BETHEL ISLAND MUNICIPAL IMPROVEMENT DISTRICT

HORSESHOE BEND LEVEE IMPROVEMENT PROJECT

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Prepared for:

BETHEL ISLAND MUNICIPAL IMPROVEMENT DISTRICT
3085 STONE ROAD
BETHEL ISLAND, CA 94511

Prepared by:

Michael Baker INTERNATIONAL

2729 PROSPECT PARK DRIVE, SUITE 220
RANCHO CORDOVA, CA 95670

NOVEMBER 2016

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C. DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because of the incorporated mitigation measures and revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.

Signature — 11/1/16 Date

L. Jeff Butzlaff — Printed Name

Interim District Manager — Title

1.0 Introduction

1.1 PURPOSE OF THE INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

The purpose of this Initial Study is to evaluate the potential environmental effects associated with implementation of the Horseshoe Bend Levee Improvement Project (hereafter referred to as the proposed Project). The proposed Project would improve an existing levee to be consistent with California Department of Water Resources (DWR) Bulletin 192-82 levee design standards and provides mitigation where necessary to avoid, minimize, lessen, and compensate for those effects. The Initial Study (IS) has been prepared consistent with California Environmental Quality Act (CEQA) Guidelines Section 15063. This document incorporates both an Initial Study and a Mitigated Negative Declaration (IS/MND).

1.2 TECHNICAL STUDIES

Technical studies referenced in this IS/MND are listed in Section 4.0, References. The technical studies are available for review at 3085 Stone Road, Bethel Island, California 94511.

2.0 Project Description

BIMID proposes to conduct four activities on Bethel Island: excavate fill material from a previously authorized borrow site located on the Crivello property (Borrow Site) (APN 028-010-004), conduct levee improvements and habitat enhancement activities at the Horseshoe Bend Levee Improvement Project site (Levee Site), create wetlands and adjacent riparian habitat at the District's existing mitigation site (Mitigation Site), and use connected roadways (Haul Roads) for hauling materials between the Borrow Site, Levee Site, and Mitigation Site. These four project components comprise the Project.

2.1 PROJECT LOCATION AND SURROUNDING USES

The Project site is located on Bethel Island within the Wetlands Land Grant on the Jersey Island, California, US Geological Survey 7.5-minute series topographic quadrangle (**Figures 1** and **2**). The Borrow Site is located approximately 0.25 mile east of the intersection of Taylor Road and Canal Road. The proposed Levee Site for the Horseshoe Bend Levee Improvement Project is located on the north side of Bethel Island between BIMID levee stations 130 and 180. The Mitigation Site (APN 029-040-011) is located east of Bethel Island Road north of the Bethel Island Golf Course. The Haul Roads connect the Project components.

2.2 EXISTING SETTING AND SURROUNDING USES

BORROW SITE

The ±96-acre Borrow Site is vacant, flat grazing land, with the exception of several depressions near the site's center that were formed as a result of previous soil excavation activities. North of the Borrow Site is Taylor Slough, which connects with the San Joaquin River farther east. West and east of the Borrow Site is vacant land in similar agricultural use. To the south lies Canal Road, with additional vacant land beyond. The nearest residences to the Borrow Site are located along Taylor Road, approximately 200 feet west and southwest.

HORSESHOE BEND PROJECT

The Horseshoe Bend Levee Improvement Project site is made up of numerous parcels along Bethel Island's northeastern shore. This site is west of Bethel Island Road. West of this roadway, the site is undeveloped, with the exception of the levee and the associated unpaved access road, Sunset Drive. Several single-family residences are located immediately east of Bethel Island Road south of the levee and north of W. Willow Road, with associated docks and boathouses immediately north of the levee. North of the Levee Site are Piper Slough and the Franks Tract State Recreation Area. In the eastern portion of the Levee Site, along the north side of W. Willow Road, are single-family residences with connecting docks on the opposite side of the levee. South of this site is vacant land bisected by Bethel Island Road.

DISTRICT MITIGATION SITE

The District Mitigation Site is located on Bethel Island, west of Bethel Island Road. Open water and riparian habitat was established on a portion of the Mitigation Site to compensate for losses of riparian, fisheries, and wildlife habitat associated with past projects on Bethel Island. The site is still active, and the Project is proposing to mitigate for impacts to jurisdictional features as a result of the project. The District plans on creating up to 5 acres of wetlands on the Mitigation Site.

The District will work with CDFW and DWR to analyze mitigation opportunities on the District's wetland site for jurisdiction wetlands and riparian habitat. If it is determined that these actions would result in impacts to the existing mitigation areas, this component will be abandoned and mitigation will be completed through an approved mitigation bank.

HAUL ROUTES

The borrow material, once excavated, will be transported to the Project site via trucks. The District will do its best to minimize the use of interior private roads for this operation and rely primarily on Canal Road, Bethel Island Road, and the levee toe road. The District Engineer believes there are several options to haul the material from the Crivello parcel to the levee improvement site; the most likely route for the fully loaded trucks would be to drive on the levee toe and get on the levee (between Station 130+00 and Station 180+00) to unload. The return route for empty trucks would be traveling on the top of the levee to the Borrow Site.

2.3 PROJECT BACKGROUND

The Horseshoe Bend Levee Improvement Project began as part of the US Army Corps of Engineers (USACE) CALFED Levee Stability Program. In July 2010, BIMID entered into a cost-sharing agreement with the USACE to complete a feasibility study of various options for levee rehabilitation improvements at Horseshoe Bend. The CALFED project planned to widen the existing levee crown to a total width of 50 feet and construct a landside toe berm approximately 80 feet wide. The total effective impact zone would be an area measured approximately 160 feet from the existing water-side levee crest. In August 2011, Hultgren-Tillis Engineers completed a geotechnical investigation in support of the CALFED Horseshoe Bend levee rehabilitation study. The geotechnical report was prepared to address recommendations for the proposed Horseshoe Bend Levee Improvement Project. The report addressed water-side scour, seepage, land- and water-side slope stability, subsidence, and water-side slope protection concerns.

BIMID determined, however, that seeking federal funding for the Horseshoe Bend project was no longer a feasible alternative and converted the project for administration and funding solely through the California Department of Water Resources (DWR) Delta Levees Special Flood Control Projects program. In 2013, the existing Project Funding Agreement between DWR and BIMID (BI-09-2.0) authorizing work in support of the USACE effort was amended to provide some funding to BIMID to proceed with the project without USACE support. In 2014, DWR released a new Project Solicitation Package (PSP) for multi-benefit projects in the Sacramento-San Joaquin Delta (Delta). The PSP presented an opportunity for BIMID to seek funding for a levee improvement project that includes substantial habitat components. BIMID executed a new Project Funding Agreement (BI-15-1.0-SP) with DWR proposing a revised multi-benefit Horseshoe Bend project.

2.4 PROJECT COMPONENTS

The Project comprises four components:

1) Soil excavation at the Borrow Site
2) Levee work and habitat enhancements at the Levee Site
3) Wetland creation of the Mitigation Site
4) Use of Haul Roads that connect the other three components

T:_GIS\Contra_Costa_County\MXDs\Bethel_Island\BA\Regional Vicinity.mxd (4/29/2016)

FIGURE 1
Regional Vicinity

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T:_GIS\Contra_Costa_County\MXDs\Bethel_Island\IS-MND\Project Location.mxd (4/29/2016)

N

0 500 1,000
FEET

FIGURE 2
Project Location

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BIMID proposes to excavate fill material from the Borrow Site for use on the Horseshoe Bend Levee Site and also for wetland creation at the Mitigation Site. The Borrow Site was previously used for extraction of fill material for nearby levee improvements. BIMID's use of the Borrow Site for fill material extraction was previously permitted under USACE Permit #199300309. The Project will be constructed over a two-year period, requiring a total of 100,000 cubic yards of suitable borrow material. Land-side activities are anticipated to occur in 2016–2017 and water-side activities are anticipated to occur in 2018. The locations of the borrow area and the levee improvements are shown on Figure 2.

The preliminary geotechnical evaluation completed by Hultgren-Tillis Engineers indicates that borrow material to be obtained from the Borrow Site comprises approximately 70 percent usable borrow material for levee improvement work and 30 percent peat soil. Peat soil is organic and not usable for levee improvement work because of its unique properties. In order to ensure that enough suitable borrow material is obtained to complete the Project, BIMID would excavate up to 142,000 cubic yards of material from the Borrow Site over the project construction period for use in improving the land side of the Levee Site. The suitable and unsuitable (peat) material will be separated; the suitable material will be used for levee improvement and the peat soil will be stockpiled on the Borrow Site for use as a topsoil in final grading of the landside levee and the berm. The Borrow Site would also be used for project staging, storage of equipment, and stockpile drying areas for the suitable levee borrow materials. It is anticipated that the temporary staging and stockpile areas would be located in the northwest portion of the Borrow Site in an area identified in on-site surveys to contain no sensitive resources.

The Horseshoe Bend Levee Improvement Project is intended to provide levee improvements to the existing levee consistent with DWR Bulletin 192-82 standards. The existing levee has known deficiencies including steep water-side slopes, active scour, seepage through the levee, and potentially liquefiable material within the levee and foundation. DWR Bulletin 192-82 criteria for an urban community in the Delta include design specifications stating that levees must accommodate the 300-year flood with a minimum freeboard of 3 feet and have a minimum 16-foot-wide crest, a water-side slope of 2H:1V, and a land-side slope varying between 5H:1V and 7H:1V depending on the depth of peat soil in the project area. The Horseshoe Bend project would include the following features:

- Improving the levee to Bulletin 192-82 standards (with a minimum land side slope of 5H:1V) to increase flood protection, alleviate seepage, and minimize scouring.
- Widening the levee crest to a minimum of 22 feet in order to better facilitate flood fighting.
- Constructing a landside stability berm for additional levee stability from station 145+00 to 155+00. The landside berm may be planted with riparian forest and scrub shrub at the discretion of the California Department of Fish and Wildlife (CDFW) and BIMID. This reach, and the reach referenced below (155+00 to 165+00), will include a 2,000-linear-foot, 15-foot-wide water-side bench to provide for fish-friendly and shaded riverine aquatic habitat.
- Remediating the levees from station 155+00 to 165+00 by construction of clay cutoff wall, installation of blanket drain, or placement of sheet piles in order to create a water-side bench for fish-friendly and shaded riverine aquatic habitat.
- Installing new or enhancing existing riprap from station 130+00 to 180+00 as needed to minimize scour.

The District is also proposing to create up to 5 acres of wetlands on the District's Mitigation Site. The Mitigation Site is located on Bethel Island, west of Bethel Island Road. A portion of the Mitigation Site contains open water and riparian forest, which was created to offset the loss of riparian, fisheries, and wildlife habitat associated with past projects on Bethel Island. It is possible that wetland creation may not be feasible at this site. If this is determined, this component of the Project will be dropped and alternative mitigation will be implemented as identified in subsection 4.0, Biological Resources.

CONSTRUCTION SCHEDULE

The Project integrates levee improvement and habitat enhancement features and provides export water supply reliability by protecting one of the eight western Delta islands. The Project has been discussed in the BIMID five-year plan and will be implemented over a three-year period, with year three finishing up the water-side work. BIMID will work with local, state, and federal agencies to obtain all necessary permits prior to the construction work.

The Project would be implemented over three years in order to minimize risk of failure and cracking of the Horseshoe Bend levee due to the added weight of fill material. In the first year, the work would consist mainly of excavating material from the Borrow Site, installing the clay cutoff wall within the levee, and beginning land-side work, which includes expanding the levee and constructing the land-side levee stability berm. A maximum depth of 4 feet of levee fill would initially be added to the land-side berm; depending on the rainy season, the land-side berm work may continue into the second and third years of construction. No water-side work would occur during the first two years of construction. Work performed during the third year would include creation of the water-side bench and completion of the levee setback and land-side berms. Fill obtained from the Borrow Site would not be used for any water-side work. At the completion of fill operations, Class 2 aggregate base rock would be placed on the levee crest to provide an all-weather levee maintenance road.

It is assumed that approximately 25 percent of the excavation on the Borrow Site (approximately 36,000 cubic yards) would occur in 2016, over the course of two months. During six months of construction in 2017, approximately 70,000 cubic yards would be excavated, and the final 36,000 yards would be excavated in 2018 over a four-month schedule.

A grading permit from Contra Costa County is not anticipated to be required for the proposed project, and BIMID would not seek a Surface Mining and Reclamation Act (SMARA) permit from the County.

3.0 INITIAL STUDY

3.1 INTRODUCTION

This section provides an evaluation of the potential environmental impacts of the proposed project, including the California Environmental Quality Act (CEQA) Mandatory Findings of Significance. There are 17 specific environmental issues evaluated in this chapter. The environmental issues evaluated in this chapter include:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards & Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities/Service Systems

For each issue area, one of four conclusions is made:

- **No Impact**: No project-related impact to the environment would occur with project development.
- **Less than Significant Impact**: The proposed project would not result in a substantial and adverse change in the environment. This impact level does not require mitigation measures.
- **Less than Significant Impact with Mitigation Incorporation**: The proposed project would result in an environmental impact or effect that is potentially significant, but the incorporation of mitigation measure(s) would reduce the project-related impact to a less than significant level.
- **Potentially Significant Impact**: The proposed project would result in an environmental impact or effect that is potentially significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

3.2 INITIAL ENVIRONMENTAL STUDY

Project Title:	Horseshoe Bend Levee Improvement Project
Lead Agency Name and Address:	Bethel Island Municipal Improvement District
Contact Person and Phone Number:	L. Jeff Butzlaff, Interim District Manager (925) 684-2210
Project Location:	There are four primary Project components (Borrow Site, Levee Site, Mitigation Site, and Haul Roads). The Project is located within the Wetlands Land Grant on the Jersey Island, California, US Geological Survey 7.5-minute series topographic quadrangle (**Figures 1** and **2**). See Section 2.0 of this IS/MND for a complete description of the Project location.
Project Sponsor's Name and Address:	Bethel Island Municipal Improvement District
Zoning:	Contra Costa County: F-1 (Water Recreational District); Flood Hazard Combining District
General Plan:	Contra Costa County: Agricultural Lands (AL); Single Family Residential – High Density (SH); Commercial Recreation (CR); Parks and Recreation (PR); Open Space (OS)
APN Number(s):	Multiple
Description of the Project:	BIMID proposes to excavate fill material from a previously authorized Borrow Site for use on the Horseshoe Bend Levee Improvement Project. The District intends to create wetlands to offset Project impacts on the District's Mitigation Site. See Section 2.0 of this IS/MND for a complete Project description.
Surrounding Land Uses and Setting:	See Section 2.0 of this IS/MND.

Other public agencies whose approval may be required: (e.g., permits, financing approval, or participation agreement)

- California Department of Fish and Wildlife (CDFW)
- Central Valley Regional Water Quality Control Board (Central Valley RWQCB)
- Bay Area Air Quality Management District (BAAQMD)
- US Army Corps of Engineers (USACE)
- US Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by the project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages. Potentially significant impacts that are mitigated to "Less Than Significant" with mitigation identified in this Initial Study are not shown here.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology and Soils
☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials	☐ Hydrology and Water Quality
☐ Land Use and Planning	☐ Mineral Resources	☐ Noise
☐ Population and Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities and Service Systems	☐ Mandatory Findings of Significance

The discussion below demonstrates that no potentially significant impacts are identified which cannot be mitigated to a less than significant level. Therefore, an environmental impact report (EIR) is not warranted.

EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources cited. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to a project like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards.
2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect, and construction as well as operational impacts.
3) A "Less Than Significant Impact" applies when the proposed project would not result in a substantial and adverse change in the environment. This impact level does not require mitigation measures.
4) A "Less Than Significant Impact With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The initial study must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level.
5) A "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect is significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required. As described previously, the following discussion demonstrates that there are no potentially significant project impacts and an EIR is not required for the proposed project.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
1. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcrops, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Discussion of Impacts

a) **Less Than Significant Impact**. Although there are no designated scenic vistas surrounding the Project site, there are views of the San Joaquin River and other surface waters and agricultural fields, which are important components of the region's visual character. The proposed Project would involve only temporary construction and maintenance activities that would not result in any permanent changes to existing views. Therefore, this impact would be less than significant.

b) **Less Than Significant Impact**. No highways in the Project vicinity are designated by state or local agencies as scenic highways. State Route 4, which is listed as an eligible state scenic highway by the California Department of Transportation (Caltrans), is located more than 10 miles southwest of the Project site (Caltrans 2013). The Project site does not include any rock outcroppings, trees, historical buildings or sites, or other significant scenic resources. Therefore, this impact would be less than significant.

c) **Less Than Significant Impact**. The Borrow Site consists of disturbed agricultural land that was previously used for extraction of fill materials similar to that currently proposed. The portion of the Mitigation Site that will be used for wetland creation is ruderal grassland. Adjacent properties of both sites are used for similar agricultural production. The proposed improvements associated with the Horseshoe Bend Levee Improvement Project would involve routine maintenance activities and enhancements to the levee function as well as wetland creation. The improvements would be consistent with the existing visual character of the area, and improvements would involve temporary construction activities. As such, Project implementation would not substantially change or degrade the existing visual character or quality of the Project site or its surroundings. The impact would be less than significant.

d) **Less Than Significant Impact**. In accordance with Contra Costa County General Plan Policy 11-8, in order to minimize disturbance of residents in the vicinity, proposed construction activities would occur during normal work hours, outside more sensitive

evening and early morning periods (Contra Costa County 2005). No night lighting would be required, so there would be no impact with regard to lighting. Construction equipment associated with the proposed Project could create new temporary sources of daytime glare from glass surfaces on the equipment, but the moving equipment would not create stationary sources of glare that would be directed toward any residence. The nearest residences to the Borrow Site are approximately 200 feet to the west and southwest; there are residences approximately 1,000 feet east of the Horseshoe Bend Levee improvement site. Because of the distance between Project activities and residences, as well as limits on construction to occur only during daylight hours, residences would not be subject to substantial light or glare. This impact would be less than significant.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
2. AGRICULTURE AND FORESTRY RESOURCES. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) Conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forestland or conversion of forestland to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use or conversion of forestland to non-forest use?	☐	☐	☒	☐

Discussion of Impacts

a) **No Impact**. According to the California Department of Conservation's (2014) Farmland Mapping and Monitoring Program, the Project sites are designated as Farmland of Local Importance and Urban and Built-Up Land. Therefore, the Project would have no impact on Prime Farmland, Farmland of Statewide Importance, or Unique Farmland.

b) **Less Than Significant Impact**. The Project sites are zoned F-1 (Water Recreational District) with a Flood Hazard Combining District Overlay. The F-1 zoning district allows crop and tree farming as well as residential and recreational uses. The proposed Project would involve temporary construction activities on three portions of the site, which would not permanently preclude the sites from agricultural use. BIMID does not propose any changes in use in the Borrow Site upon Project completion, and the other portions of the site would remain in their current use related to the levee system. The Project sites are not subject to a Williamson Act contract. Therefore, the Project would not result in any conflicts with agricultural zoning or a Williamson Act contract. This impact would be less than significant.

c) **No Impact.** As described previously, the Project site is zoned F-1 (Water Recreational District) with a Flood Hazard Combining District Overlay, which allows crop and tree farming. Neither the Borrow Site nor the other portions of the Project site contain forestland or are used for timber production. The other portions of the Project site are permanently

developed with a levee system and would remain in such use. Therefore, the Project would not result in a conflict with forestry activities or forestry-related zoning. There would be no impact.

d) **No Impact**. As described previously, the Project site does not contain any forestland. There would be no impact.

e) **Less Than Significant Impact**. The proposed construction activities would generally be limited to the Project sites and would be temporary, ceasing upon Project completion. As discussed in subsection 4, Biological Resources, the Project would result in the loss of wetland resources that would require mitigation. The location of mitigation for wetland impacts has not been determined at this time, but options include creation of replacement wetlands on the District's Mitigation Site or payment of fees at an approved off-site mitigation bank. Neither of these sites contain Farmland or forestry resources that could be negatively affected by Project activities. Therefore, the Project would not result in the conversion of any Farmland or forestland to another use. This impact would be less than significant.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
3. AIR QUALITY. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Discussion of Impacts

a) **No Impact**. The Project site is located in the San Francisco Bay Area Air Basin (SFBAAB), which comprises a single air district, the Bay Area Air Quality Management District (BAAQMD). The Project site is located in the Carquinez Strait region of the air basin. The BAAQMD prepares plans to attain ambient air quality standards in the air basin. The BAAQMD also prepares ozone attainment plans for the national ozone standard and clean air plans for the California standard, both in coordination with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The BAAQMD prepared the Bay Area 2010 Clean Air Plan (BAAQMD 2010) to address the air basin's nonattainment status with the national 1-hour ozone standard and the California ambient air quality standards (CAAQS).[1] The purpose of the Clean Air Plan is to:

1) Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement all feasible measures to reduce ozone;
2) Consider the impacts of ozone control measures on particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
3) Review progress in improving air quality in recent years; and

[1] The Bay Area Air Quality Management District is preparing an update to the Bay Area Clean Air Plan. In February 2014, BAAQMD staff held a workshop to initiate the process of updating the Clean Air Plan. This process is on-going and BAAQMD anticipates releasing the public draft of the Clean Air Plan in in June or July of 2016.

4) Establish emission control measures to be adopted or implemented in the 2009–2012 time frame.

The emissions inventories contained in the ozone attainment plan and the Clean Air Plan are based on projected population growth and vehicle miles traveled (VMT) for the region. These inventories are largely based on the predicted growth identified in regional and community general plans, including associated development projects. Projects that result in an increase in population or employment growth beyond that identified in regional or community plans could result in increases in VMT and subsequently increase mobile source emissions, which would not have been accounted for in the BAAQMD's air quality plans, making the projects inconsistent with the plans.

Because the proposed Project is a levee improvement project, it would not result in an increase in population or employment growth, and thus VMT, beyond that anticipated in the ozone attainment plan and the Clean Air Plan. This is because the proposed Project would be limited to short-term construction activities and would not result in any development or other improvements that could directly or indirectly induce population growth in the area. Therefore, the proposed Project would not conflict with or obstruct implementation of the ozone attainment plan or the Clean Air Plan.

A project is also determined to be consistent with these air quality plans if it includes applicable control measures in the plans and does not disrupt or hinder implementation of any control measures. As discussed in more detail under Response b) below, the proposed Project would not result in construction-generated or operational-related criteria air pollutants and/or precursor emissions that would exceed the BAAQMD thresholds of significance. Furthermore, although not required for consistency with these plans, adherence to mitigation measures **AQ-1** and **AQ-2** would further reduce Project emissions and ensure Project consistency with the air quality plans.

The proposed Project would support the goals of the ozone attainment plan and the Clean Air Plan, would include feasible control measures, would not disrupt or hinder implementation of any control measures, and would not result in vehicle trips greater than the projected population increase for the Project site. Therefore, the project would be considered consistent with BAAQMD air quality plans, resulting in no impact.

b) **Less Than Significant Impact With Mitigation Incorporated**. The BAAQMD has developed project-level thresholds of significance in order to provide a conservative indication of whether a proposed project could result in potentially significant air quality impacts. To meet the project-level threshold of significance for construction- and/or operational-related criteria air pollutant and precursor impacts, the proposed Project must emit no more than 54 pounds per day (lbs/day) of the ozone (O_3) precursors (reactive organic gases [ROG] and/or nitrogen oxides [NOx]), no more than 54 lbs/day of fine particulate matter ($PM_{2.5}$), and no more than 82 lbs/day of coarse particulate matter (PM_{10}).

Construction. Construction-generated emissions are short term and of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. The proposed Project would result in the temporary generation of emissions resulting from excavation, material hauling, direct levee work, and worker trips over the course of three years. Fugitive dust, the dominant source of PM_{10} and $PM_{2.5}$ emissions, is generated when wheels or blades disturb surface materials. Uncontrolled dust from construction can become a nuisance and potential health hazard

to those living and working nearby. Off-road construction equipment is often diesel-powered and can be a substantial source of NOx emissions, in addition to PM_{10} and $PM_{2.5}$ emissions. Worker commute trips and asphalt paving are dominant sources of ROG emissions.

The predicted maximum daily construction-generated emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ associated with Project construction and the BAAQMD significance criteria are shown in **Table AQ-1**.

TABLE AQ-1
UNMITIGATED PROJECT CONSTRUCTION EMISSIONS (MAXIMUM) POUNDS PER DAY

Construction Phase	ROG	NO_x	PM_{10}	$PM_{2.5}$	CO
Year 1					
Excavation and Material Hauling[1]	3.47	26.34	2.43	1.52	31.21
Horseshoe Bend Levee Work (land-side)[2]	5.49	**57.80**	21.42	12.89	44.27
Combined Emissions	*8.96*	***84.14***	*23.85*	*14.41*	*75.48*
Year 2					
Excavation and Material Hauling[3]	2.85	22.42	1.95	1.31	25.67
Horseshoe Bend Levee Work (land-side) and North Levee Work[4]	4.90	51.83	20.99	12.51	40.34
Combined Emissions	*7.75*	***74.25***	*22.94*	*13.82*	*66.01*
Year 3					
Excavation and Material Hauling[5]	2.31	18.62	1.61	1.08	22.76
Horseshoe Bend Levee Work (land-side) and North Levee Work[6]	2.06	21.20	7.00	4.01	15.22
Peat Material Hauling[7]	2.23	17.75	1.91	0.87	26.21
Combined Emissions	6.60	**57.57**	10.52	5.96	64.19
BAAQMD Significance Criteria	**54**	**54**	**82**	**54**	**None**
Significant?	*No*	*Yes*	*No*	*No*	*N/A*

*Source: Emissions modeled by Michael Baker International using the California Emissions Estimator Model (CalEEMod), version 2013.2.2 computer program. Refer to **Appendix A** for model data outputs. Note: CO = carbon monoxide*

1. *Accounts for the disturbance of 24 acres of land at the borrow site for the excavation of 35,500 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
2. *Accounts for development of a 45-foot berm on land-side and 22-foot levee crest spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
3. *Accounts for the disturbance of 45.7 acres of land at the borrow site for the excavation of 70,000 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
4. *Accounts for the further development of a 45-foot berm on landside and 22-foot levee crest spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
5. *Accounts for the disturbance of 24.6 acres of land at the borrow site for the excavation of 36,500 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
6. *Accounts for development of a 15-foot berm on waterside spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
7. *Accounts for hauling of 42,000 cubic yards of peat material 2.94 miles to District mitigation site.*

As shown in **Table AQ-1**, combined emissions generated during each year's excavation, material hauling, and levee work, which are anticipated to occur simultaneously, would exceed the BAAQMD's thresholds of significance for NOx emissions. This would be considered a potentially significant impact and require mitigation to reduce emissions to a level below the established threshold. NOx emissions are primarily associated with the use of diesel-powered construction equipment (e.g., graders, excavators, rubber-tired dozers, tractors, loaders, backhoes). The Clean Air Act of 1990 directed the US Environmental Protection Agency (EPA) to study, and regulate if warranted, the contribution of off-road internal combustion engines to urban air pollution. The first federal standards (Tier 1) for new off-road diesel engines were adopted in 1994 for engines over 50 horsepower and were phased in from 1996 to 2000. In 1996, a Statement of Principles pertaining to off-road diesel engines was signed between the EPA, the California Air Resources Board (CARB), and engine makers (including Caterpillar, Cummins, Deere, Detroit Diesel, Deutz, Isuzu, Komatsu, Kubota, Mitsubishi, Navistar, New Holland, Wis-Con, and Yanmar). On August 27, 1998, the EPA signed the final rule reflecting the provisions of the Statement of Principles. The 1998 regulation introduced Tier 1 standards for equipment under 50 horsepower and increasingly more stringent Tier 2 and Tier 3 standards for all equipment with phase-in schedules from 2000 to 2008. As a result, all off-road, diesel-fueled construction equipment manufactured in 2006 or later has been manufactured to Tier 3 standards. The Tier 3 standards can reduce NOx and PM emissions by as much as 64 and 39 percent, respectively. By requiring the use of Tier 3 construction equipment during the organic material removal phase, mitigation measure **AQ-1** would reduce temporary NOx emissions impacts generated during Project construction to a less than significant level, as shown in **Table AQ-2.**

TABLE AQ-2
MITIGATED PROJECT CONSTRUCTION EMISSIONS (MAXIMUM) POUNDS PER DAY

Construction Phase	ROG	NO_x	PM_{10}	$PM_{2.5}$	CO
Year 1					
Excavation and Material Hauling[1]	1.72	17.27	1.76	0.92	32.10
Horseshoe Bend Levee Work (land-side)[2]	1.09	21.00	19.31	11.04	26.54
Combined Emissions	*2.81*	*38.27*	*21.07*	*11.96*	*58.64*
Year 2					
Excavation and Material Hauling[3]	1.29	15.05	1.42	0.85	26.65
Horseshoe Bend Levee Work (land-side) and North Levee Work[4]	1.01	19.53	19.19	10.93	24.35
Combined Emissions	*2.30*	*34.58*	*20.61*	*11.78*	*51.00*
Year 3					
Excavation and Material Hauling[5]	1.06	14.19	1.31	0.83	24.01
Horseshoe Bend Levee Work (water-side) and North Levee Work[6]	0.44	8.33	6.27	3.37	11.46
Peat Material Hauling[7]	1.51	14.65	1.71	0.73	27.54
Combined Emissions	*3.01*	*37.17*	*9.29*	*4.93*	*63.01*
BAAQMD Significance Criteria	**54**	**54**	**82**	**54**	**None**
Significant?	*No*	*No*	*No*	*No*	*N/A*

*Source: Emissions modeled by Michael Baker International using the California Emissions Estimator Model (CalEEMod), version 2013.2.2 computer program. Refer to **Appendix A** for model data outputs. Note: CO = carbon monoxide*

1. *Accounts for the disturbance of 24 acres of land at the borrow site for the excavation of 35,500 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
2. *Accounts for development of a 45-foot berm on landside and 22-foot levee crest spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
3. *Accounts for the disturbance of 45.7 acres of land at the borrow site for the excavation of 70,000 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
4. *Accounts for the further development of a 45-foot berm on landside and 22-foot levee crest spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
5. *Accounts for the disturbance of 24.6 acres of land at the borrow site for the excavation of 36,500 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
6. *Accounts for development of a 15-foot berm on waterside spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
7. *Accounts for hauling of 42,000 cubic yards of peat material 2.94 miles to District mitigation site.*

Operation. The proposed Project would not include the provision of new permanent stationary or mobile sources of emissions; therefore, the Project would not generate quantifiable criteria emissions after construction is complete. The Project does not propose any buildings and therefore no permanent source of stationary source emissions. In addition, as determined in subsection 16, Transportation/Traffic, the Project would not result in a permanent increase in traffic. Traffic conditions after the Project is constructed would be the same as existing traffic conditions. Therefore, new permanent stationary or mobile sources of emissions would not be generated..

The proposed project would not exceed project-level thresholds of significance for construction- and/or operational-related criteria air pollutants, resulting in a less than significant impact.

c) **Less Than Significant Impact With Mitigation Incorporated**. The SFBAAB is currently designated as nonattainment for the state and federal ambient air quality standards for ground-level O3 and PM2.5 as well as for the state standards for PM10 (CARB 2013). The air basin's nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its nature, air pollution is largely a cumulative impact. According to the BAAQMD, no single project by itself is sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. In developing thresholds of significance for air pollutants, the BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. According to the BAAQMD, if a project exceeds its identified project-level significance thresholds, that project would be cumulatively considerable. As demonstrated under Response b) above, the proposed Project would not exceed BAAQMD thresholds for air pollutant emissions during construction or operations (see Tables **AQ 1** and **AQ-2**) with the implementation of mitigation measure **AQ 1**. Therefore, since the Project does not exceed BAAQMD significance thresholds with the implementation of mitigation measure **AQ-1**, it would not result in a cumulatively considerable net increase of criteria pollutants.

d) **Less Than Significant Impact With Mitigation Incorporated**. Sensitive receptors are generally defined as uses that house or attract groups of children, the elderly, people with illnesses, and others who are especially sensitive to the effects of air pollutants. Schools, hospitals, residential areas, and convalescent facilities are examples of sensitive receptors. The Project proposes excavation and levee improvement activities in proximity to residential areas.

Short-Term Construction Diesel Particulate Matter Emissions

Construction activities would involve the use of a variety of gasoline- or diesel-powered equipment that emits exhaust fumes (diesel exhaust particulate matter) and generates dust during soil disturbance (fugitive dust particulate matter). These temporary air quality impacts could negatively affect sensitive receptors in the Project area. However, the duration of exposure would be short and exhaust from construction equipment dissipates rapidly. Furthermore, as identified under Response b) above, Project construction would not exceed BAAQMD thresholds for particulate matter. Additionally, mitigation measure **AQ-1** would reduce the amount of construction-generated diesel exhaust particulate matter and other pollutants by requiring the most efficient equipment. For instance, the Tier 3 standards, required by mitigation measure **AQ-1**, reduce emissions of NOx by 24 to 64 percent, PM_{10} by 8.5 to 27 percent, and $PM_{2.5}$ by 12.5 to 39 percent (amount of reduction depending on the specific construction phase). Nonetheless, sensitive receptors could still be exposed to nuisance levels of fugitive dust. Therefore, mitigation measure **AQ-2**, which includes standard BAAQMD dust control measures, is required. With implementation of mitigation measures **AQ-1** and **AQ-2,** sensitive receptors in the Project vicinity would not be exposed to substantial diesel exhaust particulate matter or fugitive dust particulate matter emissions, and temporary impacts from construction-generated air toxics would be reduced to a less than significant level.

Localized Carbon Monoxide

Localized carbon monoxide (CO) concentrations near roadway intersections are a function of traffic volume, speed, and delay. Transport of CO is extremely limited because carbon monoxide disperses rapidly with distance from the source.

Based on BAAQMD guidance, projects meeting all of the following screening criteria would be considered to have a less than significant impact to localized carbon monoxide concentrations:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plans, and local congestion management agency plans.
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

As discussed in subsection 16, Transportation/Traffic, the Project would not result in a permanent increase in traffic. Traffic conditions after the Project is completed would be the same as existing traffic conditions. Therefore, the Project would not increase traffic volumes at any intersection to more than 24,000 vehicles per hour. As such, the proposed Project would not exceed the BAAQMD's significance thresholds for carbon monoxide.

e) **Less Than Significant Impact**. Future construction activities could result in odorous emissions from diesel exhaust associated with construction equipment. However, because of the temporary nature of these emissions, the distances to any receptors, and the highly diffusive properties of diesel exhaust, exposure of sensitive receptors to these emissions would be limited. In addition, the BAAQMD has adopted a nuisance rule that addresses the exposure of nuisance discharges such as unpleasant odors. Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. The limitations of Regulation 7 are not applicable until the BAAQMD receives odor complaints from 10 or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence. When the limits of this regulation become effective as a result of citizen complaints, the limits remain effective until such time as no citizen complaints have been received for one year. Therefore, this impact is less than significant.

Mitigation Measures

AQ-1 During construction activities, all rubber-tired dozers, graders, scrapers, excavators, and tractors shall be California Air Resources Board (CARB) Tier 3 Certified or better.

Timing/Implementation: *Throughout project construction activities*

Enforcement/Monitoring: *Bethel Island Municipal Improvement District*

AQ-2 BIMID shall ensure that the Bay Area Air Quality Management District's (BAAQMD) basic construction mitigation measures from Table 8-1 of the BAAQMD 2012 CEQA Air Quality Guidelines are included in the construction documents. These basic construction mitigation measures include the following:

1) All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2) All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3) All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4) All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5) Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of the California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
6) All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
7) A publicly visible sign shall be posted with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Timing/Implementation: *Throughout Project construction activities*

Enforcement/Monitoring: *Bethel Island Municipal Improvement District*

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional or state habitat conservation plan?	☐	☐	☐	☒

Discussion of Impacts

a) **Less Than Significant Impact With Mitigation Incorporated**. A search of the US Fish and Wildlife Service's (USFWS) Critical Habitat Portal (USFWS 2015b) and Sacramento Office's Species Lists (USFWS 2015a) was performed for the Jersey Island, California, USGS 7.5-minute quadrangle (quad) and all adjacent quads (Woodward Island, Brentwood, Antioch South, Isleton, Rio Vista, Bouldin Island, Birds Landing, and Antioch North) to identify federally protected species and their habitats that may be affected by the proposed Project. In addition, a query of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB 2015) was conducted to identify known processed and unprocessed occurrences for special-status species within the quads listed above. Lastly, the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants database (CNPS 2014) was queried to identify special-status

plant species with the potential to occur within the aforementioned quads. Raw data from the database queries can be found in **Appendix B**.

Queries of the USFWS, CNPS, and CNDDB databases revealed several special-status species with the potential to occur in the Project vicinity. **Appendix B** includes a summary of each species identified in the database results, a description of the habitat requirements for each species, and conclusions regarding the potential for each species to be impacted by the proposed Project. **Figure 3** depicts the locations of CNDDB occurrences within a 1-mile radius of the Project site.

Michael Baker biologists conducted a habitat assessment on the Borrow Site on October 11, 2012. Habitat assessments of the Horseshoe Bend Levee Project area and the District's Mitigation Site were conducted on February 20, 2014, and October 22, 2015, respectively. The Mitigation Site is included in this report, as it will be used to satisfy on-site wetland creation mitigation.

Based on the results of database searches and historic records, as well as known regional occurrences and the habitat assessments, several special-status plant and wildlife species have the potential to occur on the Project sites. **Table BIO-1** summarizes the special-status species that have the potential to occur on the Project sites and the vegetative cover types with which they are associated. **Figures 4, 5,** and **6** depict the cover types found on the Borrow Site, Horseshoe Bend Levee Project site, and Mitigation Site, respectively.

TABLE BIO-1
SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR ON THE PROJECT SITES

VEGETATION ASSOCIATION	SPECIES	
Borrow Site		
Pasture	Swainson's hawk (foraging) white-tailed kite	burrowing owl
Borrow Pond	none	
Seasonal Wetlands (man-made) and Man-made Ditches	none	
Horseshoe Bend		
Blackberry Thicket	tricolored blackbird	yellow-breasted chat
Willow Scrub	tricolored blackbird white-tailed kite Modesto song sparrow	yellow-breasted chat Swainson's hawk (nesting)
Non-native Annual Grassland	Swainson's hawk (foraging) white-tailed kite	burrowing owl
Piper Slough (includes open water, freshwater emergent wetland, riprap, and banks of slough)	bristly sedge Mason's lilaeopsis Sanford's arrowhead eel-grass pondweed marsh skullcap Suisun Marsh aster	Bolander's water-hemlock Delta tule pea woolly rose-mallow Delta mudwort side-flowering skullcap green sturgeon

Special-Status Plant Species

The proposed Project has the potential to adversely affect critical habitat for delta smelt (*Hypomesus transpacificus*), as well as other special-status fish species including Central Valley steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tschawytscha*), longfin smelt (*Spirinchus thaleichtyhys*), Sacramento splittail (*Pogonichthys macrolepidotus*), and green sturgeon (*Acipenser medirostris*). Most of the aforementioned species occur in Piper Slough on a seasonal basis. It is proposed that all in-water work be restricted to the summer season when special-status fish are not anticipated to occur in the Project sites.

There is the potential for fall-run, winter-run, and spring-run Chinook salmon to occur in the Project sites. These salmon spend most of their lives in marine waters and migrate upstream to spawn. They use sloughs in the Delta only as migratory routes and are not present during other seasons. Based on database queries, protected summer-run salmon do not run through the Project sites.

Sacramento splittail are most abundant in shallow, brackish water habitats such as Suisun Bay. Sacramento splittail migrate upstream to spawn from January through April. Juveniles move downstream to the low salinity zone in May (Moyle et al. 2004).

Green sturgeon spend most of their lives in nearshore aquatic waters, bays, and estuaries. They spawn upstream between March and July (NMFS 2015). Green sturgeon are believed to spawn in the Sacramento River but not the San Joaquin River (NMFS 2015). The Project site is downstream from the San Joaquin River and upstream from the confluence of the San Joaquin and Sacramento rivers. Thus, it is unlikely that green sturgeon would be moving through Piper Slough during their spawning season.

Delta and longfin smelt have similar life histories and spend most of their lives in brackish bays and estuaries. They are both pelagic species, inhabiting waters deep in the water column and typically staying away from shore features (USFWS 2008). Upstream migration and spawning occurs from mid-winter through spring, and juvenile smelt are thought to move downstream to the low salinity zone by the end of spring (USFWS 2008). The spawning season and pelagic nature of these smelt species result in low likelihood of them occurring in the shallows of the slough during construction activities.

All in-water impacts to Piper Slough will be temporary in nature. Construction of the water-side bench along Horseshoe Bend Levee is intended to improve the overall quality of the aquatic environment by providing fish-friendly levee enhancement in accordance with Department of Water Resources guidelines. The Project will be required to obtain a 401 permit and implement standard best management practices (BMPs) as determined by the Regional Water Quality Control Board. These BMPs will ensure no indirect effects to fish as a result of decreased water quality.

Implementation of Project-related activities could result in temporary adverse effects through direct loss of individuals and habitat modifications to these special-status fish species; however, implementation of mitigation measures **BIO-1** and **BIO-3** will reduce impacts to a less than significant level by not allowing work to occur during the seasons these special-status fish species would be present in Piper Slough.

T:_GIS\Contra_Costa_County\MXDs\Bethel_Island\IS-MNDCNDDB.mxd (4/29/2016)

Map ID	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plant Rank
1	*Buteo swainsoni*	Swainson's hawk	None	Threatened	
2	*Emys marmorata*	western pond turtle	None	None	
3	*Hibiscus lasiocarpos var. occidentalis*	woolly rose-mallow	None	None	1B.2
4	*Lathyrus jepsonii var. jepsonii*	Delta tule pea	None	None	1B.2
5	*Lilaeopsis masonii*	Mason's lilaeopsis	None	Rare	1B.1
6	*Limosella australis*	Delta mudwort	None	None	2B.1
7	*Melospiza melodia*	song sparrow ("Modesto" population)	None	None	
8	*Oncorhynchus mykiss irideus*	steelhead - Central Valley DPS	Threatened	None	
9	*Potamogeton zosteriformis*	eel-grass pondweed	None	None	2B.2
10	*Spirinchus thaleichthys*	longfin smelt	Candidate	Threatened	
11	*Symphyotrichum lentum*	Suisun Marsh aster	None	None	1B.2
12	*Thamnophis gigas*	giant garter snake	Threatened	Threatened	

Source: CA Dept of Fish & Wildlife (April, 2016); Contra Costa County (2016); ESRI.

0 1,000 2,000 FEET

FIGURE 3

CNDDB Occurrences of Special-Status Species Within 1 Mile of Project Site

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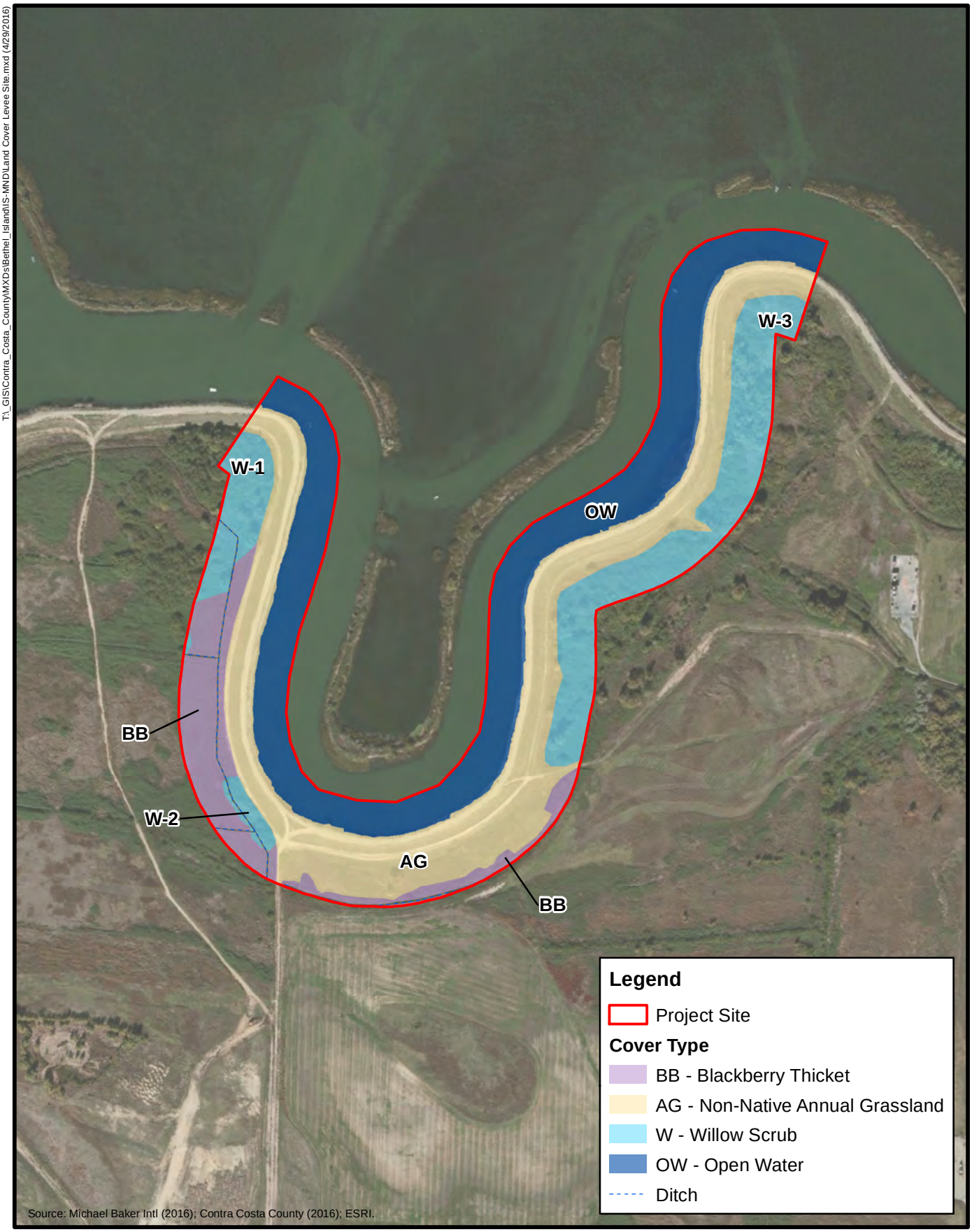
T:_GIS\Contra_Costa_County\MXDs\Bethel_Island\IS-MND\Land Cover Borrow Site.mxd (4/29/2016)

FIGURE 4
Land Cover Types (Borrow Site)

Michael Baker INTERNATIONAL

T:_GIS\Contra_Costa_County\MXDs\Bethel_Island\IS-MND\Land Cover Levee Site.mxd (4/29/2016)



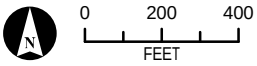
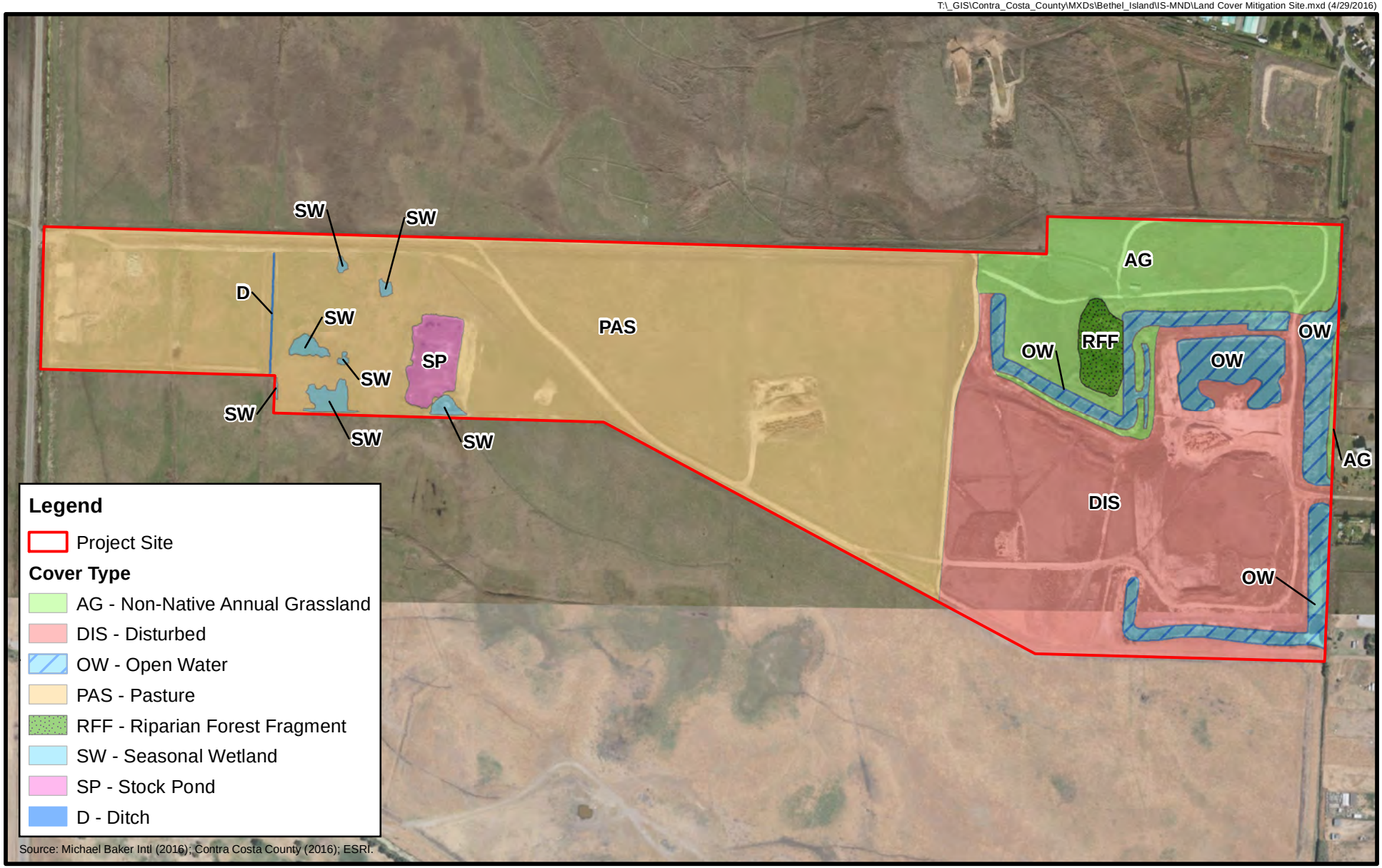


FIGURE 5
Land Cover Types (Levee Site)

Michael Baker INTERNATIONAL

T:_GIS\Contra_Costa_County\MXDs\Bethel_Island\IS-MND\Land Cover Mitigation Site.mxd (4/29/2016)



N

0 200 400
FEET

FIGURE 6
Land Cover Types (Mitigation Site)

Michael Baker INTERNATIONAL

Special-Status Fish Species

The proposed project has the potential to adversely affect critical habitat for delta smelt (*Hypomesus transpacificus*); as well as other special-status fish species including Central Valley steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tschawytscha*), longfin smelt (*Spirinchus thaleichtyhys*), Sacramento splittail (*Pogonichthys macrolepidotus*), and green sturgeon (*Acipenser medirostris*). Most of the aforementioned species occur in Piper Slough on a seasonal basis. It is proposed that all in-water work be restricted to the summer season when special-status fish are not anticipated to occur in the project site.

There is the potential for fall-run, winter-run, and spring-run Chinook salmon to occur in the project site. These salmon spend most of their lives in marine waters and migrate upstream to spawn. They use sloughs in the Delta only as migratory routes and are not present during other seasons. Based on database queries, protected summer-run salmon do not run through the project site.

Sacramento splittail are most abundant in shallow, brackish water habitats such as Suisun Bay. Sacramento splittail migrate upstream to spawn from January through April. Juveniles move downstream to the low salinity zone in May (Moyle et al. 2004).

Green sturgeon spend most of their lives in nearshore aquatic waters, bays and estuaries. They spawn upstream between March and July (NMFS 2015). Green sturgeon are believed to spawn in the Sacramento River, but not the San Joaquin River (NMFS 2015). The project site is downstream from the San Joaquin River and upstream from the confluence of the San Joaquin and Sacramento rivers. Thus, it is unlikely that green sturgeon would be moving through Piper Slough during their spawning season.

Delta and longfin smelt have similar life histories and spend most of their lives in brackish bays and estuaries. They are both pelagic species, inhabiting waters deep in the water column and typically staying away from shore features (USFWS 2008). Upstream migration and spawning occurs from mid-winter through spring and juvenile smelt are thought to move downstream to the low salinity zone by the end of spring (USFWS 2008). The spawning season and pelagic nature of these smelt species result in low likelihood of them occurring in the shallows of the slough during construction activities.

All in-water impacts to Piper Slough will be temporary in nature. Construction of the waterside bench along Horseshoe Bend Levee is intended to improve the overall quality of the aquatic environment by providing fish-friendly levee enhancement in accordance with Department of Water Resources guidelines. The project will be required to obtain a 401 permit and implement standard best management practices (BMPs) as determined by the Regional Water Quality Control Board. These BMPs will ensure no indirect effects to fish as a result of decreased water quality.

Implementation of project-related activities could result in temporary adverse effects through direct loss of individuals and habitat modifications to these special-status fish species however, implementation of mitigation measures **BIO-1** and **BIO-3** will reduce impacts to a less than significant level by not allowing work to occur during the seasons these special-status fish species would be present in Piper Slough.

Special-Status Reptiles

Special-status reptiles with the potential to occur onsite include western pond turtle (*Emys marmorata*) and giant garter snake (*Thamnophis gigas*). The sloughs provide suitable aquatic habitat for both western pond turtle and giant garter snake. However, it is unlikely the giant garter snake will occur onsite due to lack of connectivity to extant populations. If present, both species would use adjacent upland habitat for nesting, basking, and cover. Upland habitat for these species includes anything within 200 feet of aquatic habitat. Construction of project-related levee improvement activities could result in temporary substantial adverse effects, either directly or through habitat modifications, to these special-status reptile species. Implementation of mitigation measures **BIO-1** and **BIO-4** through **BIO-6** will reduce those impacts to a less than significant level by requiring preconstruction surveys and avoidance of reptiles, if present.

Burrowing Owl

Though no sign of burrowing owls was found during reconnaissance-level surveys, suitable habitat was present in the form of open, upland areas supporting ground squirrel populations. Project implementation could result in the loss of this species through destruction of active nesting sites and/or incidental burial of adults, young, and eggs, should they be present. Potential nest abandonment and mortality to burrowing owl individuals would be considered a potentially significant impact; however, implementation of mitigation measures **BIO-1** and **BIO-7** will reduce those impacts to a less than significant level by requiring preconstruction surveys and avoidance of owls, if present.

Swainson's Hawk

Upland communities on the Crivello property, Horseshoe Bend project area, and District Mitigation Site represent suitable foraging habitat for Swainson's hawk. According to the CNDDB, there are several active nests within 1 mile of Bethel Island. According to the CDFW's Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (*Buteo swainsoni*) in the Central Valley of California (CDFW 1994), loss of foraging habitat within 1 mile of active Swainson's hawk nests calls for mitigation in the form of providing 1 acre of habitat management lands for every 1 acre of foraging habitat lost. Any permanent conversion of pasture or annual grassland on the project sites will result in a loss of foraging habitat. Excavation activities on the Crivello property will impact foraging habitat. In addition, the conversion of pasture to created seasonal wetlands on the District Mitigation site will result in loss of foraging habitat. Permanent loss of foraging habitat would be considered a potentially significant impact to foraging habitat for Swainson's hawk; however implementation of mitigation measure **BIO-8** will reduce those impacts to a less than significant level by preserving foraging habitat at a 1:1 ratio for any habitat converted.

Special-Status Birds and Other Raptors and Migratory Birds

Habitats on and adjacent to the project site may provide suitable nesting habitat for special-status birds and raptors, including tricolored blackbird (*Agelaius tricolor),* yellow-breasted chat (*Icteria virens*), Modesto song sparrow (*Melospiza melodia*) and white-tailed kite (*Elanus leucurus*). In addition, other raptors and migratory birds protected under the Migratory Bird Treaty Act and Section 3503.5 of the California Fish and Game Code may nest on the project sites. The removal of vegetation and/or trees during construction

activities could result in noise, dust, human disturbance, and other direct/indirect impacts to nesting birds on or in the vicinity of the project site. Potential nest abandonment and mortality to individuals would be considered a potentially significant impact; however, implementation of mitigation measures **BIO-1** and **BIO-9** will reduce those impacts to a less than significant level be requiring preconstruction surveys and avoidance of active nests, if present.

b, c) **Less Than Significant Impact With Mitigation Incorporated**. Sensitive habitats include (a) areas of special concern to resource agencies; (b) areas protected under CEQA; (c) areas designated as sensitive natural communities by the CDFW; (d) areas outlined in Section 1600 of the FGC; (e) areas regulated under Section 404 of the federal Clean Water Act; and (f) areas protected under local regulations and policies. Several sensitive communities occur on the project sites including willow scrub wetlands, seasonal wetlands, man-made ponds, Piper Slough, and Taylor Slough. Impacts to these resources would be considered a potentially significant impact.

Michael Baker biologists conducted a formal wetland delineation of the Borrow Site on October 11, 2012. The investigation revealed that previous excavation activities in uplands had resulted in the creation of a borrow pond and other agricultural surface water features (totaling 1.78 acres) and two seasonal man-made wet depressions (1.98 acres) (**Appendix B**). An approved jurisdictional determination was obtained for the Borrow Site from the USACE on August 8, 2014.

Michael Baker biologists conducted a formal wetland delineation of the Levee Site on October 22, 2015. The investigation revealed a 0.37-acre network of agricultural ditches on the Levee Site (**Appendix B**). In addition, 15.2 acres of open water habitat occurs in Piper Slough along with a 0.18-acre patch of associated freshwater emergent wetland blackberry thicket, and non-native annual grassland occurs in the Levee Site. An approved jurisdictional determination for these sites has not yet been obtained from the USACE.

The proposed Project is anticipated to result in permanent impacts to seasonal wetlands (Borrow Site), willow scrub (Levee Site), ditch features (Borrow Site and Levee Site), and the agricultural pond, as well as open water associated with Piper Slough. The excavation of the fill material for the land-side levee improvements is anticipated to occur in the same area where the agricultural pond and seasonal wetlands on the Borrow Site occur.

Impacts to open water within Piper Slough are anticipated to be temporary in nature and are intended to improve the overall quality of the aquatic environment. Therefore, these impacts are anticipated to be partially offset through the enhancement of fish-friendly levee habitat on an approximately 15-foot-wide, 2,000-foot-long (±0.75 acre) bench between mean low tide and mean high tide. The remaining impacts to Piper Slough would be reduced to a less than significant level with implementation of mitigation measure **BIO 10**, which would ensure no net loss of riparian communities, waters of the United States, and other wetlands.

Permanent impacts to sensitive natural communities and waters of the United States would be considered potentially significant. Permanent impacts to seasonal wetlands and ditches can be offset through on-site creation. Impacts would be reduced to a less than significant level with implementation of mitigation measure **BIO-10**, which would ensure there is no net loss of riparian communities, waters of the United States, and other wetlands through on-site creation and enhancement.

d) **Less Than Significant Impact With Mitigation Incorporated**. Implementation of Project-related activities is not expected to result in significant impacts to the movement of native resident or migratory fish or wildlife species or established migratory corridors. The Project proposes to improve an existing levee; therefore, land use on the Horseshoe Bend site will not change or obstruct any movement. Furthermore, implementation of mitigation measure **BIO 3** will ensure impacts to spawning fish will be minimized. Thus, any impacts to the movements of any native resident or migratory wildlife corridors or the use of native wildlife nursery sites that occur as a result of the proposed Project will be less than significant.

e) No Impact. Implementation of project-related activities is not expected to conflict with any local policies or ordinances protecting biological resources. As such, there would be no impact.

f) No Impact. The proposed Project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. The Project site is located within the Bay Delta Conservation Plan planning area; however, this plan has not been adopted to date. As a result, the proposed Project would not conflict with the plan, and no impact would occur.

Mitigation Measures

BIO-1 **Worker Environmental Awareness Training.** A qualified biologist(s) shall monitor construction activities that could potentially cause significant impacts to sensitive biological resources. In addition, BIMID shall retain a qualified biologist to conduct mandatory contractor/worker awareness training for construction personnel. The awareness training will be provided to all construction personnel to brief them on the identified location of sensitive biological resources, including how to identify species (visual and auditory) most likely to be present, the need to avoid impacts to biological resources (e.g., plants, wildlife, and jurisdictional waters), and the penalties for not complying with biological mitigation requirements. All construction personnel will also receive training on relevant special-status species, including western pond turtle, giant garter snake, and nesting raptors and migratory birds. If new construction personnel are added to the Project, the contractor shall ensure that they receive the mandatory training before starting work.

Timing/Implementation: Prior to and during construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-2 **Special-Status Plants.** Prior to any water-side levee work, focused surveys shall be conducted to determine if special-status plants occur within the Project footprint and/or temporary construction zone. Surveys shall be conducted in accordance with CDFW (2009) Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities. These guidelines require rare plant surveys to be conducted at the proper time of year when rare or endangered species are both “evident” and identifiable. Surveys shall be scheduled to coincide with known blooming periods, and/or during periods of physiological development that are necessary to identify the plant species of concern.

If no state or federally listed CNPS List 1 or CNPS List 2 plant species are found in or adjacent to (within 100 feet) proposed construction areas, no further mitigation is required. If any state or federally listed CNPS List 1 or CNPS List 2 plant species are found in or adjacent to (within 100 feet) proposed impact areas during the surveys, these plant species shall be avoided to the greatest extent possible. Any special-status plant species that are identified adjacent to the Project site, but not proposed to be disturbed by the Project, shall be protected by barrier fencing to ensure that construction activities and material stockpiles do not impact any special-status plant species. These avoidance areas shall be identified on Project plans.

If Project-related impacts will result in the loss of greater than 10 percent of occupied habitat for a special-status plant species, compensatory mitigation shall be required for all impacts that exceed the 10 percent threshold. For example, if 18 percent of occupied habitat will be impacted, compensatory mitigation shall only be required for the 8 percent that exceeds the 10 percent threshold. Compensatory mitigation for permanent impacts to special-status plant species shall include the preservation of occupied habitat at a 1:1 ratio (i.e., 1 acre preserved for each acre impacted). Compensation for temporary impacts shall include the preservation of occupied habitat at a 0.5:1 ratio. Preservation areas may include undisturbed areas of the site that will be preserved and managed in perpetuity, off-site mitigation lands, or a combination of both. The preserved habitat shall be of equal or greater habitat quality to the areas impacted in terms of soil features, extent of disturbance, and vegetation structure, and contain extant populations of the same or greater size as the area impacted.

A report of special-status plants observed during focused surveys, as well as avoidance, minimization, and mitigation measures to be implemented, shall be prepared and submitted to BIMID, CDFW, and USFWS (as appropriate).

Timing/Implementation: Prior to water-side levee improvement activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-3 **Special-Status Fish.** In-water work for Horseshoe Bend levee improvements shall occur between August 1 and November 30 to minimize impacts to spawning fish species; particularly Delta smelt.

Timing/Implementation: Throughout project construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-4 **Western Pond Turtle Surveys.** A preconstruction survey for western pond turtle shall be conducted by a qualified biologist within 24 hours prior to the onset of construction activities adjacent to Piper and Taylor sloughs. The survey area shall include a 100-foot buffer of the area to be affected. If a western pond turtle is found within the survey area, a qualified biologist, under consultation with the CDFW, shall move the individual 500 feet downstream to suitable habitat. If a turtle nest is found within the survey area, construction activities should not take place within 100 feet buffer of the nest until the eggs

have hatched and young have emerged and moved out of the Project area. The 100-foot buffer will be marked with stakes and flagging.

Timing/Implementation: Prior to levee improvement activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-5 **Western Pond Turtle Avoidance.** In the event that a turtle is found during construction activities, construction activities shall stop until the turtle leaves the Project area on its own or a qualified biologist, under consultation with the CDFW, relocates the turtle to a suitable aquatic site 500 feet away and downstream from Project activities.

Timing/Implementation: Throughout project construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-6 **Giant Garter Snake.**

1) A survey shall be conducted by a qualified biologist for the giant garter snake within the Project area 24 hours prior to the onset of levee improvements and any time activities are halted for more than two weeks thereafter.
2) During Project development, the work area will be reduced to the smallest footprint feasible in sensitive habitat areas.
3) Work shall coincide with the giant garter snake's active season (May 1–October 1).
4) If work in the flowing portion of the affected water body is unavoidable, a qualified biologist shall survey the Project area for giant garter snake every morning prior to construction activities that occur in the flowing portion of the water body.
5) Prior to initiation of construction activities within jurisdictional features, construction best management practices (BMP) shall be employed on-site to prevent degradation to on-site and off-site waters of the United States. Methods shall include the use of appropriate measures to intercept and capture sediment prior to entering jurisdictional features, as well as erosion control measures along the perimeter of all work areas to prevent the displacement of fill material. All BMPs shall be in place prior to initiation of any construction activities and shall remain until construction activities are completed. All erosion control methods shall be maintained until all on-site soils are stabilized.
6) All exposed/disturbed areas and access points left barren of vegetation as a result of construction activities shall be restored using locally native grass seeds, locally native grass plugs, and/or a mix of quick-growing sterile non-native grass with locally native grass seeds. Seeded areas shall be covered with broadcast straw and/or jute netted (monofilament erosion blankets are not permitted).

7) During all phases of construction, snake exclusionary fencing shall be installed near the temporary construction zone boundary. The exclusionary fencing shall be maintained by the construction contractor during all phases of construction. Any breaches in the fencing shall be fixed within a 24-hour period.

8) If a giant garter snake is encountered in the Project work area, all construction activities will cease until appropriate corrective measures have been completed and the snake moves out of the construction area on its own. Any giant garter snake observed will be immediately reported to the USFWS and the CDFW.

9) Tightly woven erosion control matting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the Project site to ensure that giant garter snakes do not become trapped or entangled by the erosion control material. The edge of the material shall be buried in the ground to prevent giant garter snakes from crawling underneath the material. The use of plastic, monofilament, jute, or similar erosion control netting with mesh sizes larger than 0.25 inch that could entangle snakes at the Project site shall be prohibited.

10) Vehicles drive on or near the levees in the Project area shall maintain a 15 mile per hour speed limit, and drivers will be informed to watch for snakes and avoid running them over.

Timing/Implementation: Throughout project construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-7 **Burrowing Owls.** . For any clearing and construction activities that occur during the nesting period for burrowing owls (February 1–August 31), BIMID shall retain a qualified biologist to conduct preconstruction surveys in accordance with the CDFW's Staff Report on Burrowing Owl Mitigation, published March 7, 2012. Surveys shall be conducted within 14 days prior to ground-breaking activities and shall be repeated if Project activities are suspended or delayed for more than 14 days during nesting season.

If no burrowing owls are detected, no further mitigation is required. If active burrowing owl nest sites are detected, BIMID shall implement the avoidance, minimization, and mitigation methodologies outlined in the CDFW's Staff Report on Burrowing Owl Mitigation prior to initiating Project-related activities that may impact burrowing owls.

Timing/Implementation: Prior to ground breaking activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-8 **Swainson's Hawk Foraging Habitat.** Prior to any construction activities, BIMID shall obtain Swainson's hawk foraging habitat mitigation at a ratio of 1 acre for each 1 acre of suitable foraging habitat converted. "Suitable foraging habitat" consists of row crops, forage crops, pasture, grasslands, or fallow fields that would be affected by construction activities. BIMID shall mitigate for loss of Swainson's hawk foraging habitat through (1) payment of an in-lieu fee

for off-site preservation of foraging habitat to a resource agency or a third-party organization acceptable to a resource agency, or (2) acquisition of an irrevocable instrument (e.g., deed restriction or easement) for preservation of foraging habitat on a property that provides habitat of equal or greater quality.

Timing/Implementation: Prior to commencement of construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-9 **Nesting Birds and Raptors.** For any clearing and/or construction activities that occur during the nesting season (February 15–August 15), preconstruction surveys to identify active raptor and migratory bird nests, including ground-nesting birds, shall be conducted by a qualified biologist within 14 days of construction initiation. Focused surveys (three separate surveys for raptors) must be performed by a qualified biologist for the purposes of determining presence/absence of active nest sites within the proposed impact area.

If active nest sites are identified within 200 feet of Project activities, BIMID shall impose an exclusionary buffer for all active nest sites prior to commencement of any Project construction activities to avoid construction- or access-related disturbances to migratory bird nesting activities. An exclusionary buffer constitutes an area where Project-related activities (i.e., vegetation removal, earth moving, construction, Project staging) will not occur and will be imposed within 100 feet of any active nest sites until the nest is deemed inactive by a qualified biologist. Activities permitted within and the size (i.e., 100 feet) of the exclusionary buffer may be adjusted through consultation with the CDFW.

If active raptor nests are identified within 1,320 feet of Project activities, a 1,320-foot initial temporary nest disturbance buffer shall be established. If project-related activities within the temporary raptor nest disturbance buffer are determined to be necessary during the nesting season, an on-site biologist/monitor experienced with raptor behavior shall be retained by the BIMID to monitor the nest and BIMID shall consult with the CDFW to determine the best course of action necessary to avoid nest abandonment or take of individuals. Work may be only allowed to proceed within the temporary nest disturbance buffer if raptors are not exhibiting agitated behavior such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, and only with the agreement of the CDFW. Based on the behavior observed, the buffer may be reduced if the birds are tolerant of construction activities. The designated on-site biologist/monitor shall be on-site daily while construction-related activities are taking place within the above quarter-mile buffer and shall have the authority to stop work if raptors are exhibiting agitated behavior.

Timing/Implementation: Prior to commencement of construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

BIO-10 **No Net Loss of Riparian Habitats and Federally Protected Waters.** For every acre of riparian habitat and federally protected waters permanently affected by the proposed Project, BIMID shall replace the affected acreage at a minimum 2:1 ratio, or another approved ratio as determined by the USACE. Mitigation will be achieved through on-site creation or enhancement. Mitigation as required in regulatory permits issued through the CDFW, the USACE, or the RWQCB may be applied to satisfy this measure.

Timing/Implementation: Prior construction activities

Enforcement/Monitoring: Bethel Island Municipal Improvement District

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

Discussion of Impacts

a, b) **Less Than Significant Impact With Mitigation Incorporated***.* The Borrow Site is vacant and has been heavily disturbed through past agricultural activities and extraction of fill materials. The Horseshoe Bend Levee Project site is developed as part of a levee system, and the levee itself was previously evaluated and was determined not eligible for inclusion in the National Register of Historic Places. Even though the built environment portion of the levee was determined not eligible, the levee is sensitive for prehistoric and historic period archaeological resources. There is potential for unknown historical or archaeological resources to be discovered during ground-disturbing activities such as those proposed. Public Resources Code (PRC) Section 21083.2(i) states that "a lead agency may make provisions for archaeological sites accidentally discovered during construction. These provisions may include an immediate evaluation of the find. If the find is determined to be a unique archaeological resource, contingency funding and a time allotment sufficient to allow recovering an archaeological sample or to employ one of the avoidance measures may be required under the provisions set forth in this section." Mitigation measure **CUL 1** would comply with PRC Section 21083.2 and reduce this impact to a less than significant level by ensuring that any discovered resources are handled properly by a qualified professional.

c) **Less Than Significant Impact With Mitigation Incorporation**. As described previously, the Project site has been heavily disturbed. It is unlikely that any paleontological resources are present. However, there is potential for unknown paleontological resources to be discovered during ground-disturbing activities such as those proposed. Implementation of mitigation measure **CUL-2** would reduce this impact to a less than significant level by ensuring that any discovered resources are handled properly by a qualified professional.

d) **Less Than Significant Impact**. As described previously, the Project site has been heavily disturbed. It is unlikely that any burial sites or human remains are present. However, there is potential for unknown burial sites and human remains to be discovered during ground-disturbing activities such as those proposed. Pursuant to California PRC Section 5097.98 and California Health and Safety Code Section 7050.5, if human remains are discovered

during the course of Project implementation, all work must be halted immediately within 50 feet of the discovery, and the Bethel Island Municipal Improvement District and the county coroner must be immediately notified. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in California Code of Regulations Section 15064.5(d) and (e) must be followed.

Mitigation Measures

CUL-1 If subsurface deposits believed to be cultural or human in origin are discovered during construction, all work must halt within a 100-foot radius of the discovery and BIMID shall be immediately notified. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for a prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find and shall have the authority to modify the no-work radius as appropriate, using professional judgment. A Native American monitor, following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the Native American Heritage Commission, may also be required.

Work cannot continue within the no-work radius until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either (1) not cultural in origin or (2) not potentially significant or eligible for listing on the National Register of Historic Places or the California Register of Historical Resources.

If a potentially eligible resource is encountered, the archaeologist and BIMID shall arrange for either (1) total avoidance of the resource, if feasible, or (2) test excavations to evaluate eligibility and, if eligible, total data recovery as mitigation. The determination of the archaeologist shall be formally documented in writing and submitted to BIMID as verification that the provisions for managing unanticipated discoveries have been met.

Timing/Implementation: *Throughout project construction activities*

Enforcement/Monitoring: *Bethel Island Municipal Improvement District*

CUL-2 If, during the course of implementing the Project, any paleontological resources (fossils) are discovered, work shall be halted immediately within 50 feet of the discovery, and BIMID shall be immediately notified. At that time, BIMID will coordinate any necessary investigation of the discovery with a qualified paleontologist.

BIMID shall consider the mitigation recommendations of a qualified paleontologist for any unanticipated discoveries of paleontological resources. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. BIMID shall be required to implement any mitigation necessary for the protection of paleontological resources.

Timing/Implementation: *Throughout project construction activities*

Enforcement/Monitoring: *Bethel Island Municipal Improvement District*

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
6. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning map, issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would became unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Discussion of Impacts

a)

i) **No Impact**. The Project site is not located in an Alquist-Priolo Earthquake Fault Zone (DOC 2015) and is not considered at risk from rupture of a known earthquake fault.

ii–iv) **Less Than Significant Impact**. The Project site is located near the San Francisco Bay Area, which is one of the most seismically active regions in the United States and has a high ground shaking hazard potential. However, the Project does not involve the development of any habitable structures. Furthermore, the Horseshoe Bend levee improvements are intended to correct identified deficiencies, including unstable slopes and potentially liquefiable material within the levee and foundation. The Project would improve public safety related to seismic ground shaking, seismic-related ground failure, and landslides. Therefore, this impact would be less than significant.

b) **Less Than Significant Impact**. The proposed construction activities (i.e., excavating, grading, hauling of fill materials) would expose site soils to wind and water erosion.

The State Water Resources Control Board (SWRCB) permits all regulated construction activities under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order No. 209-0009-DWQ). Every construction project that disturbs 1 or more acres of land surface or that is part of a common plan of development or sale that disturbs more than 1 acre of land surface would require coverage under the Construction General Permit. Project proponents are required to prepare and comply with a stormwater pollution prevention plan (SWPPP) that provides a schedule for the implementation and maintenance of erosion control measures and a description of the erosion control practices, including appropriate design details and a time schedule. The SWPPP considers the full range of erosion control best management practices (BMPs), including any additional site-specific and seasonal conditions. The BMPs would include controls for water and wind erosion, sediment, and tracking, such as preserving existing vegetation, mulching, and hydroseeding; street sweeping, fiber rolls, silt fencing, gravel bags, sand bags, storm drain inlet protection, sediment traps, and detention basins; applying water or other dust suppressants to exposed soils; limiting site access; and wheel washing. Implementation of these BMPs would substantially reduce the contaminant load of stormwater runoff and minimize the effect on downstream waterways. Compliance with these existing regulations would reduce this impact to a less than significant level.

c) **Less Than Significant Impact**. See Response 6(a)(ii–iv). The Project does not involve the development of any habitable structures that could be at risk of damage due to unstable soil. The levee improvements proposed as part of the Project are intended to correct identified deficiencies related to unstable soils. Therefore, this impact would be less than significant.

d) **Less Than Significant Impact**. As described previously, the Project does not involve the development of any structures, infrastructure, or other improvements that could be at risk of damage associated with expansive soils. The levee improvements are intended to correct identified deficiencies, including those associated with unstable soils. Therefore, this impact would be less than significant.

e) **No Impact**. The proposed project does not include the development of any structures and would not involve the installation of septic tanks or alternative wastewater disposal systems. There would be no impact.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
7. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion of Impacts

a) **Less Than Significant Impact**. Greenhouse gas (GHG) emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature. The combination of GHG emissions from past, present, and future projects contributes substantially to the phenomenon of global climate change and its associated environmental impacts and as such is addressed only as a cumulative impact.

GHG emissions associated with the project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust.

Construction. The BAAQMD does not have an adopted threshold of significance for construction-related greenhouse gas emissions. However, the BAAQMD recommends quantification and disclosure of GHG emissions that would occur during construction, in addition to making a determination on the significance of these construction-generated GHG emissions impacts in relation to meeting Assembly Bill (AB) 32 greenhouse gas reduction goals. AB 32 is the California Global Warming Solutions Act, enacted by the State Legislature in September 2006. AB 32 requires the reduction of statewide GHG emissions to 1990 levels by 2020. Construction of the proposed project would result in direct emissions of GHGs from construction. The approximate quantity of daily GHG emissions generated by construction equipment used for the proposed project is depicted in **Table GHG-1.**

As shown in **Table GHG-1**, the construction of the proposed project would result in a maximum of 864 metric tons of construction-generated carbon dioxide equivalents (CO_2e) over the course of three years.

TABLE GHG-1
UNMITIGATED PROJECT CONSTRUCTION EMISSIONS METRIC TONS PER YEAR

Construction Phase	CO_2e
Year 1	
Excavation and Material Hauling[1]	72
Horseshoe Bend Levee Work (land-side)[2]	91
Year 1 Total	*163*
Year 2	
Excavation and Material Hauling[3]	193
Horseshoe Bend Levee Work (land-side) and North Levee Work[4]	253
Year 2 Total	*446*
Year 3	
Excavation and Material Hauling[5]	119
Horseshoe Bend Levee Work (land-side) and North Levee Work[6]	71
Peat Material Hauling[7]	65
Year 3 Total	*255*
Total Construction – Year 1, Year 2, and Year 3	***864***
BAAQMD Significance Criteria	**None**
Significant?	*No*

*Source: Emissions modeled by Michael Baker International using the California Emissions Estimator Model (CalEEMod), version 2013.2.2 computer program. Refer to **Appendix C** for model data outputs.*

1. *Accounts for the disturbance of 24 acres of land at the borrow site for the excavation of 35,500 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
2. *Accounts for development of a 45-foot berm on landside and 22-foot levee crest spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
3. *Accounts for the disturbance of 45.7 acres of land at the borrow site for the excavation of 70,000 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
4. *Accounts for the further development of a 45-foot berm on landside and 22-foot levee crest spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
5. *Accounts for the disturbance of 24.6 acres of land at the borrow site for the excavation of 36,500 cubic yards of material for levee improvements, hauled 2.38 miles to Horseshoe Bend Levee. Also accounts for material processing/peat separation equipment.*
6. *Accounts for development of a 15-foot berm on waterside spanning the entire 4,774-foot length of Horseshoe Bend Levee.*
7. *Accounts for hauling of 42,000 cubic yards of peat material 2.94 miles to Hoover restoration site.*

In addition to quantifying construction-generated GHG emissions, the BAAQMD recommends that all construction projects incorporate best management practices to minimize GHG emissions. The BAAQMD-recommended best management practices include using alternative-fueled (i.e., biodiesel, electric) construction vehicles and equipment to the maximum extent possible, using local construction materials (within 100 miles) to the maximum extent possible, and recycling construction waste and demolition materials to the maximum extent possible. Mitigation measure **AQ-1**, included in subsection 3.3, Air Quality, requires the use of the most efficient heavy-duty diesel-powered equipment to implement the project. This measure would minimize construction-related emissions, consistent with AB 32 reduction goals. Because the project is a levee

improvement project, construction would not employ the use of typical construction materials. It is noted, however, that the material used to improve the levee would be excavated within 3 miles of the levee itself. Lastly, the 2013 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) requires the diversion of 50 percent of construction waste from landfills. For these reasons, the project would comply with BAAQMD-recommended best management practices and would therefore result in a less than significant construction-related impact.

Operation. The BAAQMD threshold of significance applicable to the project is whether the project would exceed 1,100 metric tons per year of CO_2e. However, the proposed project would not include new permanent sources of GHG emissions; therefore, it would not generate quantifiable criteria emissions from project operations. For instance, the project does not propose any buildings or other permanent source of stationary source emissions. In addition, as determined in subsection 16, Transportation/Traffic, the project would not result in a permanent increase in traffic. Traffic conditions after the project is completed would be the same as the existing traffic conditions. Therefore, there would be no new mobile sources of emissions. The proposed project would not result in the long-term generation of GHG emissions and would not exceed BAAQMD greenhouse gas thresholds of significance. This is a less than significant impact.

b) **Less Than Significant Impact**. The proposed project is subject to compliance with AB 32, which is a legal mandate requiring that statewide GHG emissions be reduced to 1990 levels by 2020. In adopting AB 32, the State Legislature determined the necessary GHG reductions for California to make in order to sufficiently offset its contribution to the cumulative climate change problem to reach 1990 levels. AB 32 is the only legally mandated requirement for the reduction of GHG emissions. As such, compliance with AB 32 is the basis on which a lead agency can base its significance threshold for evaluating a project's GHG impacts. As identified above, the proposed project would not surpass the BAAQMD's GHG significance threshold of 1,100 metric tons per year of CO_2e, which was developed with the purpose of complying with the requirements of AB 32. BAAQMD thresholds were developed based on substantial evidence that such thresholds represent quantitative levels of GHG emissions, compliance with which means that the environmental impact of the GHG emissions will normally not be cumulatively considerable under CEQA. Compliance with such thresholds will be part of the solution to the cumulative GHG emissions problem, rather than hinder the State's ability to meet its goals of reduced statewide GHG emissions under AB 32. Therefore, the proposed project would not conflict with AB 32, and the impact is less than significant.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
8. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles or a public airport or public use airport, result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) 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?	☐	☐	☐	☒

Discussion of Impacts

a, b) **Less Than Significant Impact**. As described previously, the proposed project consists of short-term construction activities and would not result in any long-term activities that would include the use, transport, or disposal of hazardous materials. Typical hazardous materials used during construction activities would be limited to diesel fuel, gasoline, oil, and similar materials for the operation and maintenance of equipment. The transport and use of hazardous materials is strictly regulated by local, state, and federal agencies to minimize adverse hazards from accidental release. The EPA, the California Highway Patrol (CHP), Caltrans, and the California Department of Toxic Substances Control

(DTSC) implement and enforce state and federal laws regarding hazardous materials transportation. Contractors would be required to use, store, and dispose of any hazardous materials in accordance with all applicable regulations. In addition, the Contra Costa County Hazardous Materials Division operates an incident response program to ensure public safety in the event of an accidental release. Compliance with existing regulations and programs would minimize potential risks to the public and the environment associated with the use, storage, and transport of hazardous materials associated with the proposed project. Therefore, this impact would be less than significant.

c) **No Impact**. No existing or proposed schools are located within one-quarter mile of the project site. There would be no impact.

d) **No Impact**. According to the State Water Resources Control Board's (2015) GeoTracker database and the California Department of Toxic Substances Control's (2015) EnviroStor database, there are no known hazardous materials release sites on the project site. There would be no impact.

e, f) **No Impact**. There are no airports or airstrips on or within 2 miles of Bethel Island. There would be no impact.

g) **No Impact**. Neither Contra Costa County's Emergency Operations Plan (2011a) nor its Hazard Mitigation Plan Update (2011b) identifies specific evacuation routes. However, the project site is located in a rural area on a minor roadway and is not located near any critical public facilities (e.g., police stations, fire stations, hospitals). Therefore, the proposed project would not interfere with implementation of the County's emergency response plans. There would be no impact.

h) **No Impact**. According to the California Department of Forestry and Fire Protection (Cal Fire 2009), the project site is designated non-VHFHSZ (outside of the very high fire hazard severity zone). Furthermore, the project involves temporary construction activities only and would not result in the development of any structures. There would be no impact.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
9. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?	☐	☐	☒	☐
e) 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?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within 100-year flood hazard area structures, which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Discussion of Impacts

a, c, f) **Less Than Significant Impact**. The project site is located in the San Joaquin River Basin. In accordance with Section 303 of the federal Clean Water Act, water quality standards for this basin are contained in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin prepared by the Central Valley Regional Water Quality Control Board (2015). These standards generally consist of water quality objectives for the various water bodies in the basin and implementation programs to achieve these objectives. Stormwater runoff from the project site is ultimately discharged to the San Joaquin River and the Sacramento-San Joaquin Delta.

As described previously, the proposed project is limited to short-term construction activities that would cease upon project completion. The proposed construction activities would include vegetation removal, excavation, and grading, which would disturb and expose soils to water erosion, potentially increasing the amount of silt and debris entering area drainages and ultimately the San Joaquin River. In addition, refueling and parking of construction equipment and other vehicles on-site during construction could result in oil, grease, and other related pollutant leaks and spills that could enter runoff. However, because the project would disturb more than 1 acre of land, as part of the NPDES permit, preparation and implementation of a stormwater pollution prevention plan would be required to address potential stormwater quality issues. The SWPPP would include pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills), demonstrate compliance with all applicable local and regional erosion and sediment control standards, identify responsible parties, and include a detailed construction timeline. The SWPPP must also include best management practices to reduce construction effects on receiving water quality by implementing erosion control measures and reducing or eliminating non-stormwater discharges.

Examples of typical construction BMPs included in SWPPPs include, but are not limited to, using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; and installing sediment control devices such as gravel bags, inlet filters, fiber rolls, or silt fences to reduce or eliminate sediment and other pollutants from discharging to the drainage system or receiving waters. Stormwater pollution prevention plan BMPs are recognized as effective methods to prevent or minimize the potential releases of pollutants into drainages, surface water, or groundwater. Strict SWPPP compliance, coupled with the use of appropriate BMPs, would reduce the project's potential water quality impacts to a less than significant level. The project would not generate any wastewater.

b) **Less Than Significant Impact**. As described previously, the proposed project is limited to short-term construction activities that would cease upon project completion. Therefore, project water demands would be short term and would be limited to the water used for dust control. It is estimated that a 2,000-gallon water truck would be required daily at the borrow site and on the levee. Assuming construction activities could occur five days per week for a total of 12 months (2 months in year one, 6 months in year two, and 4 months in year three), the project's water demand for dust control purposes would be approximately 3.19 acre-feet. The Contra Costa Water District pumps 5,039 acre-feet per year of groundwater (Luhdorff and Scalmanini 2007, Table 2-1). The proposed project's

demand would be less than 0.1 percent of the district's total groundwater demand in a single year. This would be considered a less than significant impact.

d, e) **Less Than Significant Impact**. Stormwater runoff, as well as levee seepage water, flows overland to open drainage ditches along roadways and slowly flows to the main canal and west across the island to the pump station at the end of Taylor Road. Drainage is pumped over the levee into the surrounding slough. The proposed project would not change this existing drainage pattern and would not increase drainage flows. Therefore, the project would not result in any on- or off-site flooding or exceedance of the existing drainage system. This impact would be less than significant.

g, h) **No Impact**. The proposed project would not result in the development of any structures. Therefore, placement of housing or another structure within a 100-year flood hazard area would not occur with implementation of the proposed project. There would be no impact.

i) **Less Than Significant Impact**. The proposed project would be limited to short-term construction impacts and would not result in the development of any habitable structures that could be at risk of flooding due to the failure of a levee or dam. Furthermore, as described previously, the project would include improvements to the adjacent levee system to correct identified deficiencies and minimize the risk from levee failure. Impacts would be less than significant.

j) **No Impact**. The project site is located adjacent to the San Joaquin River, which connects to San Pablo Bay and ultimately the Pacific Ocean. As such, the site could be subject to inundation by seiche or tsunami waves. However, as described previously, the project would be limited to short-term construction impacts and would not result in the development of any habitable structures that would be subject to hazards from seiche or tsunami. The project site is flat and there would be no risk of mudflow. There would be no impact.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
10. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion of Impacts

a) **No Impact**. The proposed project involves short-term construction activities for the extraction and movement of fill material and would not result in development of structures or any improvements that would result in physical barriers in the area. The project site would remain consistent with its current use as part of an existing levee system. Therefore, the project would not result in the physical division of an established community and there would be no impact.

b) **No Impact**. As described previously, the proposed project would not result in any development. The project improvements are consistent with the properties' existing General Plan land use designation and zoning. No changes to land use designations or zoning is proposed. There would be no impact.

c) **No Impact**. The project site is not subject to a habitat conservation plan or a natural community conservation plan. Therefore, there would be no impact.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
11. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Discussion of Impacts

a, b) **No Impact**. The proposed project involves the excavation of sand and other fill materials. The proposed project would not preclude the future use of the property from further mineral extraction in the future. No impact would occur.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
12. NOISE. Would the project:				
a) The exposure of persons to, or the generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) The exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within 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, exposure of people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion of Impacts

a, c) **Less Than Significant Impact**. Noise generated by the proposed project would be limited to temporary construction noise that would cease upon project completion. The project would not result in the development of any new uses that could generate permanent noise. Therefore, the project would not result in the exposure of persons to or generation of long-term noise levels in excess of applicable standards. Impacts would be less than significant.

b) **Less Than Significant Impact**. Project implementation could generate limited groundborne vibration as a result of heavy equipment operations. The project would include the use of excavators, haul trucks, bulldozers, and water trucks. The project would not require the use of a pile driver, vibratory compactor, pneumatic hammer, or other similar tool or apparatus that could exceed the threshold for annoyance of 0.2 inches per second peak particle velocity (ppv) (Caltrans 2004). Therefore, proposed activities on the Crivello property would not be expected to adversely affect the nearest residences approximately 200 feet to the west and southwest. Proposed activities at the Horseshoe Bend site would be approximately 1,000 feet from the nearest residences. Given the types of construction activities associated with the project and the distance to the nearest receptors, construction activities would not adversely affect existing residences in that area. As discussed previously, Contra Costa County General Plan Policy 11-8 states that

construction activities are to be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours (Contra Costa County 2005). Limiting construction activities to normal work hours would also avoid the effects of groundborne vibration. Therefore, this impact would be less than significant.

c) **Less Than Significant Impact**. Project construction activities would generate a temporary increase in ambient noise levels in the project vicinity. In accordance with Contra Costa County General Plan Policy 11-8, the proposed construction activities would occur during normal work hours in order to provide relative quiet during the more noise-sensitive evening and early morning hours. Given the temporary nature of the project, the limited construction hours, and the distance to existing residences, noise impacts resulting from construction activities would be considered less than significant.

e, f) **No Impact**. No airports or airstrips are located on or within 2 miles of Bethel Island. Therefore, the proposed project would not be affected by noise related to airport operations and there would be no impact.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
13. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion of Impacts

a) **No Impact**. The proposed project would be limited to short-term construction impacts and would not result in any development or other improvements that could directly or indirectly induce population growth in the area. There would be no impact.

b, c) **No Impact**. The proposed project would not result in the displacement of any housing or people. There would be no impact.

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
14. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☐	☒
b) Police protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

Discussion of Impacts

a–e) **No Impact**. As described previously, the proposed project would be limited to temporary construction activities that would cease completely upon project completion and would not result in the development of any permanent uses. As such, the project would not result in an increased demand for any public services or facilities. Therefore, no new or expanded public facilities would be needed and there would be no impact.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
15. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the Construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion of Impacts

a, b) **No Impact**. As described previously, the proposed project would be limited to temporary construction activities that would cease completely upon project completion and would not result in the development of any permanent uses. As such, the project would not result in the increased use of existing parks or recreational facilities and would not include or require the development of new or expanded parks or recreational facilities. Therefore, there would be no impact.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
16. TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Discussion of Impacts

a, b) **No Impact**. As described previously, the proposed project would be limited to short-term construction activities and would not result in the development of any permanent uses. Therefore, the project would not result in a permanent increase in traffic on area roadways or otherwise affect long-term traffic operations. In the short term, the project would generate a limited number of construction trips associated primarily with worker vehicles, water trucks, and material haul trucks. These trips would be limited and would not adversely affect traffic operations in the area. Therefore, the project would not conflict with any applicable plans or policies related to the performance of the circulation system or a congestion management program.

c) **No Impact**. No airports or airstrips are located on or within 2 miles of Bethel Island. Furthermore, the proposed project would not result in the development of any permanent uses that would cause an increase in air traffic levels. The project would not include any changes that could result in safety risks related to air traffic. There would be no impact.

d) **No Impact**. The proposed project does not include any roadway changes that could create a hazard to motorists or pedestrians. There would be no impact.

e) **Less Than Significant Impact**. The project would not result in any permanent changes to roadways or access points at the project site. However, the proposed construction activities would include the use of heavy equipment and heavy trucks to transport excavated materials to the levee improvement site. Project truck trips would be limited to daytime hours pursuant to Contra Costa County General Plan Policy 11-8 and would cease upon project completion. Furthermore, as standard practice, each construction site would maintain access points for emergency vehicles, thereby ensuring adequate emergency access. This impact would be less than significant.

f) **No Impact**. There are no existing or planned public transit, bicycle, or pedestrian facilities adjacent to the project site. Furthermore, the project would be limited to short-term construction activities that would cease completely upon project completion and would not involve any roadway improvements. Therefore, the project would have no potential to conflict with adopted policies, plans, or programs related to alternative transportation. There would be no impact.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
17. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion of Impacts

b) **No Impact**. As described previously, the proposed project would be limited to short-term construction activities and would not result in the development of any permanent uses that could generate wastewater requiring treatment. There would be no impact.

c) **No Impact**. The project would not result in the development of any permanent uses that would require treated water or generate wastewater requiring treatment. No new or expanded water or wastewater treatment facilities would be required and there would be no impact.

d) **No Impact**. The project would not involve the construction or expansion of any stormwater drainage facilities. As discussed in subsection 9, Hydrology and Water Quality, the overall drainage pattern on the project site would remain unchanged. Runoff would continue to flow overland to open drainage ditches along roadways and ultimately into the surrounding slough. There would be no impact resulting from the project.

e) **Less Than Significant Impact**. As discussed in subsection 9, Hydrology and Water Quality, project water demand would be short term, totaling approximately 3.19 acre-feet over the life of the project. This amount represents less than 0.1 percent of the Contra Costa Water District's groundwater demand in a single year. The project's water demand would be distributed over three years. This is not considered a significant increase. The district would have sufficient water supplies to meet this demand in addition to its existing commitments and would not require new or expanded entitlements. The impact would be less than significant.

f) **No Impact**. See Response 17a) above. The project would not result in the generation of any wastewater requiring treatment. There would be no impact.

f, g) **No Impact**. The project would not result in the development of any permanent uses that would generate solid waste. Construction activities would consist primarily of excavation, grading, and material hauling that would not generate solid waste requiring disposal in a landfill. The project would not exceed the capacity of any landfill or conflict with any solid waste regulations. There would be no impact.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
18. MANDATORY FINDINGS OF SIGNIFICANCE. Would the project:				
a) Have the potential to 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, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c) Have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Discussion of Impacts

a) **Less Than Significant Impact With Mitigation Incorporated**. See subsections 4, Biological Resources, and 5, Cultural Resources, for further discussion of the proposed project's potential impacts on these environmental issue areas. With implementation of mitigation measures **BIO-1** through **BIO-10** and **CUL-1** and **CUL-2**, the proposed project would have a less than significant impact on biological and cultural resources. Therefore, this impact is considered to be less than significant with incorporation of the above-referenced mitigation measures.

b) **Less Than Significant Impact With Mitigation Incorporated**. The proposed project could result in a potentially significant cumulative impact to air quality from short-term construction emissions. However, implementation of mitigation measures **AQ-1** and **AQ-2** would ensure that short-term construction emissions are reduced below applicable thresholds (see subsection 3, Air Quality). As discussed in subsection 7, Greenhouse Gas Emissions, the proposed project's contribution to the cumulative effects of climate change would be less than significant.

Given the short-term nature of the project, the remaining impacts would be individually limited and not considered "cumulatively considerable." Although incremental changes in certain areas can be expected as a result of the proposed project, all environmental impacts that could occur as a result of the proposed project would be considered less than significant or would be reduced to a less than significant level through implementation of the mitigation measures recommended in this IS/MND.

c) **Less Than Significant Impact With Mitigation Incorporated**. The proposed project would result in potentially significant impacts to air quality, which could adversely affect human beings. However, implementation of mitigation measures **AQ-1** and **AQ-2** would reduce these potential air quality impacts to less than significant levels. The proposed project, with mitigation incorporated, would not cause substantial adverse effects on human beings and would be considered to have a less than significant impact with mitigation incorporated.

4.0 REFERENCES

BAAQMD (Bay Area Air Quality Management District). 2010. *Bay Area 2010 Clean Air Plan.*

Cal Fire (California Department of Forestry and Fire Protection). 2009. *Contra Costa County Very High Fire Hazard Severity Zones in LRA as Recommended by Cal Fire*.

Caltrans (California Department of Transportation). 2004. *Transportation- and Construction-Induced Vibration Guidance Manual*.

———. 2013. *Officially Designated State Scenic Highways*.

CARB (California Air Resources Board). 2013. State and Federal Area Designation Map. http://www.arb.ca.gov/desig/adm/adm.htm.

CDFW (California Department of Fish and Wildlife). 1994. *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks* (Buteo swainsoni) *in the Central Valley of California.* Sacramento: CDFW.

———. 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities.

———. 2015. California Natural Diversity Database QuickView Tool in BIOS 5. Sacramento: CDFW Biogeographic Data Branch. https://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.

Central Valley Regional Water Quality Control Board. 2015. *Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin.*

CNPS (California Native Plant Society). 2014. *Inventory of Rare and Endangered Plants* (online edition, v8-01a). Sacramento: CNPS. http://www.rareplants.cnps.org/.

Contra Costa County. 2005. *Contra Costa County General Plan 2005–2020*.

———. 2011a. *Contra Costa Operational Area Emergency Operations Plan*.

———. 2011b. *Hazard Mitigation Plan Update.*

DOC (California Department of Conservation). 2014. Farmland Mapping and Monitoring Program. *Contra Costa County Important Farmland 2012*.

———. 2015. Regulatory Maps. Accessed January 13. http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm.

DTSC (California Department of Toxic Substances Control). 2015. EnviroStor. Accessed January 13. http://www.envirostor.dtsc.ca.gov/public/.

Luhdorff and Scalmanini Consulting Engineers, Inc. 2007. *Diablo Water District Groundwater Management Plan for AB 3030.*

Moyle, Peter B., Randall D. Baxter, Ted Sommer, Ted C. Foin, and Scott A. Matern. 2004. "Biology and Population Dynamics of Sacramento Splittail (*Pogonichthys macrolepidotus*) in the San Francisco Estuary: A Review." *San Francisco Estuary and Watershed Science* 2(2). http://escholarship.org/uc/item/61r48686.

NMFS (National Marine Fisheries Service). 2015. Species Information: Green Sturgeon. NOAA Fisheries. http://www.nmfs.noaa.gov/pr/species/fish/greensturgeon.htm.

SWRCB (State Water Resources Control Board). 2015. GeoTracker. Accessed January 13. http://geotracker.waterboards.ca.gov/.

USFWS (US Fish and Wildlife Service). 2008. *Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP).* Sacramento: USFWS.

———. 2015a. Sacramento Fish & Wildlife Office Species List (online edition). Sacramento: USFWS. http://www.fws.gov/sacramento/es_species/Lists/es_species_lists-form.cfm.

———. 2015b. Critical Habitat Portal (online edition). http://criticalhabitat.fws.gov/crithab.

APPENDICES

Appendix A – California Emissions Estimator Model Outputs -Air Quality

BIMID Crivello Property - Year 1 Excavation & Hauling

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	24.00	Acre	24.00	1,045,440.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2016

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreage identified based on an equal proportion of cubic yards of material extracted per acre of the Borrow Site.

Construction Phase - Year 1 excavation and hauling activitiy estimated to occur over 2 months in 2016

Off-road Equipment - No graders, dozers, or scrapers

Off-road Equipment - No graders, dozers, or scrapers. Processing Equipment for peat separation

Trips and VMT - Haul Truck Trip Length = Distance from southern end of Borrow Site to farthest point using existing road facilities.

Grading - Acreage disturbed based on the proportion of Borrow Site acreage and material excavated

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	35.00	44.00
tblGrading	AcresOfGrading	0.00	24.00
tblGrading	MaterialExported	0.00	35,500.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	2.38

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2016	3.4736	26.3485	31.2108	0.0362	1.0033	1.4330	2.4362	0.1667	1.3537	1.5204	0.0000	3,610.9385	3,610.9385	0.6208	0.0000	3,623.9742
Total	**3.4736**	**26.3485**	**31.2108**	**0.0362**	**1.0033**	**1.4330**	**2.4362**	**0.1667**	**1.3537**	**1.5204**	**0.0000**	**3,610.9385**	**3,610.9385**	**0.6208**	**0.0000**	**3,623.9742**

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	lb/day										lb/day					
2016	1.7270	17.2721	32.1034	0.0362	1.0033	0.7633	1.7666	0.1667	0.7590	0.9257	0.0000	3,610.9385	3,610.9385	0.6208	0.0000	3,623.9742
Total	**1.7270**	**17.2721**	**32.1034**	**0.0362**	**1.0033**	**0.7633**	**1.7666**	**0.1667**	**0.7590**	**0.9257**	**0.0000**	**3,610.9385**	**3,610.9385**	**0.6208**	**0.0000**	**3,623.9742**

	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	**50.28**	**34.45**	**-2.86**	**0.00**	**0.00**	**46.73**	**27.49**	**0.00**	**43.93**	**39.11**	**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	Material to Horseshoe Bend	Grading	6/1/2016	8/1/2016	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Material to Horseshoe Bend	Crushing/Proc. Equipment	1	8.00	85	0.78
Material to Horseshoe Bend	Excavators	2	8.00	162	0.38
Material to Horseshoe Bend	Graders	0	8.00	174	0.41
Material to Horseshoe Bend	Rubber Tired Dozers	0	8.00	255	0.40
Material to Horseshoe Bend	Scrapers	0	8.00	361	0.48
Material to Horseshoe Bend	Tractors/Loaders/Backhoes	2	8.00	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
Material to Horseshoe Bend	5	13.00	0.00	4,438.00	12.40	6.60	2.38	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Clean Paved Roads

3.2 Material to Horseshoe Bend - 2016

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	lb/day										lb/day					
Fugitive Dust					0.6697	0.0000	0.6697	0.0763	0.0000	0.0763			0.0000			0.0000
Off-Road	2.2994	20.7870	16.1525	0.0238		1.3805	1.3805		1.3055	1.3055		2,411.7209	2,411.7209	0.6030		2,424.3843
Total	**2.2994**	**20.7870**	**16.1525**	**0.0238**	**0.6697**	**1.3805**	**2.0502**	**0.0763**	**1.3055**	**1.3818**		**2,411.7209**	**2,411.7209**	**0.6030**		**2,424.3843**

Unmitigated Construction Off-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	lb/day										lb/day					
Hauling	1.1201	5.4973	14.2892	0.0108	0.2110	0.0516	0.2625	0.0579	0.0473	0.1052		1,070.8940	1,070.8940	0.0112		1,071.1292
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
Worker	0.0541	0.0642	0.7691	1.5300e-003	0.1226	9.6000e-004	0.1236	0.0325	8.8000e-004	0.0334		128.3236	128.3236	6.5300e-003		128.4607
Total	**1.1742**	**5.5615**	**15.0583**	**0.0124**	**0.3336**	**0.0525**	**0.3861**	**0.0905**	**0.0482**	**0.1386**		**1,199.2176**	**1,199.2176**	**0.0177**		**1,199.5899**

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	lb/day										lb/day					
Fugitive Dust					0.6697	0.0000	0.6697	0.0763	0.0000	0.0763			0.0000			0.0000
Off-Road	0.5528	11.7106	17.0451	0.0238		0.7108	0.7108		0.7108	0.7108	0.0000	2,411.7209	2,411.7209	0.6030		2,424.3843
Total	**0.5528**	**11.7106**	**17.0451**	**0.0238**	**0.6697**	**0.7108**	**1.3805**	**0.0763**	**0.7108**	**0.7871**	**0.0000**	**2,411.7209**	**2,411.7209**	**0.6030**		**2,424.3843**

Mitigated Construction Off-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	lb/day										lb/day					
Hauling	1.1201	5.4973	14.2892	0.0108	0.2110	0.0516	0.2625	0.0579	0.0473	0.1052		1,070.8940	1,070.8940	0.0112		1,071.1292
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
Worker	0.0541	0.0642	0.7691	1.5300e-003	0.1226	9.6000e-004	0.1236	0.0325	8.8000e-004	0.0334		128.3236	128.3236	6.5300e-003		128.4607
Total	**1.1742**	**5.5615**	**15.0583**	**0.0124**	**0.3336**	**0.0525**	**0.3861**	**0.0905**	**0.0482**	**0.1386**		**1,199.2176**	**1,199.2176**	**0.0177**		**1,199.5899**

BIMID - Year 1 Levee Work

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	319.86	1000sqft	7.34	319,860.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2016

1.3 User Entered Comments & Non-Default Data

Construction Phase - Horseshoe Bend Levee work assumed to occur simultaneously with excavation and material hauling

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Off-road Equipment - Assume dozers, tractors, and rollers

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	44.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2016	5.4929	57.8045	44.2766	0.0440	18.2549	3.1665	21.4213	9.9807	2.9132	12.8939	0.0000	4,531.4623	4,531.4623	1.3173	0.0000	4,559.1265
Total	**5.4929**	**57.8045**	**44.2766**	**0.0440**	**18.2549**	**3.1665**	**21.4213**	**9.9807**	**2.9132**	**12.8939**	**0.0000**	**4,531.4623**	**4,531.4623**	**1.3173**	**0.0000**	**4,559.1265**

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	lb/day										lb/day					
2016	1.0982	21.0077	26.5422	0.0440	18.2549	1.0642	19.3191	9.9807	1.0641	11.0448	0.0000	4,531.4623	4,531.4623	1.3173	0.0000	4,559.1265
Total	**1.0982**	**21.0077**	**26.5422**	**0.0440**	**18.2549**	**1.0642**	**19.3191**	**9.9807**	**1.0641**	**11.0448**	**0.0000**	**4,531.4623**	**4,531.4623**	**1.3173**	**0.0000**	**4,559.1265**

	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	**80.01**	**63.66**	**40.05**	**0.00**	**0.00**	**66.39**	**9.81**	**0.00**	**63.47**	**14.34**	**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	6/1/2016	8/1/2016	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rollers	1	8.00	80	0.38

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	8	20.00	0.00	0.00	12.40	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Site Preparation - 2016

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.4096	57.7058	43.0933	0.0417		3.1650	3.1650		2.9118	2.9118		4,334.0414	4,334.0414	1.3073		4,361.4947
Total	**5.4096**	**57.7058**	**43.0933**	**0.0417**	**18.0663**	**3.1650**	**21.2313**	**9.9307**	**2.9118**	**12.8425**		**4,334.0414**	**4,334.0414**	**1.3073**		**4,361.4947**

Unmitigated Construction Off-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	lb/day										lb/day					
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
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
Worker	0.0833	0.0987	1.1832	2.3500e-003	0.1886	1.4800e-003	0.1901	0.0500	1.3600e-003	0.0514		197.4209	197.4209	0.0100		197.6318
Total	**0.0833**	**0.0987**	**1.1832**	**2.3500e-003**	**0.1886**	**1.4800e-003**	**0.1901**	**0.0500**	**1.3600e-003**	**0.0514**		**197.4209**	**197.4209**	**0.0100**		**197.6318**

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	1.0150	20.9090	25.3590	0.0417		1.0627	1.0627		1.0627	1.0627	0.0000	4,334.0414	4,334.0414	1.3073		4,361.4947
Total	**1.0150**	**20.9090**	**25.3590**	**0.0417**	**18.0663**	**1.0627**	**19.1290**	**9.9307**	**1.0627**	**10.9934**	**0.0000**	**4,334.0414**	**4,334.0414**	**1.3073**		**4,361.4947**

Mitigated Construction Off-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	lb/day										lb/day					
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
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
Worker	0.0833	0.0987	1.1832	2.3500e-003	0.1886	1.4800e-003	0.1901	0.0500	1.3600e-003	0.0514		197.4209	197.4209	0.0100		197.6318
Total	**0.0833**	**0.0987**	**1.1832**	**2.3500e-003**	**0.1886**	**1.4800e-003**	**0.1901**	**0.0500**	**1.3600e-003**	**0.0514**		**197.4209**	**197.4209**	**0.0100**		**197.6318**

BIMID - Year 2 Excavation & Hauling

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	45.70	Acre	45.70	1,990,692.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2017

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreage identified based on an equal proportion of cubic yards of material extracted per acre of Borrow Site

Construction Phase - Year 2 activity estimated to occur over 6 months

Off-road Equipment - No graders, dozers, or scrapers. Processing equipment to separate peat.

Trips and VMT - Haul truck trip length = distance from southern end of Borrow Site to farthest point using existing road facilities.

Grading - Acreage disturbed based on teh proportion of Borrow Site acreage and material excavated

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	75.00	133.00
tblGrading	AcresOfGrading	0.00	45.70
tblGrading	MaterialExported	0.00	70,000.00
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	2.38

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2017	2.8522	22.4297	25.6706	0.0324	0.6841	1.2695	1.9536	0.1187	1.1987	1.3174	0.0000	3,193.6584	3,193.6584	0.6077	0.0000	3,206.4200
Total	**2.8522**	**22.4297**	**25.6706**	**0.0324**	**0.6841**	**1.2695**	**1.9536**	**0.1187**	**1.1987**	**1.3174**	**0.0000**	**3,193.6584**	**3,193.6584**	**0.6077**	**0.0000**	**3,206.4200**

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	lb/day										lb/day					
2017	1.2905	15.0561	26.6530	0.0324	0.6841	0.7413	1.4254	0.1187	0.7388	0.8575	0.0000	3,193.6584	3,193.6584	0.6077	0.0000	3,206.4200
Total	**1.2905**	**15.0561**	**26.6530**	**0.0324**	**0.6841**	**0.7413**	**1.4254**	**0.1187**	**0.7388**	**0.8575**	**0.0000**	**3,193.6584**	**3,193.6584**	**0.6077**	**0.0000**	**3,206.4200**

	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	**54.76**	**32.87**	**-3.83**	**0.00**	**0.00**	**41.61**	**27.04**	**0.00**	**38.37**	**34.91**	**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	Material to Horseshoe Bend	Grading	3/1/2017	9/1/2017	5	133	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Material to Horseshoe Bend	Excavators	2	8.00	162	0.38
Material to Horseshoe Bend	Graders	0	8.00	174	0.41
Material to Horseshoe Bend	Rubber Tired Dozers	0	8.00	255	0.40
Material to Horseshoe Bend	Scrapers	0	8.00	361	0.48
Material to Horseshoe Bend	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Material to Horseshoe Bend	Crushing/Proc. Equipment	1	8.00	85	0.78

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
Material to Horseshoe Bend	5	13.00	0.00	8,750.00	12.40	6.60	2.38	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Material to Horseshoe Bend - 2017

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	lb/day										lb/day					
Fugitive Dust					0.4239	0.0000	0.4239	0.0484	0.0000	0.0484			0.0000			0.0000
Off-Road	2.1146	19.0841	16.0627	0.0238		1.2390	1.2390		1.1707	1.1707		2,383.5835	2,383.5835	0.5945		2,396.0688
Total	**2.1146**	**19.0841**	**16.0627**	**0.0238**	**0.4239**	**1.2390**	**1.6629**	**0.0484**	**1.1707**	**1.2191**		**2,383.5835**	**2,383.5835**	**0.5945**		**2,396.0688**

Unmitigated Construction Off-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	lb/day										lb/day					
Hauling	0.6895	3.2881	8.9215	7.0400e-003	0.1376	0.0296	0.1672	0.0378	0.0272	0.0650		686.6301	686.6301	7.2000e-003		686.7813
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
Worker	0.0482	0.0574	0.6864	1.5300e-003	0.1226	9.2000e-004	0.1235	0.0325	8.5000e-004	0.0334		123.4448	123.4448	5.9600e-003		123.5699
Total	**0.7376**	**3.3456**	**9.6079**	**8.5700e-003**	**0.2602**	**0.0305**	**0.2907**	**0.0703**	**0.0280**	**0.0983**		**810.0749**	**810.0749**	**0.0132**		**810.3512**

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	lb/day										lb/day					
Fugitive Dust					0.4239	0.0000	0.4239	0.0484	0.0000	0.0484			0.0000			0.0000
Off-Road	0.5528	11.7106	17.0451	0.0238		0.7108	0.7108		0.7108	0.7108	0.0000	2,383.5835	2,383.5835	0.5945		2,396.0688
Total	**0.5528**	**11.7106**	**17.0451**	**0.0238**	**0.4239**	**0.7108**	**1.1347**	**0.0484**	**0.7108**	**0.7591**	**0.0000**	**2,383.5835**	**2,383.5835**	**0.5945**		**2,396.0688**

Mitigated Construction Off-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	lb/day										lb/day					
Hauling	0.6895	3.2881	8.9215	7.0400e-003	0.1376	0.0296	0.1672	0.0378	0.0272	0.0650		686.6301	686.6301	7.2000e-003		686.7813
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
Worker	0.0482	0.0574	0.6864	1.5300e-003	0.1226	9.2000e-004	0.1235	0.0325	8.5000e-004	0.0334		123.4448	123.4448	5.9600e-003		123.5699
Total	**0.7376**	**3.3456**	**9.6079**	**8.5700e-003**	**0.2602**	**0.0305**	**0.2907**	**0.0703**	**0.0280**	**0.0983**		**810.0749**	**810.0749**	**0.0132**		**810.3512**

BIMID - Year 2 Levee Work

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	319.86	1000sqft	7.34	319,860.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2017

1.3 User Entered Comments & Non-Default Data

Construction Phase - Levee work assumed to occur simultaneously with excavation and material hauling

Off-road Equipment -

Trips and VMT -

Grading -

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	133.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2017	4.9049	51.8330	40.3474	0.0412	18.2360	2.7555	20.9915	9.9757	2.5351	12.5108	0.0000	4,174.0095	4,174.0095	1.2348	0.0000	4,199.9400
Total	**4.9049**	**51.8330**	**40.3474**	**0.0412**	**18.2360**	**2.7555**	**20.9915**	**9.9757**	**2.5351**	**12.5108**	**0.0000**	**4,174.0095**	**4,174.0095**	**1.2348**	**0.0000**	**4,199.9400**

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	lb/day										lb/day					
2017	1.0182	19.5380	24.3506	0.0412	18.2360	0.9623	19.1983	9.9757	0.9622	10.9379	0.0000	4,174.0095	4,174.0095	1.2348	0.0000	4,199.9400
Total	**1.0182**	**19.5380**	**24.3506**	**0.0412**	**18.2360**	**0.9623**	**19.1983**	**9.9757**	**0.9622**	**10.9379**	**0.0000**	**4,174.0095**	**4,174.0095**	**1.2348**	**0.0000**	**4,199.9400**

	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	**79.24**	**62.31**	**39.65**	**0.00**	**0.00**	**65.08**	**8.54**	**0.00**	**62.04**	**12.57**	**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	3/1/2017	9/1/2017	5	133	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	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	7	18.00	0.00	0.00	12.40	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Site Preparation - 2017

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339		4,003.0859	4,003.0859	1.2265		4,028.8432
Total	**4.8382**	**51.7535**	**39.3970**	**0.0391**	**18.0663**	**2.7542**	**20.8205**	**9.9307**	**2.5339**	**12.4646**		**4,003.0859**	**4,003.0859**	**1.2265**		**4,028.8432**

Unmitigated Construction Off-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	lb/day										lb/day					
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
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
Worker	0.0667	0.0795	0.9503	2.1200e-003	0.1698	1.2700e-003	0.1710	0.0450	1.1700e-003	0.0462		170.9236	170.9236	8.2500e-003		171.0968
Total	**0.0667**	**0.0795**	**0.9503**	**2.1200e-003**	**0.1698**	**1.2700e-003**	**0.1710**	**0.0450**	**1.1700e-003**	**0.0462**		**170.9236**	**170.9236**	**8.2500e-003**		**171.0968**

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	0.9515	19.4584	23.4003	0.0391		0.9611	0.9611		0.9611	0.9611	0.0000	4,003.0859	4,003.0859	1.2265		4,028.8432
Total	**0.9515**	**19.4584**	**23.4003**	**0.0391**	**18.0663**	**0.9611**	**19.0273**	**9.9307**	**0.9611**	**10.8918**	**0.0000**	**4,003.0859**	**4,003.0859**	**1.2265**		**4,028.8432**

Mitigated Construction Off-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	lb/day										lb/day					
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
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
Worker	0.0667	0.0795	0.9503	2.1200e-003	0.1698	1.2700e-003	0.1710	0.0450	1.1700e-003	0.0462		170.9236	170.9236	8.2500e-003		171.0968
Total	**0.0667**	**0.0795**	**0.9503**	**2.1200e-003**	**0.1698**	**1.2700e-003**	**0.1710**	**0.0450**	**1.1700e-003**	**0.0462**		**170.9236**	**170.9236**	**8.2500e-003**		**171.0968**

BIMID - Year 3 Excavation & Hauling

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	24.60	Acre	24.60	1,071,576.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2018

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreage identified based on an equal proportion of cubic yards of material extracted per acre of Borrow Site

Construction Phase - Year 3 activity estimated to occur over 4 months

Off-road Equipment - No graders, dozers, or scrapers. Processing equipment to separate peat.

Trips and VMT - Haul truck trip length = distance from southern end of Borrow Site to farthest point using existing road facilities.

Grading - Acreage disturbed based on teh proportion of Borrow Site acreage and material excavated

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	35.00	87.00
tblGrading	AcresOfGrading	0.00	24.60
tblGrading	MaterialExported	0.00	36,500.00
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	2.38

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2018	2.3124	18.6294	22.7634	0.0309	0.5796	1.0366	1.6162	0.1022	0.9802	1.0824	0.0000	3,011.7590	3,011.7590	0.5986	0.0000	3,024.3289
Total	**2.3124**	**18.6294**	**22.7634**	**0.0309**	**0.5796**	**1.0366**	**1.6162**	**0.1022**	**0.9802**	**1.0824**	**0.0000**	**3,011.7590**	**3,011.7590**	**0.5986**	**0.0000**	**3,024.3289**

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	lb/day										lb/day					
2018	1.0619	14.1938	24.0177	0.0309	0.5796	0.7348	1.3144	0.1022	0.7329	0.8351	0.0000	3,011.7590	3,011.7590	0.5986	0.0000	3,024.3289
Total	**1.0619**	**14.1938**	**24.0177**	**0.0309**	**0.5796**	**0.7348**	**1.3144**	**0.1022**	**0.7329**	**0.8351**	**0.0000**	**3,011.7590**	**3,011.7590**	**0.5986**	**0.0000**	**3,024.3289**

	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	**54.08**	**23.81**	**-5.51**	**0.00**	**0.00**	**29.12**	**18.67**	**0.00**	**25.24**	**22.85**	**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	Material to Horseshoe Bend	Grading	3/1/2018	6/29/2018	5	87	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Material to Horseshoe Bend	Crushing/Proc. Equipment	1	8.00	85	0.78
Material to Horseshoe Bend	Excavators	2	8.00	162	0.38
Material to Horseshoe Bend	Graders	0	8.00	174	0.41
Material to Horseshoe Bend	Rubber Tired Dozers	0	8.00	255	0.40
Material to Horseshoe Bend	Scrapers	0	8.00	361	0.48
Material to Horseshoe Bend	Tractors/Loaders/Backhoes	2	8.00	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
Material to Horseshoe Bend	5	13.00	0.00	4,563.00	12.40	6.60	2.38	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Material to Horseshoe Bend - 2018

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	lb/day										lb/day					
Fugitive Dust					0.3473	0.0000	0.3473	0.0396	0.0000	0.0396			0.0000			0.0000
Off-Road	1.8034	16.1461	15.7908	0.0238		1.0126	1.0126		0.9582	0.9582		2,355.5602	2,355.5602	0.5873		2,367.8924
Total	**1.8034**	**16.1461**	**15.7908**	**0.0238**	**0.3473**	**1.0126**	**1.3599**	**0.0396**	**0.9582**	**0.9977**		**2,355.5602**	**2,355.5602**	**0.5873**		**2,367.8924**

Unmitigated Construction Off-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	lb/day										lb/day					
Hauling	0.4658	2.4315	6.3556	5.5900e-003	0.1097	0.0231	0.1328	0.0301	0.0213	0.0514		537.3367	537.3367	5.8400e-003		537.4593
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
Worker	0.0433	0.0518	0.6171	1.5300e-003	0.1226	8.9000e-004	0.1235	0.0325	8.2000e-004	0.0333		118.8621	118.8621	5.4800e-003		118.9772
Total	**0.5091**	**2.4832**	**6.9726**	**7.1200e-003**	**0.2323**	**0.0240**	**0.2563**	**0.0626**	**0.0221**	**0.0847**		**656.1988**	**656.1988**	**0.0113**		**656.4365**

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	lb/day										lb/day					
Fugitive Dust					0.3473	0.0000	0.3473	0.0396	0.0000	0.0396			0.0000			0.0000
Off-Road	0.5528	11.7106	17.0451	0.0238		0.7108	0.7108		0.7108	0.7108	0.0000	2,355.5602	2,355.5602	0.5873		2,367.8924
Total	**0.5528**	**11.7106**	**17.0451**	**0.0238**	**0.3473**	**0.7108**	**1.0581**	**0.0396**	**0.7108**	**0.7503**	**0.0000**	**2,355.5602**	**2,355.5602**	**0.5873**		**2,367.8924**

Mitigated Construction Off-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	lb/day										lb/day					
Hauling	0.4658	2.4315	6.3556	5.5900e-003	0.1097	0.0231	0.1328	0.0301	0.0213	0.0514		537.3367	537.3367	5.8400e-003		537.4593
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
Worker	0.0433	0.0518	0.6171	1.5300e-003	0.1226	8.9000e-004	0.1235	0.0325	8.2000e-004	0.0333		118.8621	118.8621	5.4800e-003		118.9772
Total	**0.5091**	**2.4832**	**6.9726**	**7.1200e-003**	**0.2323**	**0.0240**	**0.2563**	**0.0626**	**0.0221**	**0.0847**		**656.1988**	**656.1988**	**0.0113**		**656.4365**

BIMID - Year 3 Levee Work

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	71.61	1000sqft	1.64	71,610.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2018

1.3 User Entered Comments & Non-Default Data

Construction Phase - Levee work assumed to occur simultaneously with excavation and material hauling

Trips and VMT -

Grading -

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	2.00	87.00
tblConstructionPhase	PhaseEndDate	6/29/2018	7/1/2018
tblProjectCharacteristics	OperationalYear	2014	2018
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2018	2.0663	21.2062	15.2262	0.0180	5.8750	1.1266	7.0016	2.9737	1.0365	4.0102	0.0000	1,795.9275	1,795.9275	0.5397	0.0000	1,807.2611
Total	**2.0663**	**21.2062**	**15.2262**	**0.0180**	**5.8750**	**1.1266**	**7.0016**	**2.9737**	**1.0365**	**4.0102**	**0.0000**	**1,795.9275**	**1,795.9275**	**0.5397**	**0.0000**	**1,807.2611**

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	lb/day										lb/day					
2018	0.4425	8.3372	11.4699	0.0180	5.8750	0.4015	6.2765	2.9737	0.4015	3.3752	0.0000	1,795.9275	1,795.9275	0.5397	0.0000	1,807.2611
Total	**0.4425**	**8.3372**	**11.4699**	**0.0180**	**5.8750**	**0.4015**	**6.2765**	**2.9737**	**0.4015**	**3.3752**	**0.0000**	**1,795.9275**	**1,795.9275**	**0.5397**	**0.0000**	**1,807.2611**

	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	**78.59**	**60.69**	**24.67**	**0.00**	**0.00**	**64.36**	**10.36**	**0.00**	**61.26**	**15.83**	**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	3/1/2018	7/1/2018	5	87	

Acres of Grading (Site Preparation Phase): 43.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Graders	1	8.00	174	0.41

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	3	8.00	0.00	0.00	12.40	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Site Preparation - 2018

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	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.0397	21.1744	14.8464	0.0171		1.1260	1.1260		1.0359	1.0359		1,722.7816	1,722.7816	0.5363		1,734.0444
Total	**2.0397**	**21.1744**	**14.8464**	**0.0171**	**5.7996**	**1.1260**	**6.9256**	**2.9537**	**1.0359**	**3.9896**		**1,722.7816**	**1,722.7816**	**0.5363**		**1,734.0444**

Unmitigated Construction Off-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	lb/day										lb/day					
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
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
Worker	0.0266	0.0319	0.3797	9.4000e-004	0.0754	5.5000e-004	0.0760	0.0200	5.1000e-004	0.0205		73.1459	73.1459	3.3700e-003		73.2167
Total	**0.0266**	**0.0319**	**0.3797**	**9.4000e-004**	**0.0754**	**5.5000e-004**	**0.0760**	**0.0200**	**5.1000e-004**	**0.0205**		**73.1459**	**73.1459**	**3.3700e-003**		**73.2167**

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	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	0.4158	8.3054	11.0902	0.0171		0.4010	0.4010		0.4010	0.4010	0.0000	1,722.7816	1,722.7816	0.5363		1,734.0444
Total	**0.4158**	**8.3054**	**11.0902**	**0.0171**	**5.7996**	**0.4010**	**6.2006**	**2.9537**	**0.4010**	**3.3547**	**0.0000**	**1,722.7816**	**1,722.7816**	**0.5363**		**1,734.0444**

Mitigated Construction Off-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	lb/day										lb/day					
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
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
Worker	0.0266	0.0319	0.3797	9.4000e-004	0.0754	5.5000e-004	0.0760	0.0200	5.1000e-004	0.0205		73.1459	73.1459	3.3700e-003		73.2167
Total	**0.0266**	**0.0319**	**0.3797**	**9.4000e-004**	**0.0754**	**5.5000e-004**	**0.0760**	**0.0200**	**5.1000e-004**	**0.0205**		**73.1459**	**73.1459**	**3.3700e-003**		**73.2167**

BIMID - Year 3 Restoration Work

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	28.30	Acre	28.30	1,232,748.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2018

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreage identified based on an equal proportion of cubic yards of material extracted per acre of Borrow Site

Construction Phase - Year 3 restoration activity estimated to occur over 2 months

Off-road Equipment - No graders, dozers, or scrapers

Trips and VMT - Haul truck trip length = distance from Borrow Site to farthest point using existing road facilities.

Grading - Acreage disturbed based on the proportion of Borrow Site acreage and material excavated

Construction Off-road Equipment Mitigation - Tier 3 mitigation

Off-road Equipment - No graders, dozers, or scrapers

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblGrading	AcresOfGrading	0.00	28.30
tblGrading	MaterialExported	0.00	42,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	2.94

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2018	2.2304	17.7590	26.2160	0.0328	1.1677	0.7436	1.9112	0.1956	0.6840	0.8796	0.0000	3,210.6445	3,210.6445	0.5452	0.0000	3,222.0944
Total	**2.2304**	**17.7590**	**26.2160**	**0.0328**	**1.1677**	**0.7436**	**1.9112**	**0.1956**	**0.6840**	**0.8796**	**0.0000**	**3,210.6445**	**3,210.6445**	**0.5452**	**0.0000**	**3,222.0944**

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	lb/day										lb/day					
2018	1.5177	14.6576	27.5440	0.0328	1.1677	0.5493	1.7170	0.1956	0.5443	0.7398	0.0000	3,210.6445	3,210.6445	0.5452	0.0000	3,222.0944
Total	**1.5177**	**14.6576**	**27.5440**	**0.0328**	**1.1677**	**0.5493**	**1.7170**	**0.1956**	**0.5443**	**0.7398**	**0.0000**	**3,210.6445**	**3,210.6445**	**0.5452**	**0.0000**	**3,222.0944**

	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	**31.95**	**17.46**	**-5.07**	**0.00**	**0.00**	**26.12**	**10.16**	**0.00**	**20.43**	**15.89**	**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	Material to Hoover Site	Grading	4/1/2018	6/1/2018	5	45	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Material to Hoover Site	Excavators	2	8.00	162	0.38
Material to Hoover Site	Graders	0	8.00	174	0.41
Material to Hoover Site	Rubber Tired Dozers	0	8.00	255	0.40
Material to Hoover Site	Scrapers	0	8.00	361	0.48
Material to Hoover Site	Tractors/Loaders/Backhoes	2	8.00	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
Material to Hoover Site	4	10.00	0.00	5,250.00	12.40	6.60	2.94	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Material to Hoover Site - 2018

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	lb/day										lb/day					
Fugitive Dust					0.7725	0.0000	0.7725	0.0880	0.0000	0.0880			0.0000			0.0000
Off-Road	1.1251	11.6080	11.3906	0.0168		0.6805	0.6805		0.6261	0.6261		1,691.0301	1,691.0301	0.5264		1,702.0854
Total	**1.1251**	**11.6080**	**11.3906**	**0.0168**	**0.7725**	**0.6805**	**1.4530**	**0.0880**	**0.6261**	**0.7141**		**1,691.0301**	**1,691.0301**	**0.5264**		**1,702.0854**

Unmitigated Construction Off-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	lb/day										lb/day					
Hauling	1.0719	6.1112	14.3508	0.0148	0.3009	0.0624	0.3633	0.0826	0.0573	0.1399		1,428.1820	1,428.1820	0.0146		1,428.4881
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
Worker	0.0333	0.0398	0.4747	1.1800e-003	0.0943	6.8000e-004	0.0950	0.0250	6.3000e-004	0.0256		91.4324	91.4324	4.2200e-003		91.5209
Total	**1.1052**	**6.1510**	**14.8254**	**0.0160**	**0.3952**	**0.0631**	**0.4582**	**0.1076**	**0.0580**	**0.1656**		**1,519.6143**	**1,519.6143**	**0.0188**		**1,520.0090**

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	lb/day										lb/day					
Fugitive Dust					0.7725	0.0000	0.7725	0.0880	0.0000	0.0880			0.0000			0.0000
Off-Road	0.4125	8.5066	12.7186	0.0168		0.4863	0.4863		0.4863	0.4863	0.0000	1,691.0301	1,691.0301	0.5264		1,702.0854
Total	**0.4125**	**8.5066**	**12.7186**	**0.0168**	**0.7725**	**0.4863**	**1.2588**	**0.0880**	**0.4863**	**0.5743**	**0.0000**	**1,691.0301**	**1,691.0301**	**0.5264**		**1,702.0854**

Mitigated Construction Off-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	lb/day										lb/day					
Hauling	1.0719	6.1112	14.3508	0.0148	0.3009	0.0624	0.3633	0.0826	0.0573	0.1399		1,428.1820	1,428.1820	0.0146		1,428.4881
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
Worker	0.0333	0.0398	0.4747	1.1800e-003	0.0943	6.8000e-004	0.0950	0.0250	6.3000e-004	0.0256		91.4324	91.4324	4.2200e-003		91.5209
Total	**1.1052**	**6.1510**	**14.8254**	**0.0160**	**0.3952**	**0.0631**	**0.4582**	**0.1076**	**0.0580**	**0.1656**		**1,519.6143**	**1,519.6143**	**0.0188**		**1,520.0090**

Appendix B – Biological Information Documents

CNDDB 9-Quad Species List 419 records.

Element Type	Scientific Name	Common Name	Element Code	Federal Status	State Status	CDFW Status	CA Rare Plant Rank	Quad Code	Quad Name	Data Status	Taxonomic Sort
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	SSC	-	3712186	Brentwood	Mapped	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	SSC	-	3712187	Antioch South	Mapped and Unprocessed	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	SSC	-	3812117	Antioch North	Mapped	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	SSC	-	3812127	Birds Landing	Mapped and Unprocessed	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Rana draytonii	California red-legged frog	AAABH01022	Threatened	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Amphibians - Ranidae - Rana draytonii
Animals - Amphibians	Rana draytonii	California red-legged frog	AAABH01022	Threatened	None	SSC	-	3712187	Antioch South	Mapped and Unprocessed	Animals - Amphibians - Ranidae - Rana draytonii
Animals - Amphibians	Rana draytonii	California red-legged frog	AAABH01022	Threatened	None	SSC	-	3712186	Brentwood	Unprocessed	Animals - Amphibians - Ranidae - Rana draytonii
Animals - Birds	Accipiter cooperii	Cooper's hawk	ABNKC12040	None	None	WL	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Accipitridae - Accipiter cooperii
Animals - Birds	Aquila chrysaetos	golden eagle	ABNKC22010	None	None	FP , WL	-	3812127	Birds Landing	Unprocessed	Animals - Birds - Accipitridae - Aquila chrysaetos
Animals - Birds	Aquila chrysaetos	golden eagle	ABNKC22010	None	None	FP , WL	-	3712186	Brentwood	Unprocessed	Animals - Birds - Accipitridae - Aquila chrysaetos
Animals - Birds	Aquila chrysaetos	golden eagle	ABNKC22010	None	None	FP , WL	-	3712187	Antioch South	Unprocessed	Animals - Birds - Accipitridae - Aquila chrysaetos
Animals - Birds	Aquila chrysaetos	golden eagle	ABNKC22010	None	None	FP , WL	-	3812117	Antioch North	Unprocessed	Animals - Birds - Accipitridae - Aquila chrysaetos
Animals - Birds	Buteo regalis	ferruginous hawk	ABNKC19120	None	None	WL	-	3812127	Birds Landing	Unprocessed	Animals - Birds - Accipitridae - Buteo regalis
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3812127	Birds Landing	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3812126	Rio Vista	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3812125	Isleton	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712187	Antioch South	Mapped and Unprocessed	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3812115	Bouldin Island	Mapped	Animals - Birds - Accipitridae - Buteo

											swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712186	Brentwood	Mapped and Unprocessed	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712185	Woodward Island	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Circus cyaneus	northern harrier	ABNKC11010	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Accipitridae - Circus cyaneus
Animals - Birds	Circus cyaneus	northern harrier	ABNKC11010	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Accipitridae - Circus cyaneus
Animals - Birds	Circus cyaneus	northern harrier	ABNKC11010	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Accipitridae - Circus cyaneus
Animals - Birds	Circus cyaneus	northern harrier	ABNKC11010	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Accipitridae - Circus cyaneus
Animals - Birds	Circus cyaneus	northern harrier	ABNKC11010	None	None	SSC	-	3812127	Birds Landing	Unprocessed	Animals - Birds - Accipitridae - Circus cyaneus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3812127	Birds Landing	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3712186	Brentwood	Mapped and Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3712187	Antioch South	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	3812117	Antioch North	Unprocessed	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	3812117	Antioch North	Unprocessed	Animals - Birds - Accipitridae - Pandion haliaetus
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Accipitridae - Pandion haliaetus
Animals - Birds	Eremophila alpestris actia	California horned lark	ABPAT02011	None	None	WL	-	3812117	Antioch North	Unprocessed	Animals - Birds - Alaudidae - Eremophila alpestris actia
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3812117	Antioch North	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3812125	Isleton	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
											Animals - Birds -

Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3812126	Rio Vista	Unprocessed	Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3812125	Isleton	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3812115	Bouldin Island	Mapped and Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3712185	Woodward Island	Mapped and Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3812117	Antioch North	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Botaurus lentiginosus	American bittern	ABNGA01020	None	None	-	-	3812117	Antioch North	Unprocessed	Animals - Birds - Ardeidae - Botaurus lentiginosus
Animals - Birds	Botaurus lentiginosus	American bittern	ABNGA01020	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Ardeidae - Botaurus lentiginosus
Animals - Birds	Botaurus lentiginosus	American bittern	ABNGA01020	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Ardeidae - Botaurus lentiginosus
Animals - Birds	Nycticorax nycticorax	black-crowned night heron	ABNGA11010	None	None	-	-	3712186	Brentwood	Unprocessed	Animals - Birds - Ardeidae - Nycticorax nycticorax
Animals - Birds	Nycticorax nycticorax	black-crowned night heron	ABNGA11010	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Ardeidae - Nycticorax nycticorax
Animals - Birds	Charadrius alexandrinus nivosus	western snowy plover	ABNNB03031	Threatened	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Charadriidae - Charadrius alexandrinus nivosus
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Charadriidae - Charadrius montanus
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Charadriidae - Charadrius montanus
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Charadriidae - Charadrius montanus
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	3812127	Birds Landing	Mapped and Unprocessed	Animals - Birds - Charadriidae - Charadrius montanus
Animals - Birds	Melospiza melodia	song sparrow (-inModesto-in population)	ABPBXA3010	None	None	SSC	-	3812126	Rio Vista	Mapped	Animals - Birds - Emberizidae - Melospiza melodia
Animals - Birds	Melospiza melodia	song sparrow (-inModesto-in population)	ABPBXA3010	None	None	SSC	-	3812125	Isleton	Mapped	Animals - Birds - Emberizidae - Melospiza melodia
Animals - Birds	Melospiza melodia	song sparrow (-inModesto-in population)	ABPBXA3010	None	None	SSC	-	3712185	Woodward Island	Mapped	Animals - Birds - Emberizidae - Melospiza melodia
Animals - Birds	Melospiza melodia	song sparrow (-inModesto-in population)	ABPBXA3010	None	None	SSC	-	3812115	Bouldin Island	Mapped	Animals - Birds - Emberizidae - Melospiza melodia
Animals - Birds	Melospiza melodia	song sparrow (-inModesto-in population)	ABPBXA3010	None	None	SSC	-	3812116	Jersey Island	Mapped	Animals - Birds - Emberizidae - Melospiza melodia
Animals -	Melospiza	song sparrow							Antioch		Animals - Birds -

Birds	melodia	(-inModesto-in population)	ABPBXA3010	None	None	SSC	-	3812117	North	Mapped	Emberizidae - Melospiza melodia
Animals - Birds	Melospiza melodia maxillaris	Suisun song sparrow	ABPBXA301K	None	None	SSC	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Birds - Emberizidae - Melospiza melodia maxillaris
Animals - Birds	Melospiza melodia samuelis	San Pablo song sparrow	ABPBXA301W	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Emberizidae - Melospiza melodia samuelis
Animals - Birds	Falco mexicanus	prairie falcon	ABNKD06090	None	None	WL	-	3712187	Antioch South	Unprocessed	Animals - Birds - Falconidae - Falco mexicanus
Animals - Birds	Falco mexicanus	prairie falcon	ABNKD06090	None	None	WL	-	3712186	Brentwood	Unprocessed	Animals - Birds - Falconidae - Falco mexicanus
Animals - Birds	Falco peregrinus anatum	American peregrine falcon	ABNKD06071	Delisted	Delisted	FP	-	3812117	Antioch North	Unprocessed	Animals - Birds - Falconidae - Falco peregrinus anatum
Animals - Birds	Falco peregrinus anatum	American peregrine falcon	ABNKD06071	Delisted	Delisted	FP	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Falconidae - Falco peregrinus anatum
Animals - Birds	Falco peregrinus anatum	American peregrine falcon	ABNKD06071	Delisted	Delisted	FP	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Falconidae - Falco peregrinus anatum
Animals - Birds	Grus canadensis canadensis	lesser sandhill crane	ABNMK01011	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Birds - Gruidae - Grus canadensis canadensis
Animals - Birds	Grus canadensis canadensis	lesser sandhill crane	ABNMK01011	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Gruidae - Grus canadensis canadensis
Animals - Birds	Grus canadensis tabida	greater sandhill crane	ABNMK01014	None	Threatened	FP	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Gruidae - Grus canadensis tabida
Animals - Birds	Grus canadensis tabida	greater sandhill crane	ABNMK01014	None	Threatened	FP	-	3812125	Isleton	Unprocessed	Animals - Birds - Gruidae - Grus canadensis tabida
Animals - Birds	Riparia riparia	bank swallow	ABPAU08010	None	Threatened	-	-	3812116	Jersey Island	Mapped	Animals - Birds - Hirundinidae - Riparia riparia
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3712186	Brentwood	Mapped and Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3712187	Antioch South	Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Xanthocephalus xanthocephalus	yellow-headed blackbird	ABPBXB3010	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Icteridae - Xanthocephalus xanthocephalus
Animals - Birds	Xanthocephalus xanthocephalus	yellow-headed blackbird	ABPBXB3010	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Icteridae - Xanthocephalus xanthocephalus
Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus

Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3712186	Brentwood	Mapped and Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus
Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3712187	Antioch South	Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus
Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus
Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus
Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus
Animals - Birds	Lanius ludovicianus	loggerhead shrike	ABPBR01030	None	None	SSC	-	3812127	Birds Landing	Unprocessed	Animals - Birds - Laniidae - Lanius ludovicianus
Animals - Birds	Sternula antillarum browni	California least tern	ABNNM08103	Endangered	Endangered	FP	-	3812117	Antioch North	Unprocessed	Animals - Birds - Laridae - Sternula antillarum browni
Animals - Birds	Geothlypis trichas sinuosa	saltmarsh common yellowthroat	ABPBX1201A	None	None	SSC	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Birds - Parulidae - Geothlypis trichas sinuosa
Animals - Birds	Icteria virens	yellow-breasted chat	ABPBX24010	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Parulidae - Icteria virens
Animals - Birds	Icteria virens	yellow-breasted chat	ABPBX24010	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Parulidae - Icteria virens
Animals - Birds	Pelecanus erythrorhynchos	American white pelican	ABNFC01010	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Birds - Pelecanidae - Pelecanus erythrorhynchos
Animals - Birds	Phalacrocorax auritus	double-crested cormorant	ABNFD01020	None	None	WL	-	3812117	Antioch North	Mapped	Animals - Birds - Phalacrocoracidae - Phalacrocorax auritus
Animals - Birds	Phalacrocorax auritus	double-crested cormorant	ABNFD01020	None	None	WL	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Phalacrocoracidae - Phalacrocorax auritus
Animals - Birds	Phalacrocorax auritus	double-crested cormorant	ABNFD01020	None	None	WL	-	3812115	Bouldin Island	Unprocessed	Animals - Birds - Phalacrocoracidae - Phalacrocorax auritus
Animals - Birds	Phalacrocorax auritus	double-crested cormorant	ABNFD01020	None	None	WL	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Phalacrocoracidae - Phalacrocorax auritus
Animals - Birds	Picoides nuttallii	Nuttall's woodpecker	ABNYF07020	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Birds - Picidae - Picoides nuttallii
Animals - Birds	Laterallus jamaicensis coturniculus	California black rail	ABNME03041	None	Threatened	FP	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Birds - Rallidae - Laterallus jamaicensis coturniculus
Animals - Birds	Laterallus jamaicensis coturniculus	California black rail	ABNME03041	None	Threatened	FP	-	3812117	Antioch North	Mapped	Animals - Birds - Rallidae - Laterallus jamaicensis coturniculus
Animals - Birds	Laterallus jamaicensis coturniculus	California black rail	ABNME03041	None	Threatened	FP	-	3712185	Woodward Island	Mapped and Unprocessed	Animals - Birds - Rallidae - Laterallus jamaicensis coturniculus
Animals - Birds	Laterallus jamaicensis coturniculus	California black rail	ABNME03041	None	Threatened	FP	-	3812115	Bouldin Island	Mapped and Unprocessed	Animals - Birds - Rallidae - Laterallus jamaicensis coturniculus
Animals -	Numenius	long-billed									Animals - Birds - Scolopacidae -

Birds	americanus	curlew	ABNNF07070	None	None	WL	-	3712186	Brentwood	Unprocessed	Numenius americanus
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712186	Brentwood	Mapped and Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712187	Antioch South	Mapped and Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3812127	Birds Landing	Mapped and Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3812126	Rio Vista	Mapped and Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Crustaceans	Branchinecta conservatio	Conservancy fairy shrimp	ICBRA03010	Endangered	None	-	-	3812117	Antioch North	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta conservatio
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3812117	Antioch North	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712187	Antioch South	Mapped and Unprocessed	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712185	Woodward Island	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712186	Brentwood	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3812127	Birds Landing	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta mesovallensis	midvalley fairy shrimp	ICBRA03150	None	None	-	-	3812127	Birds Landing	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta mesovallensis
Animals - Crustaceans	Branchinecta mesovallensis	midvalley fairy shrimp	ICBRA03150	None	None	-	-	3712186	Brentwood	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta mesovallensis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3712186	Brentwood	Mapped	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3712185	Woodward Island	Mapped	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3712187	Antioch South	Mapped	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals -	Linderiella	California	ICBRA06010	None	None	-	-	3812117	Antioch	Mapped	Animals - Crustaceans - Linderiellidae -

Crustaceans	occidentalis	linderiella							North		Linderiella occidentalis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3812127	Birds Landing	Mapped and Unprocessed	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3812126	Rio Vista	Mapped	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Lepidurus packardi	vernal pool tadpole shrimp	ICBRA10010	Endangered	None	-	-	3812117	Antioch North	Mapped	Animals - Crustaceans - Triopsidae - Lepidurus packardi
Animals - Crustaceans	Lepidurus packardi	vernal pool tadpole shrimp	ICBRA10010	Endangered	None	-	-	3712187	Antioch South	Mapped	Animals - Crustaceans - Triopsidae - Lepidurus packardi
Animals - Fish	Acipenser medirostris	green sturgeon	AFCAA01030	Threatened	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Acipenseridae - Acipenser medirostris
Animals - Fish	Acipenser transmontanus	white sturgeon	AFCAA01050	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Acipenseridae - Acipenser transmontanus
Animals - Fish	Acipenser transmontanus	white sturgeon	AFCAA01050	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Acipenseridae - Acipenser transmontanus
Animals - Fish	Acipenser transmontanus	white sturgeon	AFCAA01050	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Acipenseridae - Acipenser transmontanus
Animals - Fish	Acipenser transmontanus	white sturgeon	AFCAA01050	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Acipenseridae - Acipenser transmontanus
Animals - Fish	Archoplites interruptus	Sacramento perch	AFCQB07010	None	None	SSC	-	3812117	Antioch North	Mapped	Animals - Fish - Centrarchidae - Archoplites interruptus
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus
Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus
Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus

Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB34020	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Cyprinidae - Pogonichthys macrolepidotus
Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB34020	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Cyprinidae - Pogonichthys macrolepidotus
Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB34020	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Cyprinidae - Pogonichthys macrolepidotus
Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB34020	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Fish - Cyprinidae - Pogonichthys macrolepidotus
Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB34020	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Fish - Cyprinidae - Pogonichthys macrolepidotus
Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB34020	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Cyprinidae - Pogonichthys macrolepidotus
Animals - Fish	Hysterocarpus traski traski	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traski traski
Animals - Fish	Hysterocarpus traski traski	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3812125	Isleton	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traski traski
Animals - Fish	Hysterocarpus traski traski	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3712185	Woodward Island	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traski traski
Animals - Fish	Hysterocarpus traski traski	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traski traski
Animals - Fish	Hysterocarpus traski traski	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traski traski
Animals - Fish	Hysterocarpus traski traski	Sacramento-San Joaquin tule perch	AFCQK02012	None	None	-	-	3812117	Antioch North	Unprocessed	Animals - Fish - Embiotocidae - Hysterocarpus traski traski
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB01040	Threatened	Endangered	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Fish - Osmeridae - Hypomesus transpacificus
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB01040	Threatened	Endangered	-	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Fish - Osmeridae - Hypomesus transpacificus
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB01040	Threatened	Endangered	-	-	3812115	Bouldin Island	Mapped and Unprocessed	Animals - Fish - Osmeridae - Hypomesus transpacificus
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB01040	Threatened	Endangered	-	-	3712185	Woodward Island	Mapped and Unprocessed	Animals - Fish - Osmeridae - Hypomesus transpacificus
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB01040	Threatened	Endangered	-	-	3812125	Isleton	Mapped and Unprocessed	Animals - Fish - Osmeridae - Hypomesus transpacificus
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB01040	Threatened	Endangered	-	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Osmeridae - Hypomesus transpacificus
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	SSC	-	3812126	Rio Vista	Mapped and Unprocessed	Animals - Fish - Osmeridae - Spirinchus thaleichthys

Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	SSC	-	3812125	Isleton	Mapped	Animals - Fish - Osmeridae - Spirinchus thaleichthys
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	SSC	-	3712185	Woodward Island	Mapped	Animals - Fish - Osmeridae - Spirinchus thaleichthys
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	SSC	-	3812115	Bouldin Island	Mapped	Animals - Fish - Osmeridae - Spirinchus thaleichthys
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	SSC	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Fish - Osmeridae - Spirinchus thaleichthys
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	SSC	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Fish - Osmeridae - Spirinchus thaleichthys
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Lampetra ayresii	river lamprey	AFBAA02030	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Petromyzontidae - Lampetra ayresii
Animals - Fish	Lampetra ayresii	river lamprey	AFBAA02030	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Fish - Petromyzontidae - Lampetra ayresii
Animals - Fish	Lampetra ayresii	river lamprey	AFBAA02030	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Petromyzontidae - Lampetra ayresii
Animals - Fish	Lampetra ayresii	river lamprey	AFBAA02030	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Petromyzontidae - Lampetra ayresii
Animals - Fish	Oncorhynchus kisutch	coho salmon - central California coast ESU	AFCHA02034	Endangered	Endangered	-	-	3812117	Antioch North	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus kisutch
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - central California coast DPS	AFCHA0209G	Threatened	None	-	-	3812117	Antioch North	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3812115	Bouldin Island	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712185	Woodward Island	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - central California coast DPS	AFCHA0209G	Threatened	None	-	-	3812125	Isleton	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3812125	Isleton	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus

Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3812126	Rio Vista	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	AFCHA02056	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Sacramento River winter-run ESU	AFCHA0205B	Endangered	Endangered	-	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3812126	Rio Vista	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	AFCHA02056	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3812125	Isleton	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Sacramento River winter-run ESU	AFCHA0205B	Endangered	Endangered	-	-	3812125	Isleton	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3812125	Isleton	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3712185	Woodward Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712185	Woodward Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3712186	Brentwood	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712186	Brentwood	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	AFCHA02056	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
		chinook									

Animals - Fish	Oncorhynchus tshawytscha	salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	AFCHA02056	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Sacramento River winter-run ESU	AFCHA0205B	Endangered	Endangered	-	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3812116	Jersey Island	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	AFCHA02056	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	-	-	3812117	Antioch North	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Sacramento River winter-run ESU	AFCHA0205B	Endangered	Endangered	-	-	3812117	Antioch North	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha
Animals - Insects	Andrena blennospermatis	Blennosperma vernal pool andrenid bee	IIHYM35030	None	None	-	-	3712187	Antioch South	Mapped	Animals - Insects - Andrenidae - Andrena blennospermatis
Animals - Insects	Perdita scitula antiochensis	Antioch andrenid bee	IIHYM01031	None	None	-	-	3712186	Brentwood	Mapped	Animals - Insects - Andrenidae - Perdita scitula antiochensis
Animals - Insects	Perdita scitula antiochensis	Antioch andrenid bee	IIHYM01031	None	None	-	-	3812116	Jersey Island	Mapped	Animals - Insects - Andrenidae - Perdita scitula antiochensis
Animals - Insects	Perdita scitula antiochensis	Antioch andrenid bee	IIHYM01031	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Andrenidae - Perdita scitula antiochensis
Animals - Insects	Anthicus antiochensis	Antioch Dunes anthicid beetle	IICOL49020	None	None	-	-	3812126	Rio Vista	Mapped	Animals - Insects - Anthicidae - Anthicus antiochensis
Animals - Insects	Anthicus antiochensis	Antioch Dunes anthicid beetle	IICOL49020	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Anthicidae - Anthicus antiochensis
Animals - Insects	Anthicus sacramento	Sacramento anthicid beetle	IICOL49010	None	None	-	-	3812126	Rio Vista	Mapped	Animals - Insects - Anthicidae - Anthicus sacramento
Animals - Insects	Anthicus sacramento	Sacramento anthicid beetle	IICOL49010	None	None	-	-	3812125	Isleton	Mapped	Animals - Insects - Anthicidae - Anthicus sacramento

Animals - Insects	Bombus crotchii	Crotch bumble bee	IIHYM24480	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Apidae - Bombus crotchii
Animals - Insects	Bombus crotchii	Crotch bumble bee	IIHYM24480	None	None	-	-	3712187	Antioch South	Mapped	Animals - Insects - Apidae - Bombus crotchii
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	None	-	-	3712187	Antioch South	Mapped	Animals - Insects - Apidae - Bombus occidentalis
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	None	-	-	3712186	Brentwood	Mapped	Animals - Insects - Apidae - Bombus occidentalis
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	None	-	-	3812116	Jersey Island	Mapped	Animals - Insects - Apidae - Bombus occidentalis
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Apidae - Bombus occidentalis
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	None	-	-	3812126	Rio Vista	Mapped	Animals - Insects - Apidae - Bombus occidentalis
Animals - Insects	Efferia antiochi	Antioch efferian robberfly	IIDIP07010	None	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Insects - Asilidae - Efferia antiochi
Animals - Insects	Metapogon hurdi	Hurd's metapogon robberfly	IIDIP08010	None	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Insects - Asilidae - Metapogon hurdi
Animals - Insects	Elaphrus viridis	Delta green ground beetle	IICOL36010	Threatened	None	-	-	3812127	Birds Landing	Unprocessed	Animals - Insects - Carabidae - Elaphrus viridis
Animals - Insects	Hygrotus curvipes	curved-foot hygrotus diving beetle	IICOL38030	None	None	-	-	3812116	Jersey Island	Mapped	Animals - Insects - Dytiscidae - Hygrotus curvipes
Animals - Insects	Hygrotus curvipes	curved-foot hygrotus diving beetle	IICOL38030	None	None	-	-	3712186	Brentwood	Mapped	Animals - Insects - Dytiscidae - Hygrotus curvipes
Animals - Insects	Sphecodogastra antiochensis	Antioch Dunes halcitid bee	IIHYM78010	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Halictidae - Sphecodogastra antiochensis
Animals - Insects	Lytta molesta	molestan blister beetle	IICOL4C030	None	None	-	-	3712186	Brentwood	Mapped	Animals - Insects - Meloidae - Lytta molesta
Animals - Insects	Lytta molesta	molestan blister beetle	IICOL4C030	None	None	-	-	3712187	Antioch South	Mapped	Animals - Insects - Meloidae - Lytta molesta
Animals - Insects	Myrmosula pacifica	Antioch multilid wasp	IIHYM15010	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Mutillidae - Myrmosula pacifica
Animals - Insects	Rhaphiomidas trochilus	Valley mydas fly	IIDIP05010	None	None	-	-	3812117	Antioch North	Unprocessed	Animals - Insects - Mydidae - Rhaphiomidas trochilus
Animals - Insects	Apodemia mormo langei	Lange's metalmark butterfly	IILEPH7012	Endangered	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Insects - Riodinidae - Apodemia mormo langei
Animals - Insects	Eucerceris ruficeps	redheaded sphecid wasp	IIHYM18010	None	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Insects - Sphecidae - Eucerceris ruficeps
Animals - Insects	Philanthus nasalis	Antioch specid wasp	IIHYM20010	None	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Insects - Sphecidae - Philanthus nasalis
Animals - Insects	Coelus gracilis	San Joaquin dune beetle	IICOL4A020	None	None	-	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Insects - Tenebrionidae - Coelus gracilis
Animals - Insects	Idiostatus middlekauffi	Middlekauff's shieldback katydid	IIORT31010	None	None	-	-	3812117	Antioch North	Mapped	Animals - Insects - Tettigoniidae - Idiostatus middlekauffi
Animals - Mammals	Vulpes macrotis mutica	San Joaquin kit fox	AMAJA03041	Endangered	Threatened	-	-	3712187	Antioch South	Mapped	Animals - Mammals - Canidae - Vulpes macrotis mutica

Animals - Mammals	Vulpes macrotis mutica	San Joaquin kit fox	AMAJA03041	Endangered	Threatened	-	-	3712186	Brentwood	Mapped	Animals - Mammals - Canidae - Vulpes macrotis mutica
Animals - Mammals	Perognathus inornatus	San Joaquin Pocket Mouse	AMAFD01060	None	None	-	-	3712186	Brentwood	Mapped	Animals - Mammals - Heteromyidae - Perognathus inornatus
Animals - Mammals	Perognathus inornatus	San Joaquin Pocket Mouse	AMAFD01060	None	None	-	-	3712187	Antioch South	Mapped	Animals - Mammals - Heteromyidae - Perognathus inornatus
Animals - Mammals	Reithrodontomys raviventris	salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	FP	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Mammals - Muridae - Reithrodontomys raviventris
Animals - Mammals	Taxidea taxus	American badger	AMAJF04010	None	None	SSC	-	3712187	Antioch South	Mapped	Animals - Mammals - Mustelidae - Taxidea taxus
Animals - Mammals	Antrozous pallidus	pallid bat	AMACC10010	None	None	SSC	-	3712187	Antioch South	Mapped	Animals - Mammals - Vespertilionidae - Antrozous pallidus
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3712187	Antioch South	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3712186	Brentwood	Unprocessed	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3812117	Antioch North	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3812116	Jersey Island	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3812115	Bouldin Island	Unprocessed	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3812125	Isleton	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3812126	Rio Vista	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3812126	Rio Vista	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3812116	Jersey Island	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3712186	Brentwood	Unprocessed	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Myotis ciliolabrum	western small-footed myotis	AMACC01140	None	None	-	-	3712186	Brentwood	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis ciliolabrum
Animals - Mammals	Myotis ciliolabrum	western small-footed myotis	AMACC01140	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis ciliolabrum
Animals - Mammals	Myotis lucifugus	little brown bat	AMACC01010	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis lucifugus
Animals - Mammals	Myotis lucifugus	little brown bat	AMACC01010	None	None	-	-	3712186	Brentwood	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis lucifugus
Animals - Mammals	Myotis lucifugus	little brown bat	AMACC01010	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis lucifugus
Animals - Mammals	Myotis yumanensis	Yuma myotis	AMACC01020	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis yumanensis
Animals -	Myotis	Yuma myotis	AMACC01020	None	None	-	-	3712186	Brentwood	Unprocessed	Animals - Mammals - Vespertilionidae -

Mammals	yumanensis										Myotis yumanensis
Animals - Mammals	Myotis yumanensis	Yuma myotis	AMACC01020	None	None	-	-	3812116	Jersey Island	Unprocessed	Animals - Mammals - Vespertilionidae - Myotis yumanensis
Animals - Mollusks	Helminthoglypta nickliniana bridgesi	Bridges' coast range shoulderband	IMGASC2362	None	None	-	-	3712187	Antioch South	Mapped	Animals - Mollusks - Helminthoglyptidae - Helminthoglypta nickliniana bridgesi
Animals - Mollusks	Gonidea angulata	western ridged mussel	IMBIV19010	None	None	-	-	3712185	Woodward Island	Unprocessed	Animals - Mollusks - Unionidae - Gonidea angulata
Animals - Mollusks	Gonidea angulata	western ridged mussel	IMBIV19010	None	None	-	-	3812115	Bouldin Island	Unprocessed	Animals - Mollusks - Unionidae - Gonidea angulata
Animals - Mollusks	Gonidea angulata	western ridged mussel	IMBIV19010	None	None	-	-	3812117	Antioch North	Unprocessed	Animals - Mollusks - Unionidae - Gonidea angulata
Animals - Reptiles	Anniella pulchra pulchra	silvery legless lizard	ARACC01012	None	None	SSC	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Reptiles - Anniellidae - Anniella pulchra pulchra
Animals - Reptiles	Anniella pulchra pulchra	silvery legless lizard	ARACC01012	None	None	SSC	-	3812117	Antioch North	Mapped	Animals - Reptiles - Anniellidae - Anniella pulchra pulchra
Animals - Reptiles	Anniella pulchra pulchra	silvery legless lizard	ARACC01012	None	None	SSC	-	3712186	Brentwood	Mapped	Animals - Reptiles - Anniellidae - Anniella pulchra pulchra
Animals - Reptiles	Anniella pulchra pulchra	silvery legless lizard	ARACC01012	None	None	SSC	-	3712187	Antioch South	Mapped	Animals - Reptiles - Anniellidae - Anniella pulchra pulchra
Animals - Reptiles	Masticophis lateralis euryxanthus	Alameda whipsnake	ARADB21031	Threatened	Threatened	-	-	3712187	Antioch South	Mapped	Animals - Reptiles - Colubridae - Masticophis lateralis euryxanthus
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712187	Antioch South	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712186	Brentwood	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712185	Woodward Island	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3812117	Antioch North	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3812115	Bouldin Island	Mapped	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3812125	Isleton	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Thamnophis gigas	giant garter snake	ARADB36150	Threatened	Threatened	-	-	3812115	Bouldin Island	Mapped	Animals - Reptiles - Natricidae - Thamnophis gigas
Animals - Reptiles	Thamnophis gigas	giant garter snake	ARADB36150	Threatened	Threatened	-	-	3812116	Jersey Island	Mapped and Unprocessed	Animals - Reptiles - Natricidae - Thamnophis gigas
Animals - Reptiles	Thamnophis gigas	giant garter snake	ARADB36150	Threatened	Threatened	-	-	3812117	Antioch North	Mapped	Animals - Reptiles - Natricidae - Thamnophis gigas
Animals - Reptiles	Phrynosoma blainvillii	coast horned lizard	ARACF12100	None	None	SSC	-	3812117	Antioch North	Unprocessed	Animals - Reptiles - Phrynosomatidae - Phrynosoma blainvillii
											Community -

Community - Terrestrial	Alkali Meadow	Alkali Meadow	CTT45310CA	None	None	-	-	3712186	Brentwood	Mapped	Terrestrial - Alkali Meadow
Community - Terrestrial	Alkali Seep	Alkali Seep	CTT45320CA	None	None	-	-	3712186	Brentwood	Mapped	Community - Terrestrial - Alkali Seep
Community - Terrestrial	Cismontane Alkali Marsh	Cismontane Alkali Marsh	CTT52310CA	None	None	-	-	3712186	Brentwood	Mapped	Community - Terrestrial - Cismontane Alkali Marsh
Community - Terrestrial	Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	-	-	3712185	Woodward Island	Mapped	Community - Terrestrial - Coastal and Valley Freshwater Marsh
Community - Terrestrial	Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	-	-	3812116	Jersey Island	Mapped	Community - Terrestrial - Coastal and Valley Freshwater Marsh
Community - Terrestrial	Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	-	-	3812115	Bouldin Island	Mapped	Community - Terrestrial - Coastal and Valley Freshwater Marsh
Community - Terrestrial	Coastal Brackish Marsh	Coastal Brackish Marsh	CTT52200CA	None	None	-	-	3812117	Antioch North	Mapped	Community - Terrestrial - Coastal Brackish Marsh
Community - Terrestrial	Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	CTT44120CA	None	None	-	-	3812127	Birds Landing	Mapped	Community - Terrestrial - Northern Claypan Vernal Pool
Community - Terrestrial	Stabilized Interior Dunes	Stabilized Interior Dunes	CTT23100CA	None	None	-	-	3812117	Antioch North	Mapped	Community - Terrestrial - Stabilized Interior Dunes
Community - Terrestrial	Valley Needlegrass Grassland	Valley Needlegrass Grassland	CTT42110CA	None	None	-	-	3812127	Birds Landing	Mapped	Community - Terrestrial - Valley Needlegrass Grassland
Plants - Bryophytes	Anomobryum julaceum	slender silver moss	NBMUS80010	None	None	-	4.2	3712187	Antioch South	Mapped	Plants - Bryophytes - Bryaceae - Anomobryum julaceum
Plants - Vascular	Sagittaria sanfordii	Sanford's arrowhead	PMALI040Q0	None	None	-	1B.2	3812126	Rio Vista	Mapped	Plants - Vascular - Alismataceae - Sagittaria sanfordii
Plants - Vascular	Sagittaria sanfordii	Sanford's arrowhead	PMALI040Q0	None	None	-	1B.2	3812125	Isleton	Mapped	Plants - Vascular - Alismataceae - Sagittaria sanfordii
Plants - Vascular	Cicuta maculata var. bolanderi	Bolander's water-hemlock	PDAPI0M051	None	None	-	2B.1	3812125	Isleton	Mapped	Plants - Vascular - Apiaceae - Cicuta maculata var. bolanderi
Plants - Vascular	Cicuta maculata var. bolanderi	Bolander's water-hemlock	PDAPI0M051	None	None	-	2B.1	3812117	Antioch North	Mapped	Plants - Vascular - Apiaceae - Cicuta maculata var. bolanderi
Plants - Vascular	Cicuta maculata var. bolanderi	Bolander's water-hemlock	PDAPI0M051	None	None	-	2B.1	3812127	Birds Landing	Mapped	Plants - Vascular - Apiaceae - Cicuta maculata var. bolanderi
Plants - Vascular	Cicuta maculata var. bolanderi	Bolander's water-hemlock	PDAPI0M051	None	None	-	2B.1	3712186	Brentwood	Mapped	Plants - Vascular - Apiaceae - Cicuta maculata var. bolanderi
Plants - Vascular	Cicuta maculata var. bolanderi	Bolander's water-hemlock	PDAPI0M051	None	None	-	2B.1	3812116	Jersey Island	Mapped	Plants - Vascular - Apiaceae - Cicuta maculata var. bolanderi
Plants - Vascular	Eryngium racemosum	Delta button-celery	PDAPI0Z0S0	None	Endangered	-	1B.1	3712185	Woodward Island	Mapped	Plants - Vascular - Apiaceae - Eryngium racemosum
Plants - Vascular	Lilaeopsis masonii	Mason's lilaeopsis	PDAPI19030	None	Rare	-	1B.1	3712185	Woodward Island	Mapped	Plants - Vascular - Apiaceae - Lilaeopsis masonii
Plants -	Lilaeopsis	Mason's							Jersey	Mapped and	Plants - Vascular -

Vascular	masonii	lilaeopsis	PDAPI19030	None	Rare	-	1B.1	3812116	Island	Unprocessed	Apiaceae - Lilaeopsis masonii
Plants - Vascular	Lilaeopsis masonii	Mason's lilaeopsis	PDAPI19030	None	Rare	-	1B.1	3812115	Bouldin Island	Mapped	Plants - Vascular - Apiaceae - Lilaeopsis masonii
Plants - Vascular	Lilaeopsis masonii	Mason's lilaeopsis	PDAPI19030	None	Rare	-	1B.1	3812126	Rio Vista	Mapped	Plants - Vascular - Apiaceae - Lilaeopsis masonii
Plants - Vascular	Lilaeopsis masonii	Mason's lilaeopsis	PDAPI19030	None	Rare	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Apiaceae - Lilaeopsis masonii
Plants - Vascular	Lilaeopsis masonii	Mason's lilaeopsis	PDAPI19030	None	Rare	-	1B.1	3812125	Isleton	Mapped	Plants - Vascular - Apiaceae - Lilaeopsis masonii
Plants - Vascular	Blepharizonia plumosa	big tarplant	PDAST1C011	None	None	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Asteraceae - Blepharizonia plumosa
Plants - Vascular	Blepharizonia plumosa	big tarplant	PDAST1C011	None	None	-	1B.1	3712186	Brentwood	Mapped	Plants - Vascular - Asteraceae - Blepharizonia plumosa
Plants - Vascular	Blepharizonia plumosa	big tarplant	PDAST1C011	None	None	-	1B.1	3712187	Antioch South	Mapped and Unprocessed	Plants - Vascular - Asteraceae - Blepharizonia plumosa
Plants - Vascular	Centromadia parryi ssp. congdonii	Congdon's tarplant	PDAST4R0P1	None	None	-	1B.1	3712186	Brentwood	Mapped	Plants - Vascular - Asteraceae - Centromadia parryi ssp. congdonii
Plants - Vascular	Centromadia parryi ssp. parryi	pappose tarplant	PDAST4R0P2	None	None	-	1B.2	3812127	Birds Landing	Mapped	Plants - Vascular - Asteraceae - Centromadia parryi ssp. parryi
Plants - Vascular	Centromadia parryi ssp. rudis	Parry's rough tarplant	PDAST4R0P3	None	None	-	4.2	3812127	Birds Landing	Unprocessed	Plants - Vascular - Asteraceae - Centromadia parryi ssp. rudis
Plants - Vascular	Eriophyllum jepsonii	Jepson's woolly sunflower	PDAST3N040	None	None	-	4.3	3712187	Antioch South	Unprocessed	Plants - Vascular - Asteraceae - Eriophyllum jepsonii
Plants - Vascular	Helianthella castanea	Diablo helianthella	PDAST4M020	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Asteraceae - Helianthella castanea
Plants - Vascular	Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	-	4.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Asteraceae - Hesperevax caulescens
Plants - Vascular	Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	-	4.2	3712186	Brentwood	Unprocessed	Plants - Vascular - Asteraceae - Hesperevax caulescens
Plants - Vascular	Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	-	4.2	3812117	Antioch North	Unprocessed	Plants - Vascular - Asteraceae - Hesperevax caulescens
Plants - Vascular	Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	-	4.2	3812127	Birds Landing	Unprocessed	Plants - Vascular - Asteraceae - Hesperevax caulescens
Plants - Vascular	Isocoma arguta	Carquinez goldenbush	PDAST57050	None	None	-	1B.1	3812127	Birds Landing	Mapped	Plants - Vascular - Asteraceae - Isocoma arguta
Plants - Vascular	Lasthenia conjugens	Contra Costa goldfields	PDAST5L040	Endangered	None	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Asteraceae - Lasthenia conjugens
Plants - Vascular	Lasthenia conjugens	Contra Costa goldfields	PDAST5L040	Endangered	None	-	1B.1	3712187	Antioch South	Mapped	Plants - Vascular - Asteraceae - Lasthenia conjugens
Plants - Vascular	Madia radiata	showy golden madia	PDAST650E0	None	None	-	1B.1	3712187	Antioch South	Mapped	Plants - Vascular - Asteraceae - Madia radiata

Plants - Vascular	Senecio aphanactis	chaparral ragwort	PDAST8H060	None	None	-	2B.2	3712187	Antioch South	Mapped	Plants - Vascular - Asteraceae - Senecio aphanactis
Plants - Vascular	Senecio hydrophiloides	sweet marsh ragwort	PDAST8H400	None	None	-	4.2	3812117	Antioch North	Unprocessed	Plants - Vascular - Asteraceae - Senecio hydrophiloides
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3812125	Isleton	Mapped	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3812126	Rio Vista	Mapped	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3712186	Brentwood	Mapped	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3712185	Woodward Island	Mapped	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3812117	Antioch North	Mapped and Unprocessed	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3812115	Bouldin Island	Mapped	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE8470	None	None	-	1B.2	3812116	Jersey Island	Mapped and Unprocessed	Plants - Vascular - Asteraceae - Symphyotrichum lentum
Plants - Vascular	Amsinckia grandiflora	large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	-	1B.1	3712187	Antioch South	Mapped	Plants - Vascular - Boraginaceae - Amsinckia grandiflora
Plants - Vascular	Cryptantha hooveri	Hoover's cryptantha	PDBOR0A190	None	None	-	1A	3712187	Antioch South	Mapped	Plants - Vascular - Boraginaceae - Cryptantha hooveri
Plants - Vascular	Cryptantha hooveri	Hoover's cryptantha	PDBOR0A190	None	None	-	1A	3812117	Antioch North	Mapped	Plants - Vascular - Boraginaceae - Cryptantha hooveri
Plants - Vascular	Plagiobothrys hystriculus	bearded popcornflower	PDBOR0V0H0	None	None	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Boraginaceae - Plagiobothrys hystriculus
Plants - Vascular	Plagiobothrys hystriculus	bearded popcornflower	PDBOR0V0H0	None	None	-	1B.1	3812127	Birds Landing	Mapped	Plants - Vascular - Boraginaceae - Plagiobothrys hystriculus
Plants - Vascular	Erysimum capitatum var. angustatum	Contra Costa wallflower	PDBRA16052	Endangered	Endangered	-	1B.1	3812117	Antioch North	Mapped and Unprocessed	Plants - Vascular - Brassicaceae - Erysimum capitatum var. angustatum
Plants - Vascular	Tropidocarpum capparideum	caper-fruited tropidocarpum	PDBRA2R010	None	None	-	1B.1	3712185	Woodward Island	Mapped	Plants - Vascular - Brassicaceae - Tropidocarpum capparideum
Plants - Vascular	Tropidocarpum capparideum	caper-fruited tropidocarpum	PDBRA2R010	None	None	-	1B.1	3712186	Brentwood	Mapped	Plants - Vascular - Brassicaceae - Tropidocarpum capparideum
Plants - Vascular	Brasenia schreberi	watershield	PDCAB01010	None	None	-	2B.3	3812115	Bouldin Island	Mapped	Plants - Vascular - Cabombaceae - Brasenia schreberi
Plants - Vascular	Downingia pusilla	dwarf downingia	PDCAM060C0	None	None	-	2B.2	3812117	Antioch North	Mapped	Plants - Vascular - Campanulaceae - Downingia pusilla
Plants - Vascular	Viburnum ellipticum	oval-leaved viburnum	PDCPR07080	None	None	-	2B.3	3712187	Antioch South	Mapped	Plants - Vascular - Caprifoliaceae - Viburnum ellipticum
											Plants - Vascular -

Plants - Vascular	Atriplex cordulata var. cordulata	heartscale	PDCHE040B0	None	None	-	1B.2	3812127	Birds Landing	Mapped	Chenopodiaceae - Atriplex cordulata var. cordulata
Plants - Vascular	Atriplex coronata var. coronata	crownscale	PDCHE040C3	None	None	-	4.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Chenopodiaceae - Atriplex coronata var. coronata
Plants - Vascular	Atriplex coronata var. coronata	crownscale	PDCHE040C3	None	None	-	4.2	3712186	Brentwood	Unprocessed	Plants - Vascular - Chenopodiaceae - Atriplex coronata var. coronata
Plants - Vascular	Atriplex coronata var. coronata	crownscale	PDCHE040C3	None	None	-	4.2	3712185	Woodward Island	Unprocessed	Plants - Vascular - Chenopodiaceae - Atriplex coronata var. coronata
Plants - Vascular	Atriplex coronata var. coronata	crownscale	PDCHE040C3	None	None	-	4.2	3812117	Antioch North	Unprocessed	Plants - Vascular - Chenopodiaceae - Atriplex coronata var. coronata
Plants - Vascular	Atriplex depressa	brittlescale	PDCHE042L0	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Chenopodiaceae - Atriplex depressa
Plants - Vascular	Extriplex joaquinana	San Joaquin spearscale	PDCHE041F3	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Chenopodiaceae - Extriplex joaquinana
Plants - Vascular	Extriplex joaquinana	San Joaquin spearscale	PDCHE041F3	None	None	-	1B.2	3712185	Woodward Island	Mapped	Plants - Vascular - Chenopodiaceae - Extriplex joaquinana
Plants - Vascular	Extriplex joaquinana	San Joaquin spearscale	PDCHE041F3	None	None	-	1B.2	3712186	Brentwood	Mapped	Plants - Vascular - Chenopodiaceae - Extriplex joaquinana
Plants - Vascular	Extriplex joaquinana	San Joaquin spearscale	PDCHE041F3	None	None	-	1B.2	3812117	Antioch North	Mapped	Plants - Vascular - Chenopodiaceae - Extriplex joaquinana
Plants - Vascular	Extriplex joaquinana	San Joaquin spearscale	PDCHE041F3	None	None	-	1B.2	3812126	Rio Vista	Mapped	Plants - Vascular - Chenopodiaceae - Extriplex joaquinana
Plants - Vascular	Convolvulus simulans	small-flowered morning-glory	PDCON05060	None	None	-	4.2	3812117	Antioch North	Unprocessed	Plants - Vascular - Convolvulaceae - Convolvulus simulans
Plants - Vascular	Convolvulus simulans	small-flowered morning-glory	PDCON05060	None	None	-	4.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Convolvulaceae - Convolvulus simulans
Plants - Vascular	Carex comosa	bristly sedge	PMCYP032Y0	None	None	-	2B.1	3812115	Bouldin Island	Mapped	Plants - Vascular - Cyperaceae - Carex comosa
Plants - Vascular	Eleocharis parvula	small spikerush	PMCYP091G0	None	None	-	4.3	3812117	Antioch North	Unprocessed	Plants - Vascular - Cyperaceae - Eleocharis parvula
Plants - Vascular	Arctostaphylos auriculata	Mt. Diablo manzanita	PDERI04040	None	None	-	1B.3	3712187	Antioch South	Mapped	Plants - Vascular - Ericaceae - Arctostaphylos auriculata
Plants - Vascular	Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	PDERI04273	None	None	-	1B.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Ericaceae - Arctostaphylos manzanita ssp. laevigata
Plants - Vascular	Astragalus tener var. tener	alkali milk-vetch	PDFAB0F8R1	None	None	-	1B.2	3712185	Woodward Island	Mapped	Plants - Vascular - Fabaceae - Astragalus tener var. tener
Plants - Vascular	Astragalus tener var. tener	alkali milk-vetch	PDFAB0F8R1	None	None	-	1B.2	3812117	Antioch North	Mapped	Plants - Vascular - Fabaceae - Astragalus tener var. tener
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	-	1B.2	3812117	Antioch North	Mapped	Plants - Vascular - Fabaceae - Lathyrus jepsonii

											var. jepsonii
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	-	1B.2	3812115	Bouldin Island	Mapped	Plants - Vascular - Fabaceae - Lathyrus jepsonii var. jepsonii
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	-	1B.2	3812116	Jersey Island	Mapped and Unprocessed	Plants - Vascular - Fabaceae - Lathyrus jepsonii var. jepsonii
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	-	1B.2	3712185	Woodward Island	Mapped	Plants - Vascular - Fabaceae - Lathyrus jepsonii var. jepsonii
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	-	1B.2	3812125	Isleton	Mapped	Plants - Vascular - Fabaceae - Lathyrus jepsonii var. jepsonii
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250D2	None	None	-	1B.2	3812126	Rio Vista	Mapped	Plants - Vascular - Fabaceae - Lathyrus jepsonii var. jepsonii
Plants - Vascular	Lupinus albifrons var. abramsii	Abrams' lupine	PDFAB2B010	None	None	-	3.2	3812117	Antioch North	Unprocessed	Plants - Vascular - Fabaceae - Lupinus albifrons var. abramsii
Plants - Vascular	California macrophylla	round-leaved filaree	PDGER01070	None	None	-	1B.2	3812117	Antioch North	Mapped	Plants - Vascular - Geraniaceae - California macrophylla
Plants - Vascular	California macrophylla	round-leaved filaree	PDGER01070	None	None	-	1B.2	3712186	Brentwood	Mapped	Plants - Vascular - Geraniaceae - California macrophylla
Plants - Vascular	California macrophylla	round-leaved filaree	PDGER01070	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Geraniaceae - California macrophylla
Plants - Vascular	Juglans hindsii	Northern California black walnut	PDJUG02040	None	None	-	1B.1	3812126	Rio Vista	Mapped	Plants - Vascular - Juglandaceae - Juglans hindsii
Plants - Vascular	Juglans hindsii	Northern California black walnut	PDJUG02040	None	None	-	1B.1	3812125	Isleton	Mapped	Plants - Vascular - Juglandaceae - Juglans hindsii
Plants - Vascular	Scutellaria galericulata	marsh skullcap	PDLAM1U0J0	None	None	-	2B.2	3712185	Woodward Island	Mapped	Plants - Vascular - Lamiaceae - Scutellaria galericulata
Plants - Vascular	Scutellaria galericulata	marsh skullcap	PDLAM1U0J0	None	None	-	2B.2	3812115	Bouldin Island	Mapped	Plants - Vascular - Lamiaceae - Scutellaria galericulata
Plants - Vascular	Scutellaria lateriflora	side-flowering skullcap	PDLAM1U0Q0	None	None	-	2B.2	3812115	Bouldin Island	Mapped	Plants - Vascular - Lamiaceae - Scutellaria lateriflora
Plants - Vascular	Scutellaria lateriflora	side-flowering skullcap	PDLAM1U0Q0	None	None	-	2B.2	3812125	Isleton	Mapped	Plants - Vascular - Lamiaceae - Scutellaria lateriflora
Plants - Vascular	Calochortus pulchellus	Mt. Diablo fairy-lantern	PMLIL0D160	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Liliaceae - Calochortus pulchellus
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3712186	Brentwood	Mapped and Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3812117	Antioch North	Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Fritillaria liliacea	fragrant fritillary	PMLIL0V0C0	None	None	-	1B.2	3812117	Antioch North	Mapped	Plants - Vascular - Liliaceae - Fritillaria liliacea

Plants - Vascular	Fritillaria liliacea	fragrant fritillary	PMLIL0V0C0	None	None	-	1B.2	3812127	Birds Landing	Mapped	Plants - Vascular - Liliaceae - Fritillaria liliacea
Plants - Vascular	Hesperolinon breweri	Brewer's western flax	PDLIN01030	None	None	-	1B.2	3712186	Brentwood	Mapped	Plants - Vascular - Linaceae - Hesperolinon breweri
Plants - Vascular	Hesperolinon breweri	Brewer's western flax	PDLIN01030	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Linaceae - Hesperolinon breweri
Plants - Vascular	Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	PDMAL0H0R3	None	None	-	1B.2	3712185	Woodward Island	Mapped	Plants - Vascular - Malvaceae - Hibiscus lasiocarpos var. occidentalis
Plants - Vascular	Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	PDMAL0H0R3	None	None	-	1B.2	3812115	Bouldin Island	Mapped	Plants - Vascular - Malvaceae - Hibiscus lasiocarpos var. occidentalis
Plants - Vascular	Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	PDMAL0H0R3	None	None	-	1B.2	3812116	Jersey Island	Mapped	Plants - Vascular - Malvaceae - Hibiscus lasiocarpos var. occidentalis
Plants - Vascular	Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	PDMAL0H0R3	None	None	-	1B.2	3812126	Rio Vista	Mapped	Plants - Vascular - Malvaceae - Hibiscus lasiocarpos var. occidentalis
Plants - Vascular	Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	PDMAL0H0R3	None	None	-	1B.2	3812125	Isleton	Mapped	Plants - Vascular - Malvaceae - Hibiscus lasiocarpos var. occidentalis
Plants - Vascular	Malacothamnus hallii	Hall's bush-mallow	PDMAL0Q0F0	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Malvaceae - Malacothamnus hallii
Plants - Vascular	Sidalcea keckii	Keck's checkerbloom	PDMAL110D0	Endangered	None	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Malvaceae - Sidalcea keckii
Plants - Vascular	Sidalcea keckii	Keck's checkerbloom	PDMAL110D0	Endangered	None	-	1B.1	3812127	Birds Landing	Mapped	Plants - Vascular - Malvaceae - Sidalcea keckii
Plants - Vascular	Calandrinia breweri	Brewer's calandrinia	PDPOR01020	None	None	-	4.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Montiaceae - Calandrinia breweri
Plants - Vascular	Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	-	1B.1	3712186	Brentwood	Mapped	Plants - Vascular - Onagraceae - Oenothera deltoides ssp. howellii
Plants - Vascular	Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Onagraceae - Oenothera deltoides ssp. howellii
Plants - Vascular	Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	-	1B.1	3812116	Jersey Island	Mapped	Plants - Vascular - Onagraceae - Oenothera deltoides ssp. howellii
Plants - Vascular	Chloropyron molle ssp. molle	soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	-	1B.2	3812116	Jersey Island	Mapped	Plants - Vascular - Orobanchaceae - Chloropyron molle ssp. molle
Plants - Vascular	Chloropyron molle ssp. molle	soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	-	1B.2	3812117	Antioch North	Mapped	Plants - Vascular - Orobanchaceae - Chloropyron molle ssp. molle
Plants - Vascular	Eschscholzia rhombipetala	diamond-petaled California poppy	PDPAP0A0D0	None	None	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Papaveraceae - Eschscholzia rhombipetala

Plants - Vascular	Navarretia heterandra	Tehama navarretia	PDPLM0C0A0	None	None	-	4.3	3712187	Antioch South	Unprocessed	Plants - Vascular - Polemoniaceae - Navarretia heterandra
Plants - Vascular	Navarretia leucocephala ssp. bakeri	Baker's navarretia	PDPLM0C0E1	None	None	-	1B.1	3812127	Birds Landing	Mapped	Plants - Vascular - Polemoniaceae - Navarretia leucocephala ssp. bakeri
Plants - Vascular	Navarretia nigelliformis ssp. radians	shining navarretia	PDPLM0C0J2	None	None	-	1B.2	3712187	Antioch South	Mapped	Plants - Vascular - Polemoniaceae - Navarretia nigelliformis ssp. radians
Plants - Vascular	Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	PDPGN0849Q	None	None	-	1B.1	3812117	Antioch North	Mapped and Unprocessed	Plants - Vascular - Polygonaceae - Eriogonum nudum var. psychicola
Plants - Vascular	Eriogonum truncatum	Mt. Diablo buckwheat	PDPGN085Z0	None	None	-	1B.1	3812117	Antioch North	Mapped	Plants - Vascular - Polygonaceae - Eriogonum truncatum
Plants - Vascular	Eriogonum truncatum	Mt. Diablo buckwheat	PDPGN085Z0	None	None	-	1B.1	3712187	Antioch South	Mapped	Plants - Vascular - Polygonaceae - Eriogonum truncatum
Plants - Vascular	Potamogeton zosteriformis	eel-grass pondweed	PMPOT03160	None	None	-	2B.2	3812116	Jersey Island	Mapped	Plants - Vascular - Potamogetonaceae - Potamogeton zosteriformis
Plants - Vascular	Potamogeton zosteriformis	eel-grass pondweed	PMPOT03160	None	None	-	2B.2	3812115	Bouldin Island	Mapped	Plants - Vascular - Potamogetonaceae - Potamogeton zosteriformis
Plants - Vascular	Myosurus minimus ssp. apus	little mousetail	PDRAN0H031	None	None	-	3.1	3812127	Birds Landing	Unprocessed	Plants - Vascular - Ranunculaceae - Myosurus minimus ssp. apus
Plants - Vascular	Galium andrewsii ssp. gatense	serpentine phlox-leaf bedstraw	PDRUB0N032	None	None	-	4.2	3712187	Antioch South	Unprocessed	Plants - Vascular - Rubiaceae - Galium andrewsii ssp. gatense
Plants - Vascular	Limosella australis	Delta mudwort	PDSCR10050	None	None	-	2B.1	3712185	Woodward Island	Mapped	Plants - Vascular - Scrophulariaceae - Limosella australis
Plants - Vascular	Limosella australis	Delta mudwort	PDSCR10050	None	None	-	2B.1	3812115	Bouldin Island	Mapped	Plants - Vascular - Scrophulariaceae - Limosella australis
Plants - Vascular	Limosella australis	Delta mudwort	PDSCR10050	None	None	-	2B.1	3812116	Jersey Island	Mapped	Plants - Vascular - Scrophulariaceae - Limosella australis
Plants - Vascular	Limosella australis	Delta mudwort	PDSCR10050	None	None	-	2B.1	3812126	Rio Vista	Mapped	Plants - Vascular - Scrophulariaceae - Limosella australis
Plants - Vascular	Limosella australis	Delta mudwort	PDSCR10050	None	None	-	2B.1	3812117	Antioch North	Mapped	Plants - Vascular - Scrophulariaceae - Limosella australis
Plants - Vascular	Limosella australis	Delta mudwort	PDSCR10050	None	None	-	2B.1	3812125	Isleton	Mapped	Plants - Vascular - Scrophulariaceae - Limosella australis

CNPS California Native Plant Rare and Endangered Plant Inventory

Plant List

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

Search Criteria

Found in 9 Quads around 38121A6

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Amsinckia grandiflora	large-flowered fiddleneck	Boraginaceae	annual herb	1B.1	S1	G1
Arctostaphylos auriculata	Mt. Diablo manzanita	Ericaceae	perennial evergreen shrub	1B.3	S2	G2
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	Ericaceae	perennial evergreen shrub	1B.2	S2	G5T2
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	1B.2	S2	G2T2
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	1B.2	S2	G3T2
Atriplex coronata var. coronata	crownscale	Chenopodiaceae	annual herb	4.2	S3	G4T3
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	1B.2	S2	G2
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	1B.1	S2	G2
Brasenia schreberi	watershield	Cabombaceae	perennial rhizomatous herb	2B.3	S3	G5
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	4.2	S4	G4
California macrophylla	round-leaved filaree	Geraniaceae	annual herb	1B.2	S3?	G3?
Calochortus pulchellus	Mt. Diablo fairy-lantern	Liliaceae	perennial bulbiferous herb	1B.2	S2	G2
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	2B.1	S2	G5
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	1B.1	S2	G3T2
Centromadia parryi ssp. parryi	pappose tarplant	Asteraceae	annual herb	1B.2	S2	G3T2
Centromadia parryi ssp. rudis	Parry's rough tarplant	Asteraceae	annual herb	4.2	S3	G3T3
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.2	S1	G2T1
Cicuta maculata var. bolanderi	Bolander's water-hemlock	Apiaceae	perennial herb	2B.1	S2	G5T4
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	4.2	S4	G4
Cryptantha hooveri	Hoover's cryptantha	Boraginaceae	annual herb	1A	SH	GH

Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	2B.2	S2	GU
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	Polygonaceae	perennial herb	1B.1	S1	G5T1
Eriogonum truncatum	Mt. Diablo buckwheat	Polygonaceae	annual herb	1B.1	S2	G2
Eryngium racemosum	Delta button-celery	Apiaceae	annual / perennial herb	1B.1	S1	G1Q
Erysimum capitatum var. angustatum	Contra Costa wallflower	Brassicaceae	perennial herb	1B.1	S1	G5T1
Eschscholzia rhombipetala	diamond-petaled California poppy	Papaveraceae	annual herb	1B.1	S1	G1
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	1B.2	S2	G2
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	4.2	S3	G3
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	1B.2	S2	G2
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	4.2	S3	G5T3
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	1B.2	S2	G2
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	4.2	S3	G3
Hesperolinon breweri	Brewer's western flax	Linaceae	annual herb	1B.2	S2?	G2?
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Malvaceae	perennial rhizomatous herb	1B.2	S2	G5T2
Isocoma arguta	Carquinez goldenbush	Asteraceae	perennial shrub	1B.1	S1	G1
Juglans hindsii	Northern California black walnut	Juglandaceae	perennial deciduous tree	1B.1	S1	G1
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	1B.1	S1	G1
Lathyrus jepsonii var. jepsonii	Delta tule pea	Fabaceae	perennial herb	1B.2	S2	G5T2
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	1B.1	S2	G2
Limosella australis	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	2B.1	S2	G4G5
Madia radiata	showy golden madia	Asteraceae	annual herb	1B.1	S2	G2
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	1B.2	S2	G2
Myosurus minimus ssp. apus	little mousetail	Ranunculaceae	annual herb	3.1	S2	G5T2Q
Navarretia heterandra	Tehama navarretia	Polemoniaceae	annual herb	4.3	S4	G4
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	1B.1	S2	G4T2
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	Polemoniaceae	annual herb	4.2	S3	G4T3
Navarretia nigelliformis ssp. radians	shining navarretia	Polemoniaceae	annual herb	1B.2	S2	G4T2
Neostapfia colusana	Colusa grass	Poaceae	annual herb	1B.1	S2	G2
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Onagraceae	perennial herb	1B.1	S1	G5T1

Plagiobothrys hystriculus	bearded popcornflower	Boraginaceae	annual herb	1B.1	S2	G2
Potamogeton zosteriformis	eel-grass pondweed	Potamogetonaceae	annual herb	2B.2	S3	G5
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb	1B.2	S3	G3
Scutellaria galericulata	marsh skullcap	Lamiaceae	perennial rhizomatous herb	2B.2	S2	G5
Scutellaria lateriflora	side-flowering skullcap	Lamiaceae	perennial rhizomatous herb	2B.2	S2	G5
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	2B.2	S2	G3?
Senecio hydrophiloides	sweet marsh ragwort	Asteraceae	perennial herb	4.2	S3	G5
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	1B.1	S2	G2
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	1B.2	S2	G2
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	1B.1	S1	G1
Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	2B.3	S3?	G4G5

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IPaC Trust Resources Report

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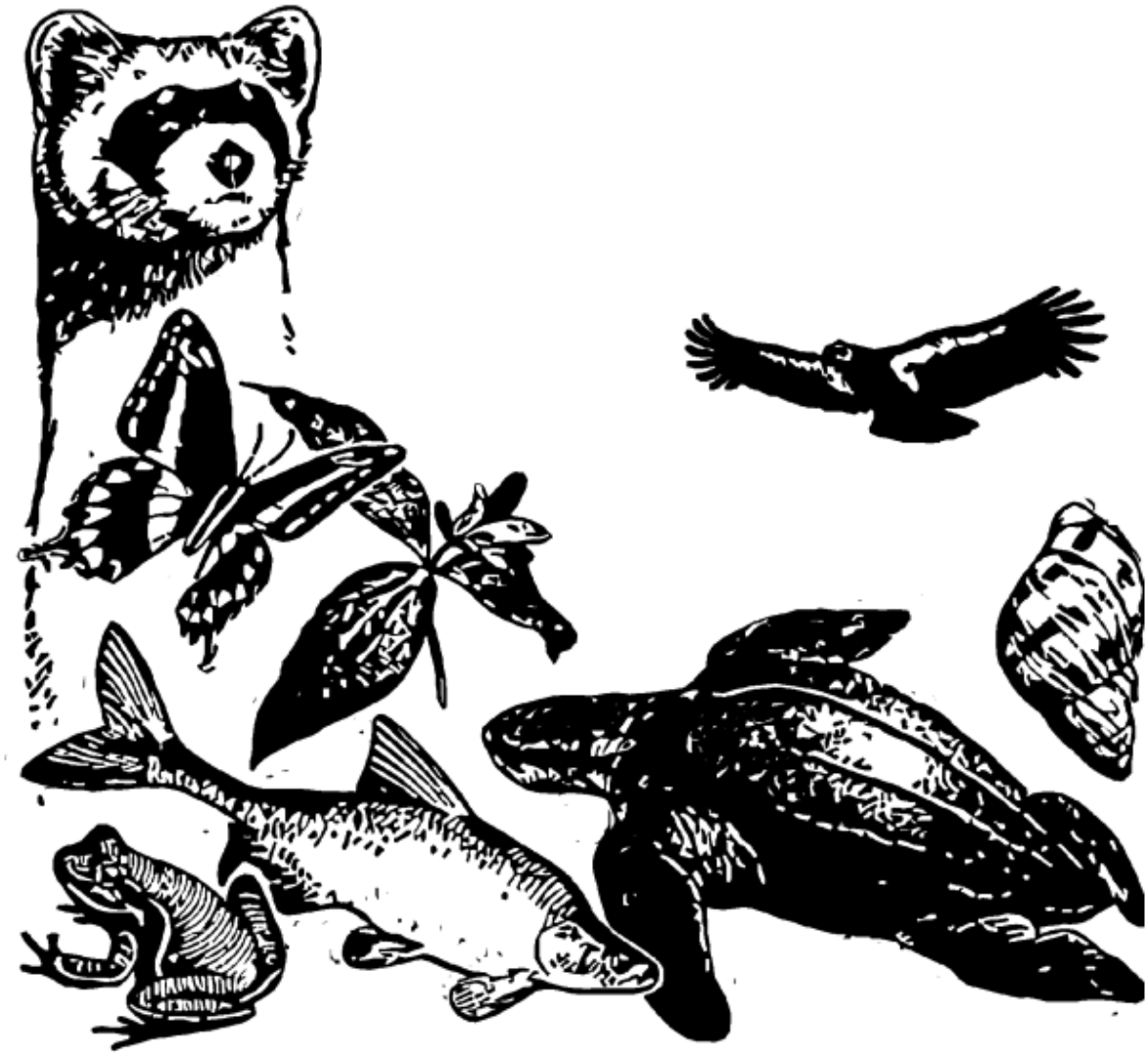

IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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