 3912252, 3912251, 3912242, 3912253, 3912241, 3912231, 3912232, 3912233, 3912244, 3912234, 3912224, 3912223, 3912222, 3912168, 3912178 3912116 and 3812176;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Acmispon rubriflorus	red-flowered bird's-foot trefoil	Fabaceae	annual herb	Apr-Jun	1B.1	S2	G2
Agrostis hendersonii	Henderson's bent grass	Poaceae	annual herb	Apr-Jun	3.2	S2	G2Q
Allium sanbornii var. sanbornii	Sanborn's onion	Alliaceae	perennial bulbiferous herb	May-Sep	4.2	S3S4	G4T3T4
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S3	G3
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	4.2	S3S4	G5? T3T4
Antirrhinum subcordatum	dimorphic snapdragon	Plantaginaceae	annual herb	Apr-Jul	4.3	S3	G3
Astragalus breweri	Brewer's milk-vetch	Fabaceae	annual herb	Apr-Jun	4.2	S3	G3
Astragalus clevelandii	Cleveland's milk-vetch	Fabaceae	perennial herb	Jun-Sep	4.3	S4	G4
Astragalus pauperculus	depauperate milk-vetch	Fabaceae	annual herb	Mar-Jun	4.3	S4	G4
Astragalus rattanii var. jepsonianus	Jepson's milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S3	G4T3
	Ferris' milk-vetch	Fabaceae	annual herb	Apr-May	1B.1	S1	G2T1

Astragalus tener var. ferrisiae							
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Atriplex persistens	vernal pool smallscale	Chenopodiaceae	annual herb	Jun,Aug,Sep,Oct	1B.2	S2	G2
Azolla microphylla	Mexican mosquito fern	Azollaceae	annual / perennial herb	Aug	4.2	S4	G5
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Brasenia schreberi	watershield	Cabombaceae	perennial rhizomatous herb (aquatic)	Jun-Sep	2B.3	S3	G5
Brodiaea rosea ssp. rosea	Indian Valley brodiaea	Themidaceae	perennial bulbiferous herb	May-Jun	3.1	S2	G2
Brodiaea rosea ssp. vallicola	valley brodiaea	Themidaceae	perennial bulbiferous herb	Apr-May(Jun)	4.2	S3	G5T3
Calystegia collina ssp. oxyphylla	Mt. Saint Helena morning-glory	Convolvulaceae	perennial rhizomatous herb	Apr-Jun	4.2	S3	G4T3
Calystegia collina ssp. tridactylosa	three-fingered morning-glory	Convolvulaceae	perennial rhizomatous herb	Apr-Jun	1B.2	S1	G4T1
Castilleja rubicundula var. rubicundula	pink creamsacs	Orobanchaceae	annual herb (hemiparasitic)	Apr-Jun	1B.2	S2	G5T2
Centromadia parryi ssp. rudis	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	4.2	S3	G3T3
Chloropyron palmatum	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	1B.1	S1	G1
Chorizanthe spinosa	Mojave spineflower	Polygonaceae	annual herb	Mar-Jul	4.2	S4	G4
Clarkia gracilis ssp. tracyi	Tracy's clarkia	Onagraceae	annual herb	Apr-Jul	4.2	S3	G5T3
Collomia diversifolia	serpentine collomia	Polemoniaceae	annual herb	May-Jun	4.3	S4	G4
Cryptantha crinita	silky cryptantha	Boraginaceae	annual herb	Apr-May	1B.2	S2	G2
Cryptantha dissita	serpentine cryptantha	Boraginaceae	annual herb	Apr-Jun	1B.2	S2	G2
Cryptantha excavata	deep-scarred cryptantha	Boraginaceae	annual herb	Apr-May	1B.1	S1	G1
Cryptantha rostellata	red-stemmed cryptantha	Boraginaceae	annual herb	Apr-Jun	4.2	S3	G4
Cymopterus deserticola	desert cymopterus	Apiaceae	perennial herb	Mar-May	1B.2	S2	G2
Cypripedium montanum	mountain lady's-slipper	Orchidaceae	perennial rhizomatous herb	Mar-Aug	4.2	S4	G4

Delphinium uliginosum	swamp larkspur	Ranunculaceae	perennial herb	May-Jun	4.2	S3	G3
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU
Eriastrum tracyi	Tracy's eriastrum	Polemoniaceae	annual herb	May-Jul	3.2	S3	G3Q
Eriogonum nervulosum	Snow Mountain buckwheat	Polygonaceae	perennial rhizomatous herb	Jun-Sep	1B.2	S2	G2
Erythranthe glaucescens	shield-bracted monkeyflower	Phrymaceae	annual herb	Feb-Aug(Sep)	4.3	S3S4	G3G4
Eschscholzia rhombipetala	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	1B.1	S1	G1
Euphorbia hooveri	Hoover's spurge	Euphorbiaceae	annual herb	Jul-Sep(Oct)	1B.2	S1	G1
Euphorbia ocellata ssp. rattanii	Stony Creek spurge	Euphorbiaceae	annual herb	May-Oct	1B.2	S2?	G4T2?
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Fritillaria eastwoodiae	Butte County fritillary	Liliaceae	perennial bulbiferous herb	Mar-Jun	3.2	S3	G3Q
Fritillaria pluriflora	adobe-lily	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2S3	G2G3
Gratiola heterosepala	Boggs Lake hedge-hyssop	Plantaginaceae	annual herb	Apr-Aug	1B.2	S2	G2
Harmonia hallii	Hall's harmonia	Asteraceae	annual herb	Apr-Jun	1B.2	S2?	G2?
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	4.2	S3	G3
Hesperolinon drymarioides	drymaria-like western flax	Linaceae	annual herb	May-Aug	1B.2	S2	G2
Heteranthera dubia	water star-grass	Pontederiaceae	perennial herb (aquatic)	Jul-Oct	2B.2	S2	G5
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	1B.2	S3	G5T3
Juncus leiospermus var. ahartii	Ahart's dwarf rush	Juncaceae	annual herb	Mar-May	1B.2	S1	G2T1
Juncus leiospermus var. leiospermus	Red Bluff dwarf rush	Juncaceae	annual herb	Mar-Jun	1B.1	S2	G2T2
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	Feb-Jun	1B.1	S2	G4T2
Layia septentrionalis	Colusa layia	Asteraceae	annual herb	Apr-May	1B.2	S2	G2
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2
Lepidium latipes var. heckardii	Heckard's pepper-grass	Brassicaceae	annual herb	Mar-May	1B.2	S1	G4T1
Limnanthes floccosa ssp. californica	Butte County meadowfoam	Limnanthaceae	annual herb	Mar-May	1B.1	S1	G4T1

Limnanthes floccosa ssp. floccosa	woolly meadowfoam	Limnanthaceae	annual herb	Mar-May(Jun)	4.2	S3	G4T4
Lupinus milo-bakeri	Milo Baker's lupine	Fabaceae	annual herb	Jun-Sep	1B.1	S1	G1Q
Lupinus sericatus	Cobb Mountain lupine	Fabaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
Malacothamnus helleri	Heller's bush-mallow	Malvaceae	perennial deciduous shrub	May-Jul	3.3	S3	G3Q
Myosurus minimus ssp. apus	little mousetail	Ranunculaceae	annual herb	Mar-Jun	3.1	S2	G5T2Q
Navarretia heterandra	Tehama navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	Polemoniaceae	annual herb	Apr-Jun	4.2	S3	G4T3
Navarretia nigelliformis ssp. radians	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	1B.2	S2	G4T2
Navarretia paradoxinota	Porter's navarretia	Polemoniaceae	annual herb	May-Jun(Jul)	1B.3	S2	G2
Navarretia subuligera	awl-leaved navarretia	Polemoniaceae	annual herb	Apr-Aug	4.3	S4	G4
Neostapfia colusana	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
Orcuttia pilosa	hairy Orcutt grass	Poaceae	annual herb	May-Sep	1B.1	S1	G1
Orcuttia tenuis	slender Orcutt grass	Poaceae	annual herb	May-Sep(Oct)	1B.1	S2	G2
Paronychia ahartii	Ahart's paronychia	Caryophyllaceae	annual herb	Feb-Jun	1B.1	S3	G3
Polygonum bidwelliae	Bidwell's knotweed	Polygonaceae	annual herb	Apr-Jul	4.3	S4	G4
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	1B.2	S3	G3
Senecio clevelandii var. clevelandii	Cleveland's ragwort	Asteraceae	perennial herb	Jun-Jul	4.3	S3	G4?T3Q
Sidalcea celata	Redding checkerbloom	Malvaceae	perennial herb	Apr-Aug	3	S2S3	G2G3
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	Apr-May(Jun)	1B.1	S2	G2
		Brassicaceae	annual herb	Apr-Jun	4.3	S4	G4

Streptanthus drepanoides	sickle-fruit jewelflower						
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	1B.2	S2	G2
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Asteraceae	annual herb	May-Sep	2B.1	S1	G4T3
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1
Tuctoria greenei	Greene's tuctoria	Poaceae	annual herb	May-Jul(Sep)	1B.1	S1	G1
Wolffia brasiliensis	Brazilian watermeal	Araceae	perennial herb (aquatic)	Apr,Dec	2B.3	S2	G5

Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 16 December 2020].

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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

Questions and Comments
rareplants@cnps.org

National Marine Fisheries Service Species List

Quad Name	Logan Ridge	Rail Canyon	Lodoga	Moulton Weir	Maxwell	Sites
Quad Number	39122- D3	39122- D4	39122- C4	39122-C1	39122-C2	39122- C3
ESA Anadromous Fish						
SONCC Coho ESU (T) -						
CCC Coho ESU (E) -						
CC Chinook Salmon ESU (T) -						
CVSR Chinook Salmon ESU (T) -				X	X	X
SRWR Chinook Salmon ESU (E) -				X	X	X
NC Steelhead DPS (T) -						
CCC Steelhead DPS (T) -						
SCCC Steelhead DPS (T) -						
SC Steelhead DPS (E) -						
CCV Steelhead DPS (T) -				X	X	X
Eulachon (T) -						
sDPS Green Sturgeon (T) -				X		
ESA Anadromous Fish Critical Habitat						
SONCC Coho Critical Habitat -						
CCC Coho Critical Habitat -						
CC Chinook Salmon Critical Habitat -						
CVSR Chinook Salmon Critical Habitat -				X		
SRWR Chinook Salmon Critical Habitat -				X		
NC Steelhead Critical Habitat -						
CCC Steelhead Critical Habitat -						
SCCC Steelhead Critical Habitat -						
SC Steelhead Critical Habitat -						
CCV Steelhead Critical Habitat -				X		
Eulachon Critical Habitat -						
sDPS Green Sturgeon Critical Habitat -				X		
ESA Marine Invertebrates						
Range Black Abalone (E) -						
Range White Abalone (E) -						
ESA Marine Invertebrates Critical Habitat						
Black Abalone Critical Habitat -						
ESA Sea Turtles						
East Pacific Green Sea Turtle (T) -						
Olive Ridley Sea Turtle (T/E) -						
Leatherback Sea Turtle (E) -						
North Pacific Loggerhead Sea Turtle (E) -						
ESA Whales						
Blue Whale (E) -						
Fin Whale (E) -						
Humpback Whale (E) -						
Southern Resident Killer Whale (E) -						
North Pacific Right Whale (E) -						
Sei Whale (E) -						
Sperm Whale (E) -						
ESA Pinnipeds						
Guadalupe Fur Seal (T) -						
Steller Sea Lion Critical Habitat -						
Essential Fish Habitat						
Coho EFH -						
Chinook Salmon EFH -	X	X	X	X	X	X
Groundfish EFH -						
Coastal Pelagics EFH -						
Highly Migratory Species EFH -						
MMPA Species (See list at left)						
ESA and MMPA Cetaceans/Pinnipeds						
See list at left and consult the NMFS Long Beach office						
562-980-4000						
MMPA Cetaceans -						
MMPA Pinnipeds -						

Attachment D-2: Biological Resources Mapbook

Biological Resources Mapbook 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations
Page 1 of 29

SDI2-B-002
SD8-SR-005
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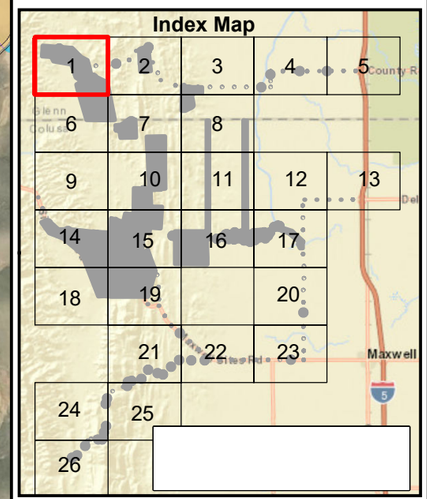
SD8-SR-004
SD8-B-005a
SD8-B-005b
SDI1-B-002
SDI1-SR-001
SD8-B-004
SD6-B-002a
SD6-B-002b
SD6-SR-001
SD6-SR-002
NA-B-003w
NA-B-003u
North Rd
SD5-SR-001
SD5-SR-004
SD5-SR-003
SD5-B-003
SD5-Mapping
SD5-SR-002
SD5-B-004b
SD5-B-004a
SD5-B-005
SD5-B-007
SD5-B-006
Funks Creek
SDQ-B-002
SDQ-SR-001
SDQ-B-005
SD3-SR-001
SD3-Mapping

- Existing Road/Path
- Geologic Mapping Survey Areas
- Geophysical Survey Lines
- Piezometer
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Developed
- Disturbed
- Ephemeral Stream
- Forested Wetland
- Freshwater Marsh
- Intermittent Stream
- Pond
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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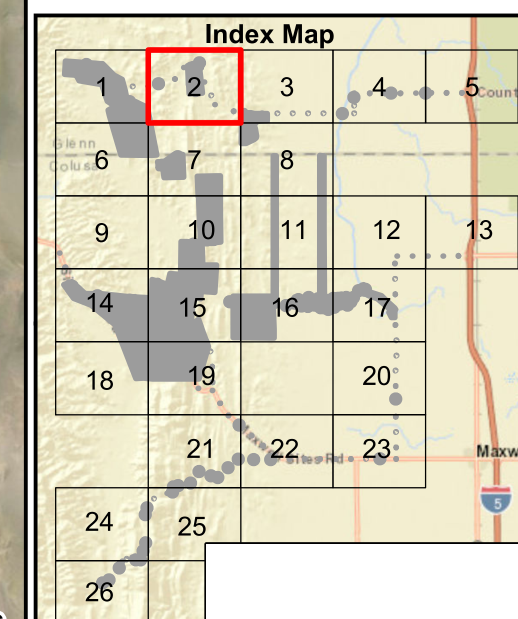
- Existing Road/Path
- Geologic Mapping Survey Areas
- Geophysical Survey Lines
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Developed
- Ephemeral Stream
- Freshwater Marsh
- Intermittent Stream
- Pond
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland



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Tehama Colusa Canal

NA-B-003e
NA-B-003c
NA-B-003a
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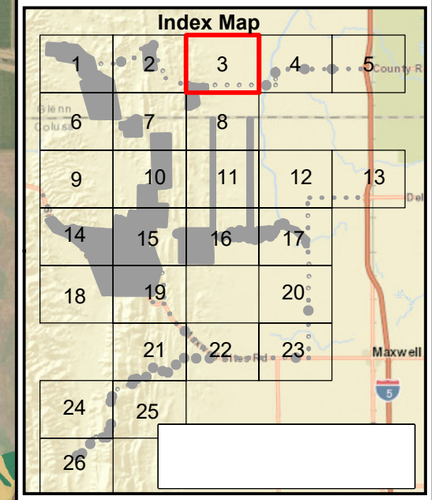
R69-B-003i
R69-B-003g
R69-B-003e
R69-B-003c
Glenn-Colusa Canal

- Existing Road/Path
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ditch
- Intermittent Stream
- Pond
- Rice
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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Existing Road/Path
Auger/Boring
Pavement Core

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ditch
- Freshwater Marsh
- Intermittent Stream
- Ornamental Woodland
- Rice
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

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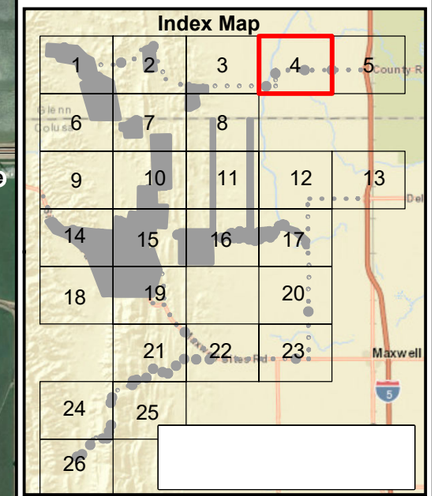

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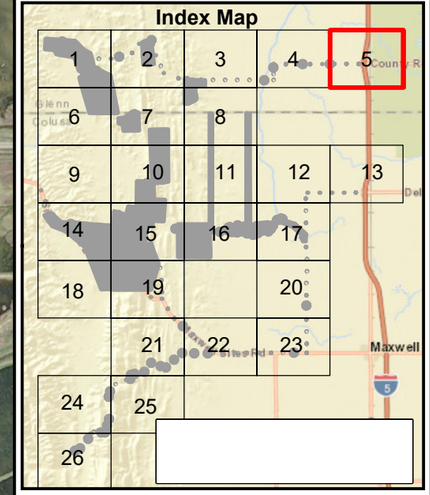
- Existing Road/Path
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Canal
- Disturbed
- Ditch
- Freshwater Marsh
- Rice
- Scrub-Shrub Wetland



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SD3-B-009
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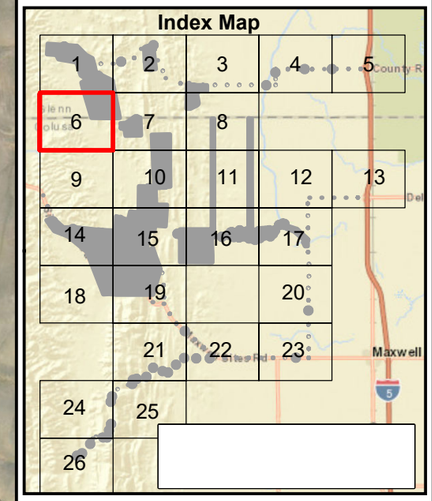
Grapevine Creek
Funks Creek

- Existing Road/Path
- Geologic Mapping Survey Areas
- Geophysical Survey Lines
- Piezometer
- Auger/Boring

Land Cover within Project Area

- Annual Grassland
- Developed
- Ephemeral Stream
- Freshwater Marsh
- Hayfield
- Intermittent Stream
- Pond
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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SD3-B-010a
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SD1-SR-002
SD1-B-002a
SD2-Mapping
SD2-B-003b
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SD2-SR-002
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Existing Road/Path
Geologic Mapping Survey Areas
Geophysical Survey Lines
Piezometer
Auger/Boring

Land Cover within Project Area
- Annual Grassland
- Ephemeral Stream
- Freshwater Marsh
- Hayfield
- Intermittent Stream
- Pond
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland

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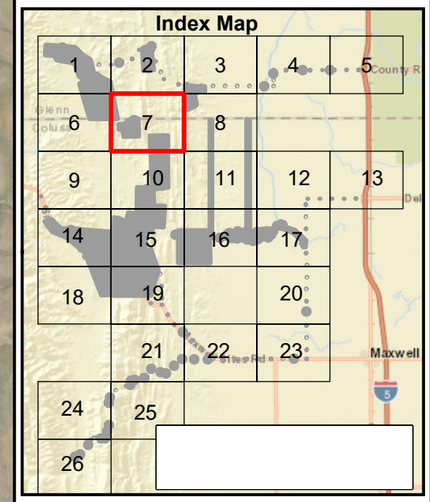

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Tehama Colusa Canal

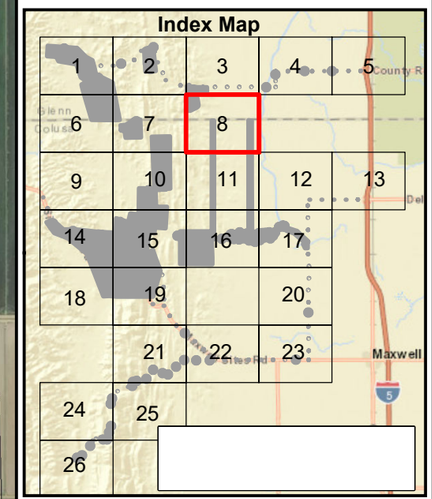
Glenn-Colusa Canal

Existing Road/Path

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ephemeral Stream
- Intermittent Stream
- Pond
- Ruderal
- Seasonal Wetland

Index Map



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Grapevine Creek

Funks Creek

SL-B-025e

Stone Corral Creek

SL-B-025c

- Existing Road/Path
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Developed
- Disturbed
- Hayfield
- Intermittent Stream
- Oak Savanna
- Ruderal
- Upland Riparian

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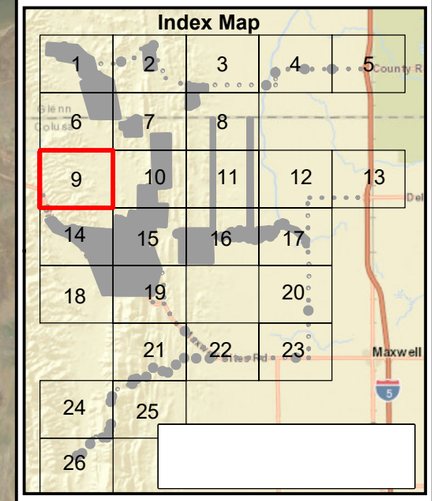

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GGQ-B-021
GGQ-B-018
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GGQ-SR-003a
Funks Creek
GGB-B-007
GG-B-003
GG-SR-005
GG-B-004a

- Existing Road/Path
- Geologic Mapping Survey Areas
- Geophysical Survey Lines
- Piezometer
- Auger/Boring

Land Cover within Project Area

- Annual Grassland
- Developed
- Ephemeral Stream
- Forested Wetland
- Freshwater Marsh
- Hayfield
- Intermittent Stream
- Oak Savanna
- Pond
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

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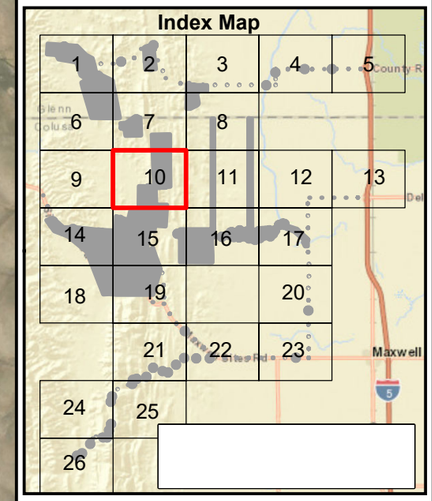

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Glenn-Colusa Canal

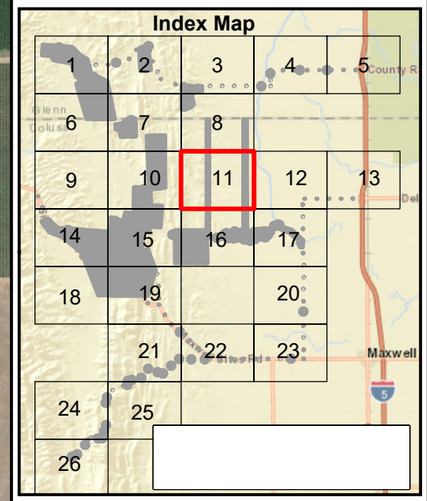
Tehama Colusa Canal

Existing Road/Path

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ditch
- Ephemeral Stream
- Intermittent Stream
- Pond
- Seasonal Wetland

Index Map



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Glenn-Colusa Canal

McDermott Rd

D-B-001a

D-B-001c

D-B-001e

MD-B-001b

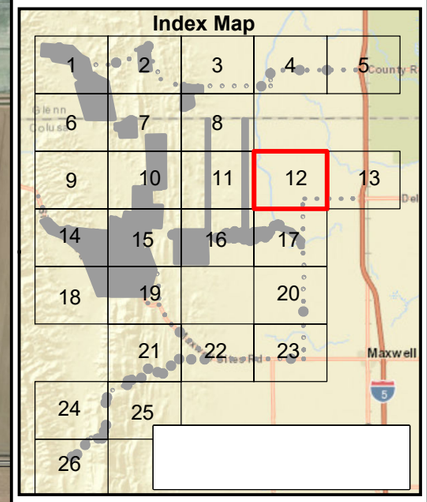
Existing Road/Path

Pavement Core

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ditch

Index Map



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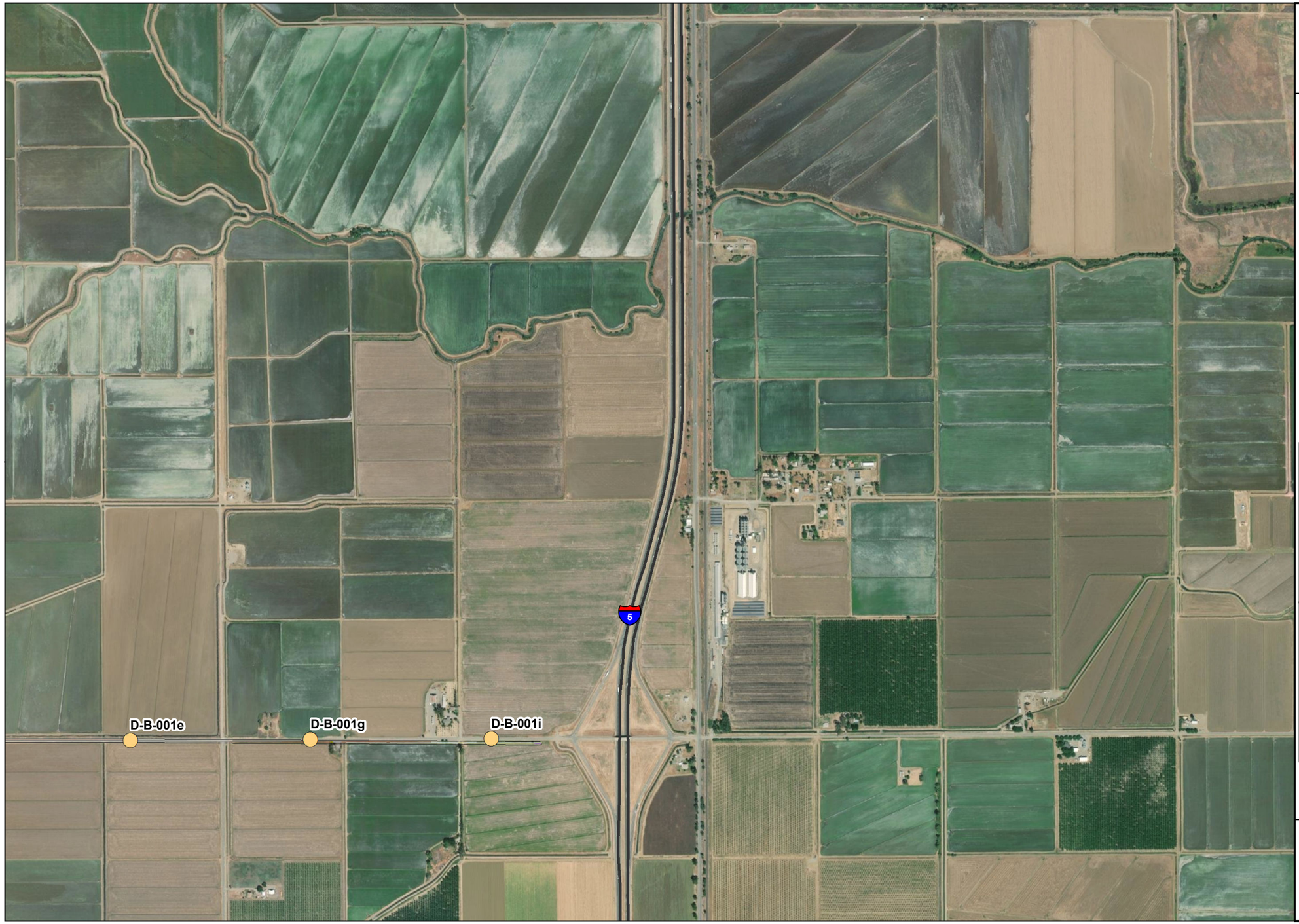


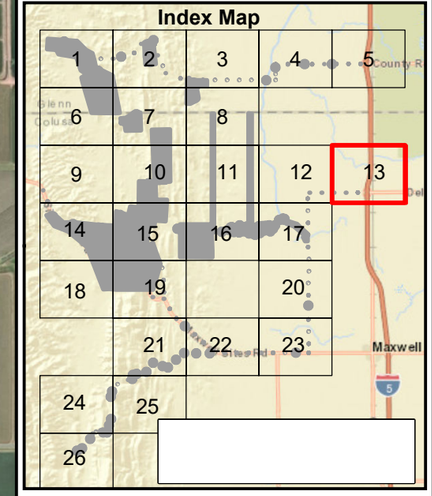
Existing Road/Path

Pavement Core

Land Cover within Project Area

- Developed
- Disturbed
- Ditch
- Ornamental Woodland
- Rice
- Ruderal

Index Map



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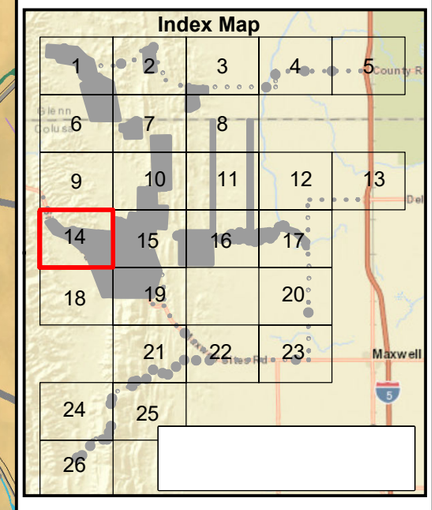
SL-SR-023

Existing Road/Path
Geophysical Survey Lines
Piezometer
Auger/Boring
Pavement Core

Land Cover within Project Area
- Annual Grassland
- Blue Oak Woodland
- Developed
- Ephemeral Stream
- Intermittent Stream
- Mixed Chaparral
- Oak Savanna
- Pond
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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GG-B-004b
GG-B-004a
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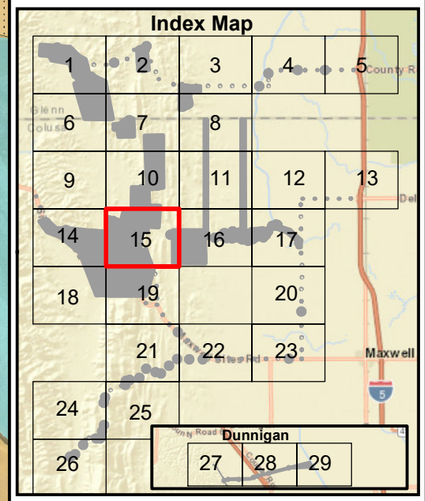
Funks Reservoir

Index Map



Existing Road/Path
Geologic Mapping Survey Areas
Geophysical Survey Lines
Piezometer
Auger/Boring

Land Cover within Project Area

- Annual Grassland
- Blue Oak Woodland
- Developed
- Disturbed
- Ditch
- Ephemeral Stream
- Forested Wetland
- Freshwater Marsh
- Intermittent Stream
- Oak Savanna
- Ornamental Woodland
- Pond
- Reservoir
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

N

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Feet

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FNK-B-019
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TRW-B-042
TRW-B-041
TRW-B-044
TRW-B-038
TRW-B-036
TRW-B-035
TRW-B-037
TRW-B-034
TRW-B-043
TRW-B-031
TRW-B-039
TRW-B-033
TRW-B-040
TRW-C-027
TRW-C-026
TRW-C-019
TRW-B-032
TRW-C-018
TRW-B-012
TRW-C-012
TRW-B-019
TRW-B-021
TRW-B-018
TRW-B-020
TRW-B-024
TRW-B-017
TRW-B-015
TRW-B-025
TRW-B-013
TRW-C-017

- Existing Road/Path
- Geologic Mapping Survey Areas
- Piezometer
- Auger/Boring
- CPT
- Seismic CPT

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ditch
- Ephemeral Stream
- Forested Wetland
- Freshwater Marsh
- Intermittent Stream
- Orchard
- Pond
- Reservoir
- Row Crops
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map

1 2 3 4 5
6 7 8
9 10 11 12 13
14 15 16 17
18 19 20
21 22 23
24 25
26 27 28 29
Maxwell
Dunnigan

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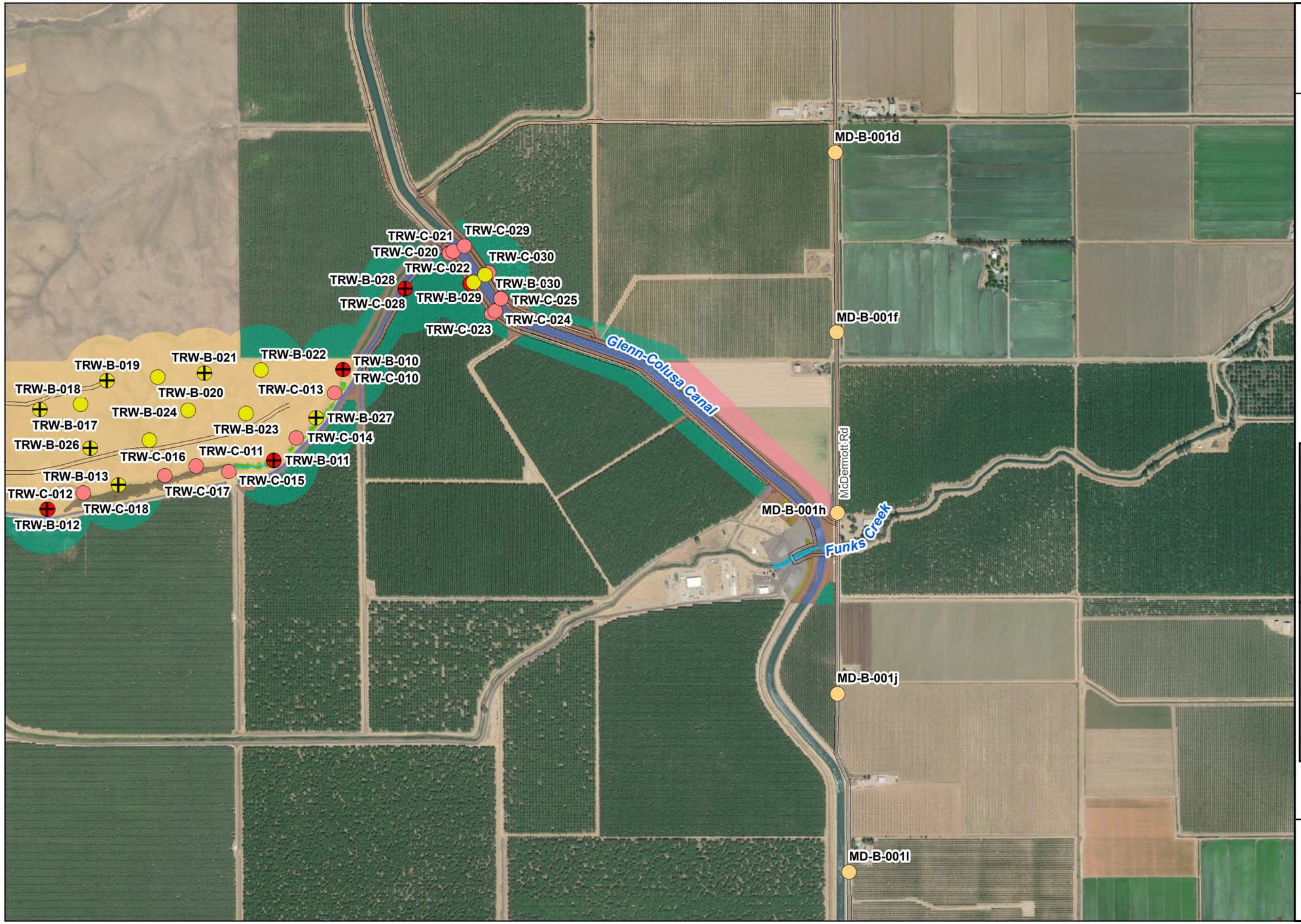
Biological Resources Mapbook 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations

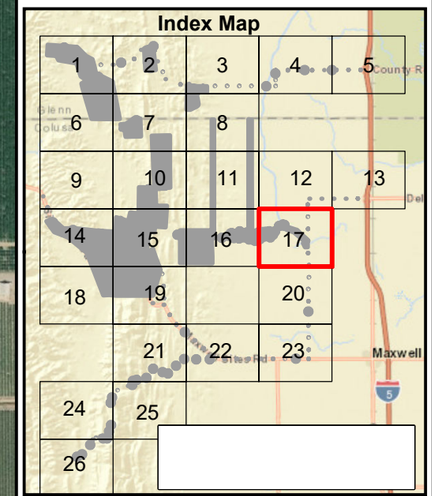


Existing Road/Path
Piezometer
Auger/Boring
Pavement Core
CPT
Seismic CPT

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Ditch
- Ephemeral Stream
- Freshwater Marsh
- Intermittent Stream
- Orchard
- Ornamental Woodland
- Row Crops
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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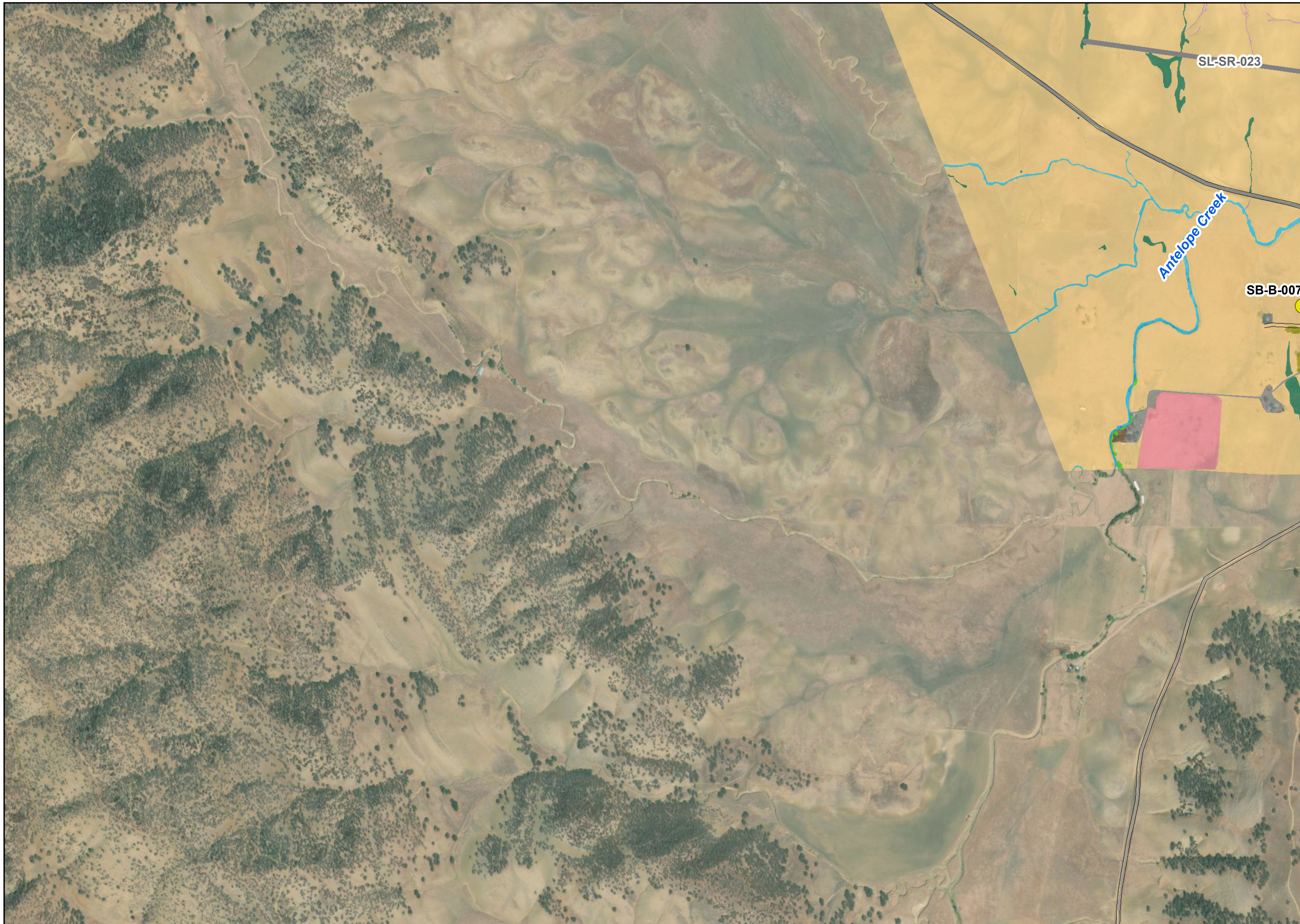
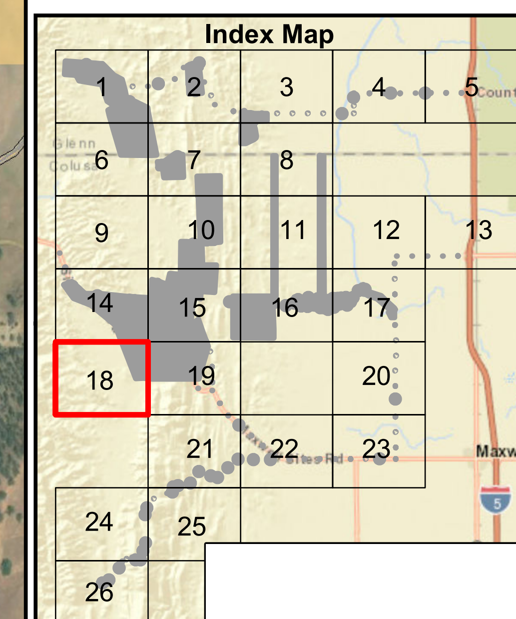


Existing Road/Path
Geophysical Survey Lines
Auger/Boring

Land Cover within Project Area

- Annual Grassland
- Developed
- Disturbed
- Ephemeral Stream
- Intermittent Stream
- Ornamental Woodland
- Pond
- Row Crops
- Seasonal Wetland
- Upland Riparian



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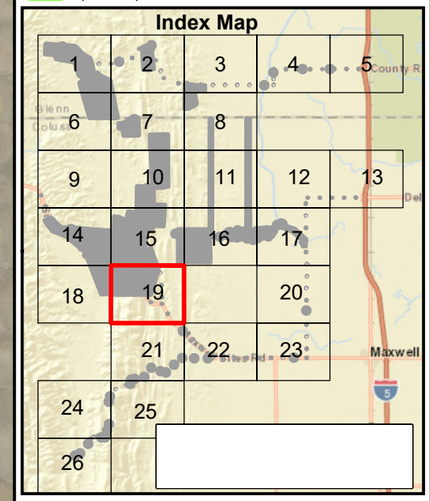
SL-SR-023
SB-B-001
Antelope Creek
SB-B-007
SQ-SR-005a
SL-B-012
SQ-SR-004a
SL-B-001f
SQ-B-008
SQ-SR-003a
SQ-B-009
SQ-SR-002
SQ-B-011
SQ-B-012
IO-B-S-01
IO-B-S-02
IO-B-S-03
IO-B-S-04
SQ-B-013
SQ-SR-001
IO-B-S-05
S-B-007
S-B-006
S-B-009
S-B-008
S-B-005
S-B-015b
S-B-015a
MS-B-004m
SL-B-001d
Maxwell Sites Rd
SL-B-001b
MS-B-004k
MS-B-004i
MS-B-004g
Stone Corral Creek
MS-B-004e

- Existing Road/Path
- Geologic Mapping Survey Areas
- Geophysical Survey Lines
- Piezometer
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Blue Oak Woodland
- Developed
- Disturbed
- Ditch
- Ephemeral Stream
- Forested Wetland
- Freshwater Marsh
- Hayfield
- Intermittent Stream
- Oak Savanna
- Ornamental Woodland
- Pond
- Row Crops
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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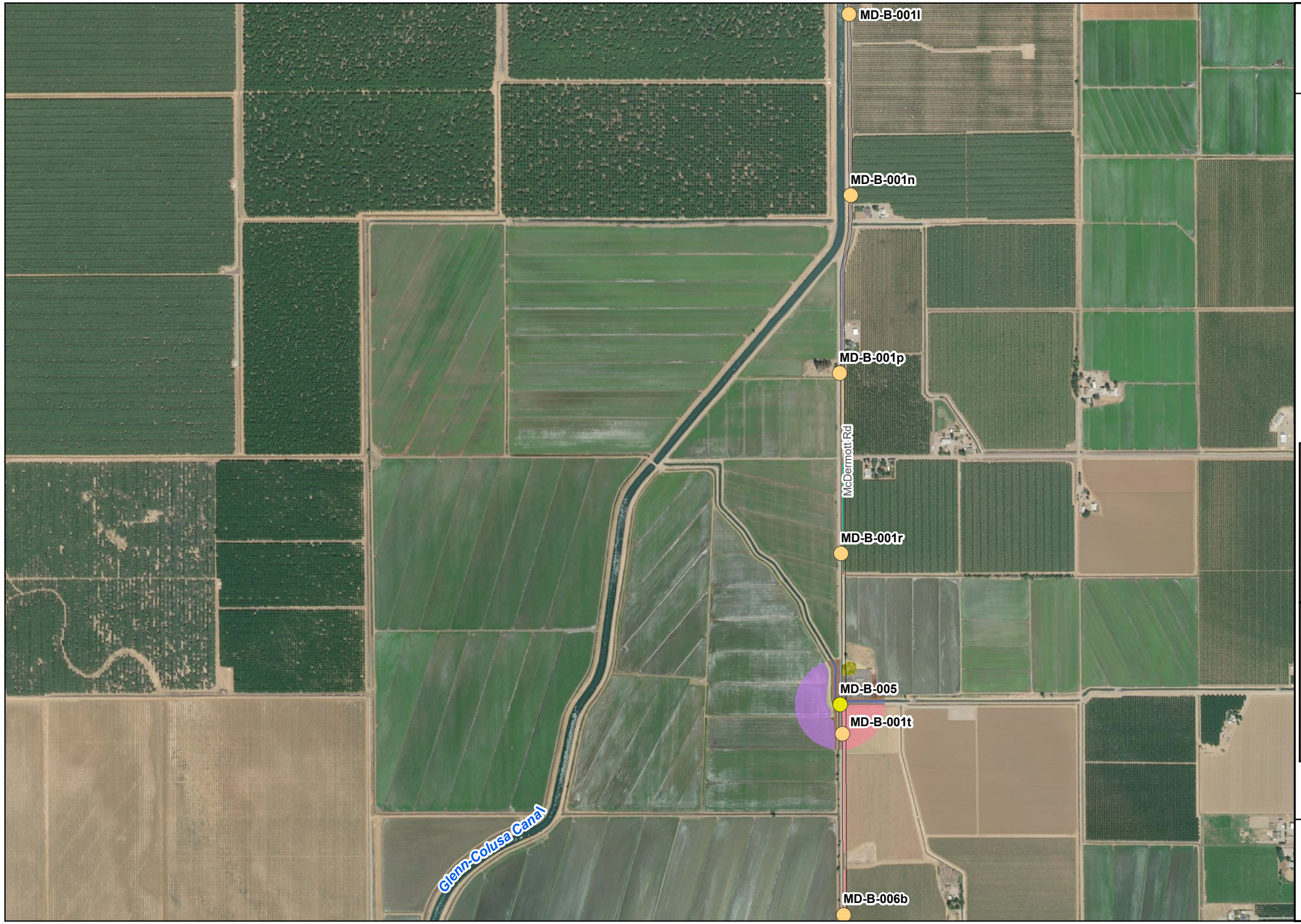
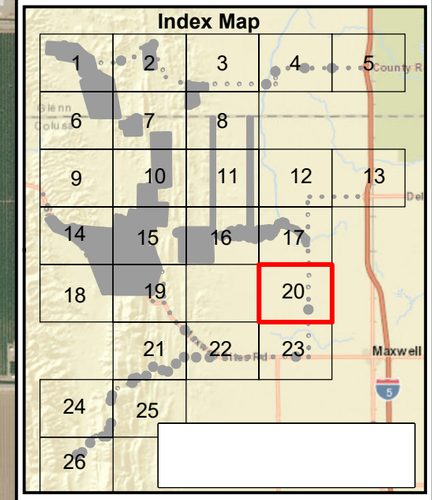


- Existing Road/Path
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Canal
- Developed
- Disturbed
- Ditch
- Orchard
- Ornamental Woodland
- Rice
- Row Crops
- Ruderal



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Biological Resources Mapbook
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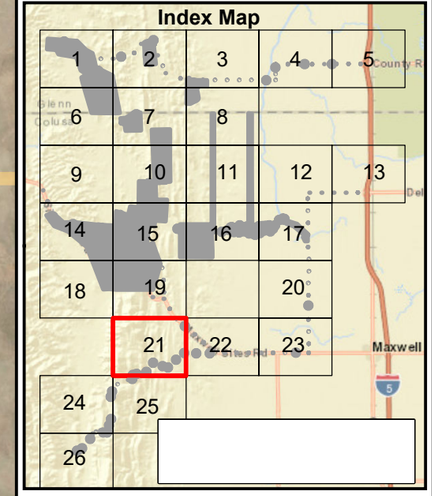
- Existing Road/Path
- Geophysical Survey Lines
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Blue Oak Woodland
- Developed
- Disturbed
- Ephemeral Stream
- Forested Wetland
- Freshwater Marsh
- Hayfield
- Intermittent Stream
- Oak Savanna
- Ornamental Woodland
- Pond
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian



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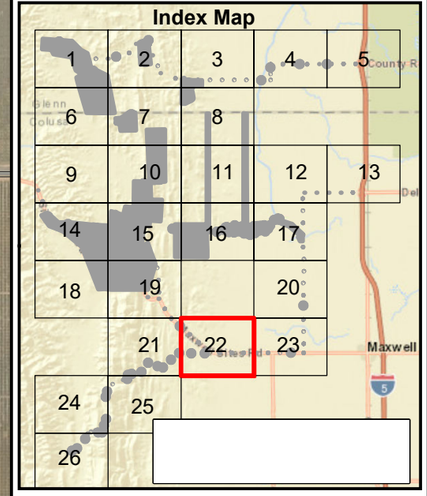
Biological Resources Mapbook 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations

- Existing Road/Path
- Auger/Boring
- Pavement Core

Land Cover within Project Area

- Annual Grassland
- Developed
- Disturbed
- Ephemeral Stream
- Forested Wetland
- Hayfield
- Intermittent Stream
- Ornamental Woodland
- Ruderal
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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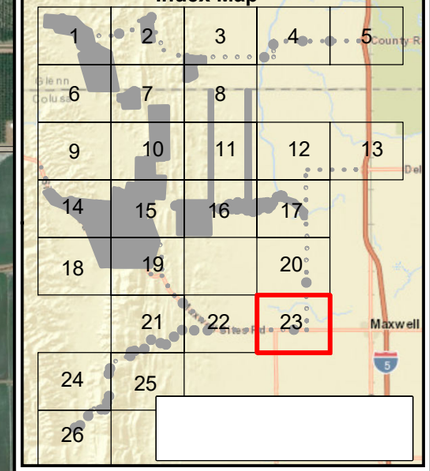
Biological Resources Mapbook 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations

MD-B-006b
MD-B-006d
MD-B-006f
MS-B-001h
MS-B-001f
MS-B-001d
MS-B-001b
MD-B-006h
MS-B-002
Glenn-Colusa Canal
Stone Corral Creek
McDermott Rd
Maxwell Sites Rd

Existing Road/Path
Auger/Boring
Pavement Core

Land Cover within Project Area
- Canal
- Developed
- Disturbed
- Ditch
- Hayfield
- Intermittent Stream
- Orchard
- Ornamental Woodland
- Rice
- Row Crops
- Ruderal

Index Map



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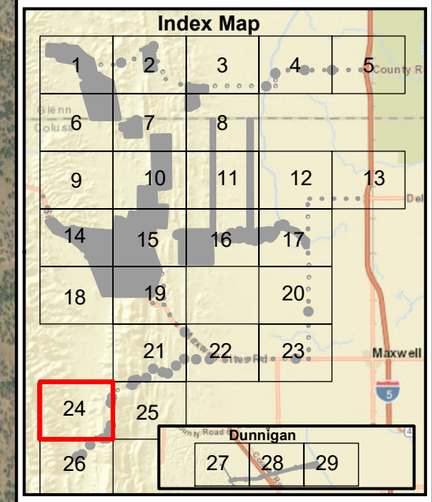
HM-SR-006
HM-B-016
HM-B-017a
Antelope Creek
HM-SR-007
HM-B-018
HM-B-019
HM-SR-008
HM-SR-009
HM-SR-012
HM-SR-014
HM-SR-011
HM-SR-015
HM-B-021
HM-B-023

Existing Road/Path
Geophysical Survey Lines
Auger/Boring

Land Cover within Project Area
- Annual Grassland
- Blue Oak Woodland
- Developed
- Ephemeral Stream
- Intermittent Stream
- Mixed Chaparral
- Oak Savanna
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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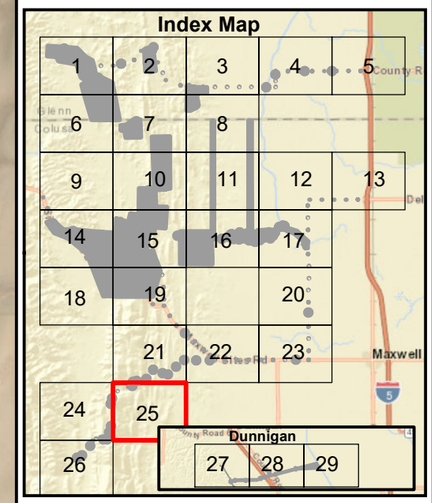
HM-B-009
HM-SR-003
HM-SR-001
HM-B-006g
HM-B-010
HM-SR-005
HM-SR-006
Lurline Creek
HM-B-016
HM-B-017a
HM-SR-007
HM-B-018
HM-B-019
HM-SR-008
HM-B-021

- Existing Road/Path
- Geophysical Survey Lines
- Auger/Boring

Land Cover within Project Area

- Annual Grassland
- Blue Oak Woodland
- Ephemeral Stream
- Intermittent Stream
- Oak Savanna
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian



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Biological Resources Mapbook 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations

HM-SR-014
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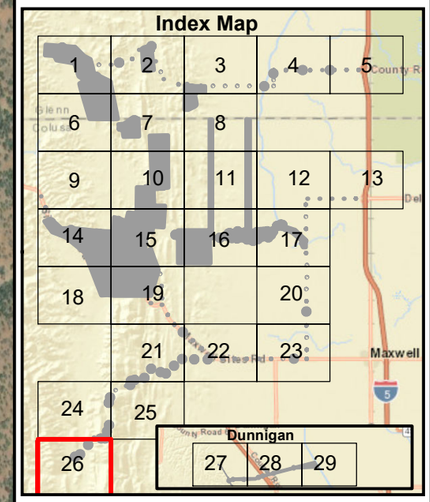
HM-B-021
HM-SR-011
HM-SR-015
Antelope Creek
HM-B-025
HM-B-027b
HM-B-029

Existing Road/Path
Geophysical Survey Lines
Auger/Boring

Land Cover within Project Area
- Annual Grassland
- Blue Oak Woodland
- Developed
- Ephemeral Stream
- Intermittent Stream
- Oak Savanna
- Pond
- Scrub-Shrub Wetland
- Seasonal Wetland
- Upland Riparian

Index Map



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Tehama Colusa Canal

5

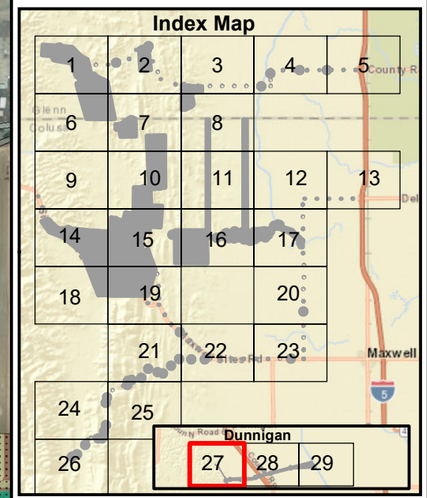
DNG-B-003
DNG-G-001
DNG-B-001
DNG-B-004
DNG-B-002
DNG-C-001

- Existing Road/Path
- Geologic Mapping Survey Areas
- Auger/Boring
- Seismic CPT

Land Cover within Project Area

- Annual Grassland
- Canal
- Developed
- Disturbed
- Intermittent Stream
- Orchard
- Row Crops
- Ruderal
- Upland Riparian

Index Map



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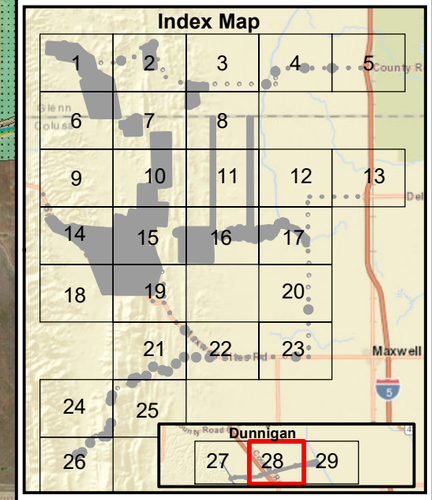
- Existing Road/Path
- Geologic Mapping Survey Areas
- Piezometer
- Auger/Boring
- Seismic CPT

Land Cover within Project Area

- Annual Grassland
- Developed
- Disturbed
- Ditch
- Intermittent Stream
- Managed Wetland
- Orchard
- Ornamental Woodland
- Pond
- Row Crops
- Ruderal
- Upland Riparian

Index Map



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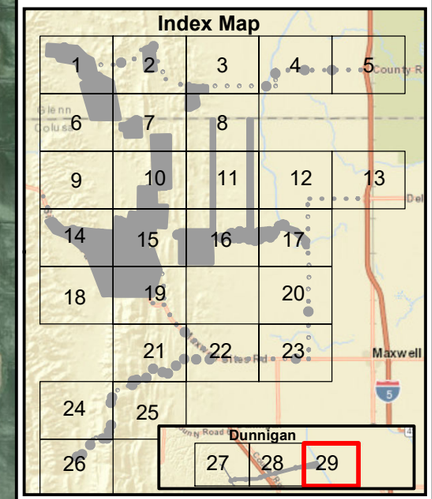
Biological Resources Mapbook
2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations
Page 29 of 29

- Existing Road/Path
- Geologic Mapping Survey Areas
- Auger/Boring
- Seismic CPT

Land Cover within Project Area

- Canal
- Disturbed
- Ditch
- Intermittent Stream
- Managed Wetland
- Row Crops
- Ruderal
- Upland Riparian



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Appendix E. Air Quality – CalEEMod Results

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Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Sites Geotech Investigations

Yolo/Solano AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	20.00	Acre	20.00	871,200.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	55
Climate Zone	3			**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

Project Characteristics -

Land Use -

Construction Phase - 1 year construction duration

Off-road Equipment - adjusted per project equipment list in Table 2-2

Grading - .

Trips and VMT - assumed 10 workers per day

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	260.00
tblConstructionPhase	PhaseEndDate	2/10/2023	12/29/2023
tblConstructionPhase	PhaseStartDate	1/28/2023	1/2/2023
tblGrading	AcresOfGrading	0.00	20.00

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	HorsePower	402.00	350.00
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	35.00	10.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.9326	7.3578	8.6571	0.0241	0.0250	0.3070	0.3320	4.9600e-003	0.2907	0.2956	0.0000	2,105.6492	2,105.6492	0.5548	2.9000e-004	2,119.6047

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Maximum	**0.9326**	**7.3578**	**8.6571**	**0.0241**	**0.0250**	**0.3070**	**0.3320**	**4.9600e-003**	**0.2907**	**0.2956**	**0.0000**	**2,105.6492**	**2,105.6492**	**0.5548**	**2.9000e-004**	**2,119.6047**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.9326	7.3578	8.6571	0.0241	0.0250	0.3070	0.3320	4.9600e-003	0.2907	0.2956	0.0000	2,105.6467	2,105.6467	0.5548	2.9000e-004	2,119.6022
Maximum	**0.9326**	**7.3578**	**8.6571**	**0.0241**	**0.0250**	**0.3070**	**0.3320**	**4.9600e-003**	**0.2907**	**0.2956**	**0.0000**	**2,105.6467**	**2,105.6467**	**0.5548**	**2.9000e-004**	**2,119.6022**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-2-2023**	**4-1-2023**	2.0500	2.0500
2	**4-2-2023**	**7-1-2023**	2.0727	2.0727
3	**7-2-2023**	**9-30-2023**	2.0727	2.0727
		Highest	2.0727	2.0727

2.2 Overall Operational

Unmitigated Operational

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0685	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0685**	**0.0000**	**1.8000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0685	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0685**	**0.0000**	**1.8000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/2/2023	12/29/2023	5	260	

Acres of Grading (Site Preparation Phase): 20

Acres of Grading (Grading Phase): 0

Acres of Paving: 20

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Bore/Drill Rigs	2	12.00	221	0.50
Site Preparation	Generator Sets	2	12.00	84	0.74
Site Preparation	Pumps	2	12.00	84	0.74
Site Preparation	Off-Highway Trucks	2	12.00	350	0.38
Site Preparation	Off-Highway Trucks	3	12.00	402	0.38
Site Preparation	Other Material Handling Equipment	2	12.00	168	0.40

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	12.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	14	10.00	0.00	0.00	15.00	9.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0106	0.0000	0.0106	1.1500e-003	0.0000	1.1500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.9282	7.3548	8.6197	0.0240		0.3070	0.3070		0.2906	0.2906	0.0000	2,094.2508	2,094.2508	0.5545	0.0000	2,108.1138
Total	**0.9282**	**7.3548**	**8.6197**	**0.0240**	**0.0106**	**0.3070**	**0.3176**	**1.1500e-003**	**0.2906**	**0.2918**	**0.0000**	**2,094.2508**	**2,094.2508**	**0.5545**	**0.0000**	**2,108.1138**

Unmitigated Construction Off-Site

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3800e-003	3.0100e-003	0.0373	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8100e-003	7.0000e-005	3.8800e-003	0.0000	11.3984	11.3984	2.7000e-004	2.9000e-004	11.4909
Total	**4.3800e-003**	**3.0100e-003**	**0.0373**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8100e-003**	**7.0000e-005**	**3.8800e-003**	**0.0000**	**11.3984**	**11.3984**	**2.7000e-004**	**2.9000e-004**	**11.4909**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0106	0.0000	0.0106	1.1500e-003	0.0000	1.1500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.9282	7.3548	8.6197	0.0240		0.3070	0.3070		0.2906	0.2906	0.0000	2,094.2483	2,094.2483	0.5545	0.0000	2,108.1113
Total	**0.9282**	**7.3548**	**8.6197**	**0.0240**	**0.0106**	**0.3070**	**0.3176**	**1.1500e-003**	**0.2906**	**0.2918**	**0.0000**	**2,094.2483**	**2,094.2483**	**0.5545**	**0.0000**	**2,108.1113**

Mitigated Construction Off-Site

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3800e-003	3.0100e-003	0.0373	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8100e-003	7.0000e-005	3.8800e-003	0.0000	11.3984	11.3984	2.7000e-004	2.9000e-004	11.4909
Total	**4.3800e-003**	**3.0100e-003**	**0.0373**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8100e-003**	**7.0000e-005**	**3.8800e-003**	**0.0000**	**11.3984**	**11.3984**	**2.7000e-004**	**2.9000e-004**	**11.4909**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	15.00	8.00	9.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.508386	0.056948	0.178426	0.142719	0.032913	0.007228	0.019592	0.017032	0.000592	0.000589	0.030937	0.000618	0.004020

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0685	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Unmitigated	0.0685	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0121					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0563					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**0.0685**	**0.0000**	**1.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0121					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0563					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**0.0685**	**0.0000**	**1.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e

Sites Geotech Investigations - Yolo/Solano AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix F. List of Contributors

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F.1 Introduction

This EA/IS was jointly prepared by Reclamation and the Authority to satisfy the requirements of both NEPA and CEQA. The table below shows the contributors to EA/IS. The following individuals led the effort from those agencies:

- CEQA Lead Agency (Authority): Alicia Forsythe – Environmental Planning and Permitting Manager
- NEPA Lead Agency (Reclamation): Melissa Dekar – NEPA Specialist/Natural Resources Specialist

Contributors to the EA/IS

Name	Organization	Qualifications/Approximate Years of Experience
Alicia Forsythe	Sites Authority	B.S. Hydrologic Sciences; B.S. Environmental Studies; 22 years
Melissa Dekar	Reclamation	B.S. Biology; M.S. Environmental Science; 12 years
Mark Carper	Reclamation	M.A. Archaeology; 25 years
Laurie Warner Herson	Phénix Environmental Planning	B.A. Anthropology; 38 years
John Spranza	HDR	B.S. Aquatic Ecology; M.S. Zoology; 23 years
Jelica Arsenijevic	HDR	B.S. Earth, Systems, Science and Policy (concentration in marine and coastal ecology); 19 years.
Dawn Edwards	HDR	B.S. Business Administration; M.S. Environmental Sciences/ Studies; 18 years
Linda Fisher	HDR	B.S. Environmental and Resources Sciences; M.S. Environmental Management; 17 years
Natalie Bogan	HDR	B.A. Psychology; Master of Environmental Management; 8 years
Tanya Kalaskar	HDR	M.S. Chemical Engineering; 5 years
Monique Briard	ICF	B.A. History; 25 years
Ellen Berryman	ICF	M.S. Biology; B.S. Zoology; 35 years
Danielle Tannourji	ICF	M.S. Conservation Biology; B.S. Ecology; 18 years
Christiaan Halveaar	ICF	B.A. Anthropology; 25 years
Jena Rogers	ICF	M.A. Historic Preservation; 23 years