APPENDIX BIO

Biological Resources Appendices

BIO-1: Biological Technical Report

BIO-2: “California” Ridgway (Clapper) Rail Survey

BIO-3: Soft Bird’s-Beak Field Survey

Biological Technical Report

Martinez Renewable Fuels Project

30 April 2021

Project No.: 0576404

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30 April 2021

Biological Technical Report

Martinez Renewable Fuels Project

Sarah Cromie
Principal Biologist

Kimberley Corwin
Senior Biologist

ERM-West, Inc.

114 Sansome Street

Suite 750

San Francisco, CA 94104

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Acronyms and Abbreviations

Name	Description
AMM	avoidance and minimization measure
bbl	barrels
BMP	best management practice
BTR	Biological Technical Report
CDFD	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CSLC	California State Land Commission
CWA	Clean Water Act
DPS	distinct population segment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
ERM	ERM-West, Inc.
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FR	Federal Register
LSA	LSA Associates, Inc.
Marathon	Marathon Petroleum Corporation
MBTA	Migratory Bird Treaty Act
MISA	Marine Invasive Species Act
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NFH	National Fish Hatchery
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
CNDDB	California Natural Diversity Database
Project	Martinez Renewable Fuels Project
SSC	Species of Special Concern
SWPPP	Storm Water Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1. INTRODUCTION

1.1 Project Background

Marathon Petroleum Corporation (Marathon) is planning to convert its Martinez Refinery to a renewable fuels facility. The Martinez Renewable Fuels Project (Project) consists primarily of a change in facility operation rather than construction of new facilities, although some construction for new and modified equipment will take place. The Project supports California's ambitious goals to reduce greenhouse gas emissions and transition from fossil-fuel processing to renewable fuel alternatives.

1.2 Report Purpose

This report has been prepared to describe biological resources (vegetation communities and special-status plants, natural communities, fish, and wildlife) in the Project area that may be affected by the Project.

1.3 Project Location

The Project is located within and east of the City of Martinez in Contra Costa County, California, on the south side of the Carquinez Strait (Figure 1). The Project consists of modifications to the following Marathon facilities:

- The Martinez Refinery located at 150 Solano Way, Martinez;
- The Avon Marine Terminal at the north end of the Martinez Refinery; and,
- The Amorco Marine Terminal located approximately 2 miles west of the Avon Marine Terminal.

The Project area is located within an un-sectioned portion of Township 2N, Range 2W on the Vine Hill 7.5-minute United States Geological Survey (USGS) quadrangle and is centered at 38.031792° N and 122.075696° W.

1.4 Project Description

The Project consists of three Project areas and associated Project activities described below. These areas are depicted on Figure 2.

1.4.1 Martinez Refinery

The Martinez Refinery is located on approximately 2,000 acres of land west of the City of Martinez on the south side of the Carquinez Strait in Contra Costa County, California (Figure 2). The Martinez Refinery will be converted to the Martinez Renewable Fuels Facility, consisting of three main hydroprocessing units, two hydrogen supply units, a hydrocracker gas plant for fractionation, and waste and by-product systems including systems for treating ammonia and hydrogen sulfide-contaminated water (sour water), and a conventional wastewater treatment plant. Conversion to a renewable fuels facility will primarily use existing process equipment, although some construction of new and modified equipment will be necessary.

Proposed construction activities will occur within the developed portion of the facility, which supports limited biological resources. Operations will remain mostly unchanged, with the exception of a change in the feedstocks delivered to and subsequently processed at the facility, from crude oil to renewable feedstocks (vegetable oils, soybean oil, rendered fats, and other miscellaneous renewable feedstocks). Though the Martinez Refinery is developed and paved, there are shrubs and mature trees that may provide suitable habitat for biological resources such as nesting birds.

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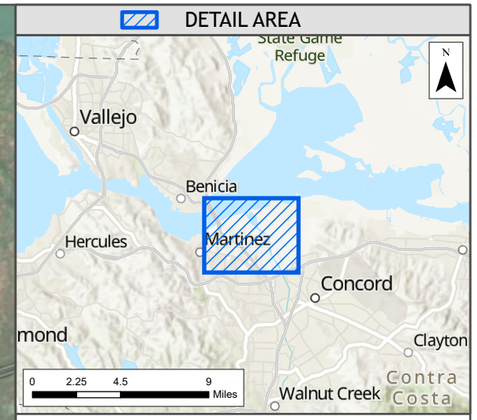
Marathon Petroleum Corporation

Figure 1

REGIONAL LOCATION MAP

Marathon Martinez Refinery
150 Solano Way
Martinez, CA 94553



City of Martinez
Bent Location
Existing Pipeline (Work Location)
Existing Pipeline

Project Area
Amorco Marine Terminal
Avon Marine Terminal
Martinez Refinery

N

0 500 1,000 2,000
Feet

Figure 2
Project Area Overview

Marathon Martinez Refinery
150 Solano Way
Martinez, CA 94553

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FILE: C:\Users\gordon.li\Documents\OneDrive - ERM\Documents\Marathon Refinery\GIS\aprx\Marathon_Bio Figure 2.aprx REVISED: 04/26/2021 SCALE: 1:24,000 when printed at 11x17

1.4.2 Avon Marine Terminal

The Avon Marine Terminal (Avon) is located in the lower Suisun Bay on approximately 13.3 acres of leased state land, about 1.75 miles east of the Benicia-Martinez Bridge in unincorporated Contra Costa County. It is at the north end of the Martinez Refinery (Figure 2). The wharf at Avon extends approximately 1,200 feet from the shoreline and consists of one active berth, Berth 1A, used for product shipments and feedstock deliveries. Avon will be converted from distribution uses to primarily receiving uses, requiring small changes to the facility including minor piping modifications, reconfiguration of pipes and hoses to segregate renewable feedstocks from petroleum products, and addition of heat tracing and insulation to one of the pipelines (26 Line) extending from the wharf to the renewable fuels facility.[1] The pipeline will not be in service when the work is performed.

The modifications on the wharf will not require in-water work. The pipeline offshore is attached to a pipe rack on the east side of a paved access road on the wharf (Appendix A, Photographs 1 and 2). The pipeline onshore is located aboveground on a pipe rack on the east side of a pedestrian walkway (Appendix A, Photographs 3 and 4). Scaffolding will be attached to the pipe rack to provide a safe working platform and to enable completion of the pipeline work without equipment and materials having direct contact with biological resources (vegetation communities and special-status plants, natural communities, fish, and wildlife) that may be present. Scaffolding will be installed for the section of pipeline extending northward between Land's End and the end of the wharf. South of Land's End, the pipeline will be accessed from the pedestrian walkway, with scaffolding used where needed to bridge gaps. Access to work areas will be directly from the developed areas of the Martinez Refinery and Avon Marine Terminal to avoid foot traffic in wetland areas. Upon completion of the work, the scaffolding will be removed using the existing pedestrian walkway, access road, and the same technique as during the installation, thereby avoiding equipment and foot traffic from entering wetland areas.

Heat tracing and insulation will be installed using hand tools. Work on the pipeline will consist of taping a heat tracing wire to the pipeline, wrapping the pipeline with insulation (e.g., Pyrogel, Aerogel, or other product), and then placing a metal sleeve (cladding) around the insulation, the joints of which will be sealed with silicone. Anomalies discovered on the pipe during this task will be repaired before installing heat tracing and insulation. Repairs may be made to the existing pipe coating or require use of a portable welder.

A tarp will be secured to the underside of the scaffolding and pipe rack for all work over water and any areas where pipe repairs are required. This is to catch any tools or material that may inadvertently fall. In other areas, a worker may descend off the scaffolding to retrieve any tools or material that inadvertently fall onto the ground. All material will be retrieved and an inspection completed before the job is complete and scaffolding removed.

Under the proposed Project, the Amorco and Avon Marine Terminals are expected to handle similar throughput volumes using smaller vessels. Crude oil is typically delivered to the marine terminals by marine tankers with capacities of up to 750,000 barrels per vessel (bbl/vessel). Under the proposed Project, the majority of the renewable fuels feedstock is expected to be delivered in smaller barges with capacities of 25,000 to 50,000 bbl/vessel, thus resulting in smaller but more marine vessels. Vessel calls at the Avon Marin Terminal are anticipated to increase twofold from 120 annual vessel visits pre-Project to approximately 364 annual vessel visits post-Project. A smaller percentage of the renewable feedstock will be delivered by smaller tanker vessels with capacities of approximately 260,000 bbl/vessel to Avon. In addition, current petroleum-based terminal operations will continue.

[1] Heat tracing and insulation is a system used to maintain or raise the temperature of a pipe using electrical cables in order to maintain the free flow of liquids.

1.4.3 Amorco Marine Terminal

The Amorco Marine Terminal (Amorco) is located 0.6 mile west of the Benicia-Martinez Bridge and approximately 2 miles west of the Avon Marine Terminal on approximately 14.3 acres of leased state land. The wharf at Amorco extends approximately 1,000 feet from the shoreline of the City of Martinez into the open water of the Carquinez Strait (Figure 2 and Appendix A, Photographs 5 and 6). Amorco has one active berth at the eastern end of the wharf currently used for receiving petroleum products. The Project will result in the berth also being used for shipment of renewable diesel products. To accommodate the smaller vessels that ship renewable diesel, a new fender will be mounted at Dolphin A-81 (Appendix A, Photograph 7), in between the existing fenders on Dolphins A-76 and A-77 (Appendix A, Photographs 8, 9 and 10). The new super cone fender will be attached to Dolphin A-81 above the high water line, with the fender panel extending into the water but not into the substrate below.

Additionally, the Project will include maintenance activities on Dolphins A-76 and A-77 consisting of repairs to the concrete and five of the pilings. The concrete repairs will be above-water and performed from scaffolding suspended from the deck. The piling repairs will be performed by placing a fiberglass (Fox) sleeve around the piling that is then filled with grout. The piling damage at Dolphin A-76 is close to the deck, and the jackets are not anticipated to extend below the mean higher high water (MHHW) level. Repairs to the three pilings at Dolphin A-77 are all expected to be below MHHW level, and the jacket installed on one of the pilings will likely extend to the substrate, but not into it. A marine construction barge with spuds will be used for installing the fender and completing the repairs to the pilings. The mooring hooks at Dolphins A-76 and A-77 may also be rotated depending on mooring layouts.

The work activities at Amorco will primarily take place on the wharf and within the water where there could be interaction with biological resources (natural communities and fish) present at or near Amorco. Minor adjustments to piping with the onshore portion of the terminal will also be required (such as installing a new jumper bypass), however this work is within a developed setting that supports limited, if any, biological resources.

Similar with the Avon Marine Terminal, the majority of the vessel traffic is expected to be smaller barges with capacities of 25,000 to 50,000 bbl/vessel, thus resulting in smaller marine vessels. However, vessel calls at the Amorco Marine Terminal are anticipated to decrease from approximately 90 annual vessel visits pre-Project to only 40 annual vessel visits post-Project. The decrease in vessel calls at the Amorco Marine Terminal are a result of the Amorco Marine Terminal being converted from receiving crude oil and heavy fuel oil for refining, to primarily distribution of renewable diesel product.

2. METHODOLOGY

2.1 Definitions

Definitions of key terms used in this document are provided below.

- *Project area:* Refers to the areas where proposed construction will occur, including Marathon's existing Martinez Refinery, Avon Marine Terminal, Amorco Marine Terminal, and adjacent staging, access, and work areas.
- *Project vicinity:* Encompasses all lands within 5 miles of the Project area boundary.
- *Proposed Project:* Refers to the Marathon Martinez Renewable Fuels Project and is synonymous with "Project."
- *Study area:* Encompasses the Project area plus adjacent areas that have been designated as wetlands, other waters, and uplands. All tidal brackish marsh within 700 feet of the Project area is included in the study area based on the standard buffer distance considered by the United States Fish and Wildlife Service (USFWS 2013) to be adequate to protect breeding California Ridgway's rails from construction-related effects.

For the purposes of this report, special-status plant and/or wildlife species are defined as those:

- Listed as endangered, threatened, rare, or proposed/candidates for listing under the federal Endangered Species Act (ESA) and/or California ESA;
- Designated by California Department of Fish and Wildlife (CDFW) as a species of special concern (SSC);
- Designated by CDFW as fully protected under the California Fish and Game Code (sections 3511, 4700, 5050, and 5515);
- Designated as rare under the California Native Plant Protection Act;
- Included on the CDFW's Special Vascular Plants, Bryophytes, and Lichens List with a California Rare Plant Rank of 1 or 2 (CDFW 2021); and/or
- Considered a locally significant species (i.e., rare or uncommon in the county or region).

Though not defined as special-status, this report also considers Essential Fish Habitat (EFH) (defined for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity"), which is designated for commercially fished species under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) Reauthorization Act (Public Law 104-297).

Natural communities were considered sensitive if they were identified on the most recent CDFW List of Vegetation Alliances and Associations as a California Sensitive Natural Community with a State Rank of 1, 2, or 3 (CDFW 2020g).

2.2 Sources for Species Consideration

To identify state and federally listed plant and animal species potentially affected by the proposed Project, ERM-West, Inc. (ERM) reviewed recent biological assessments prepared for other projects in the vicinity (see Section 2.3 below). In addition, ERM also reviewed the following databases:

- California Natural Diversity Database (CNDDB 2020): species occurrences in the USGS 9 quadrangle areas surrounding the Vine Hill 7.5-minute quadrangle;
- USFWS Information for Planning and Conservation (IPaC) database (USFWS 2020a); species occurrences in the proposed Project area;

- California Native Plant Society Rare Plant Program database (CNPS 2020): species occurrences in the USGS 9 quadrangle areas surrounding the Vine Hill quadrangle; and
- USFWS Critical Habitat for Threatened and Endangered Species database (USFWS 2020b); designated critical habitats for listed species in the proposed Project area.

2.3 Recent Biological Assessments in Project Vicinity

Several other projects in the Project vicinity have recently undergone ESA consultation. Specific biological assessments and/or biological opinions referenced in the preparation of this Biological Technical Report (BTR) include the following:

- *Section 7 Biological Assessment, Avon Marine Terminal Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) Compliance Project, Golden Eagle Refinery, Martinez, Contra Costa County, California* (LSA 2014)
- *Section 7 Biological Assessment, Tesoro Martinez Refinery, Amorco Marine Oil Terminal MOTEMS Audit Repairs and EIR Mitigation Measures Project, Martinez, Contra Costa County, California* (LSA 2016), which referenced the following additional local projects:
  - *Section 7 Biological Assessment, Amorco Marine Terminal MOTEMS Seismic Upgrades Project* (WRA 2011a)
  - *NMFS Biological Opinion on the Amorco Marine Terminal MOTEMS Seismic Upgrades Project* (NMFS 2011)
  - *Section 7 Biological Assessment, Waste Management Units 10/11/14, 31, and 32, Golden Eagle Refinery, Martinez, Contra Costa County, California* (WRA 2012a)
  - *Section 7 Biological Assessment Addendum, Waste Management Units 10/11/14, 31, and 32, Golden Eagle Refinery, Martinez, Contra Costa County, California* (WRA 2013a)
  - *Biological Assessment, Tesoro Waterfront Road Pipelines, Amorco Transfer Lines Pipe Support Repair and Pipeline Demolition Project, Martinez, Contra Costa County, California* (LSA 2013)
  - *USFWS Biological Opinion on the Tesoro Refining and Marketing Company's (Tesoro) Proposed Amorco Pipeline Support Repair and Pipeline Demolition Project, the Avon Remediation Team's (ART) Monitoring Well Installation, and ART's Residual Acid Tar Interim Corrective Action at Waste Management Unit (WMU) 32 at the Tesoro Golden Eagle Refinery along Waterfront Road near the City of Martinez, Contra Costa County, California* (USFWS 2014)

2.4 Site Visit

A site visit was conducted on 8 April 2021 at the three Project locations: Martinez Refinery, Avon Marine Terminal, and Amorco Marine Terminal. Due to the industrial nature of the Martinez Refinery and low suitability as wildlife habitat, portions of the refinery survey were conducted as a windshield assessment. Pedestrian surveys were completed at the pipeline along the eastern boundary of the industrial area of the Martinez Refinery that is bordered by vegetated areas, and at both marine terminals. The biologist identified and verified mapped habitat for special status plants and wildlife, and recorded a list of species observed while conducting the pedestrian survey. Areas not accessible by foot were viewed using binoculars. Representative photographs were taken at each of the Project areas (Appendix A). Records of bird observations posted on eBird (eBird 2021) were reviewed prior to the site visit for any recent sightings of special status birds. No protocol-level surveys were performed during this survey.

Additionally, a protocol-level survey for Ridgway's rail was conducted on seven dates between January 22 and March 31, 2021 (Appendix B).

3. ENVIRONMENTAL BASELINE

3.1 Land Use and Topography

Land use in the general vicinity of the Project area consists of a mix of industrial uses, open water habitats, and open space. Carquinez Strait is a narrow gap in the Coast Range that connects San Pablo Bay to Suisun Bay and the Sacramento-San Joaquin River Delta. Typical river deltas widen from their source into a fan-shaped, sediment-heavy region. The narrow channel in the Carquinez Strait, however, restricts the outflow of flood waters and sediment from the Central Valley to the ocean, causing waters to pool and sediment to slow and settle in the Suisun Bay, resulting in a rare geological feature know as an inverted river delta. Upstream of the strait, the channel depth transitions rapidly from the deep channel of Carquinez Strait into the shallows of Suisun Bay.

The Project area is located within extant, remnant, and former marshlands of the Pacheco Slough delta and lands to the west on the southern shoreline of Suisun Bay (Figures 1 and 2). West of the Refinery, Peyton Slough and McNabney Marsh are altered natural water features. Elevations within much of the Project area would be around mean high water if not for anthropogenic alterations over recent time in the marsh areas. Peyton Hill is a natural upland feature that appears to have been altered in the course of highway construction. Much of the area around the Project area has been filled and drained in various ways, leaving a patchwork of elevated fill surfaces, berms, ditches, and remnant marsh.

3.1.1 Avon Marine Terminal

The total length of the Avon Marine Terminal approachway from its southern terminus (Bent 328 near the refinery) to Berth 1A, is approximately 1 mile. The approachway between Bent 328 and Bent 163 (Land's End) is a distance of approximately 2,900 feet and consists of a roadway constructed on a levee. The roadway and a pedestrian walkway are located to the west of the elevated pipe rack containing pipelines to/from the Refinery to Avon Marine Terminal. Beyond Bent 163, the approachway is a single lane, elevated concrete roadway for vehicle and pedestrian access from Land's End to the Avon Wharf Berth 1A.

Within the southern part of the Avon area, the marsh surface has been partially covered with imported fill to create the maintenance yard at the southern end of the approachway and the various levees that parallel the pipe rack. Marshlands north and west of Land's End are open to tidal action, while areas south of Land's End (including marsh surfaces underneath the pipe rack) are behind levees. An approximately 20-foot-wide topographically elevated area at Land's End prevents tidal action from areas to the south. Some non-tidal areas south of the berm remain subject to occasional seasonal ponding from rainfall. See Appendix A, Photographs 11 and 12.

3.1.2 Amorco Marine Terminal

The Amorco Marine Terminal has a 1,130-foot-long wharf arm connected to the shore by 1,500 feet of approach trestle. The wharf is constructed of wood, concrete, and metal. The wharf has four small buildings on-site, including two buildings for personnel, a pump house, and a tool shed. Lights are placed regularly along the wharf arm and approach trestle, and there is one large light bank under the main loading arm.

Amorco is located within the Suisun Point Channel. Coastal brackish marsh is present along the shoreline between Bulls Head Point to the east and the Martinez Marine to the west of Amorco. Upland areas associated with the marshlands are primarily industrial and developed, with the exception of a small patch of coastal scrub/ruderal vegetation found on the hillside leading up to the Amorco Tank Farm. The channel north of the Amorco Marine Terminal is approximately 4,000 feet wide and is bordered by the Port of Benicia and Valero's Benicia Refinery.

3.2 Vegetation or Cover Types

Vegetation or cover types with the Project area are generally categorized as open water, marsh, ruderal upland, and developed.

3.2.1 Avon Marine Terminal

This Project area is within Open Water, Marsh, Ruderal Upland, and Developed habitat types, as depicted in Figure 3 and described below.

Open Water. The Avon wharf and the pipeline extending to the southeast from the wharf are located within Deep Bay habitat (SFEI 2017). The pipeline extends southeast through an area surveyed by LSA Associates, Inc. (LSA), which is mapped as Non-Wetland Waters, and continues through un-vegetated Suisun Bay mudflats.

***Marsh*.** The pipeline extends in a southeasterly direction through relatively undisturbed Brackish Marsh habitat, as mapped by LSA. Based on aerial photography and former reports, LSA concluded that the cover in this marsh was predominantly alkali bulrush (*Bolboschoenus maritimus*) until a few years ago, but common reed (*Phragmites australis*) is now the dominant cover along the high tide line and is spreading south into the marsh. Fat-hen (*Atriplex prostrata*), pickleweed (*Salicornia pacifica*), and jaumea (*Jaumea carnosa*) are also common but do not cover any significant expanses.

Plant species composition of marsh areas along the pipeline and inland of the levees are more variable depending on their elevations. Lower elevations subject to occasional ponding with rainwater support a more freshwater-influenced mix of emergent marsh plants, including bulrush (*Schoenoplectus americana* and *S. californica*) and cattail (*Typha* sp.). Higher and consequently drier elevations support high marsh species such as salt grass (*Distichlis spicata*) and fat-hen interspersed with small stands of pickleweed. An elevated berm that runs below the length of the existing approachway also supports dense stands of invasive ruderal species such as perennial pepperweed (*Lepidium latifolium*) and bristly ox-tongue (*Helminthotheca echioides*). An open area east of the pipeline is dominated by salt grass but is also thickly covered in parts by stinkwort (*Dittrichia graveolens*), an invasive non-native herb.

***Ruderal and Shrub Upland*.** The pipeline continues southeast through upland vegetation characterized by ruderal (i.e., weedy) species that readily colonize disturbed sites. Dominant woody species include coyote brush (*Baccharis pilularis*) intermixed with both planted and naturalized olive (*Olea europea*) and Canary Island date palm trees. Thickets of California rose (*Rosa californica*) and non-native Himalayan blackberry (*Rubus armeniacus*) are common. Herbaceous cover is often dominated by the invasive non-native perennial pepperweed, along with marsh gumplant (*Grindelia stricta* var. *angustifolia*), rush (*Juncus balticus*), and bristly ox-tongue. There is also an area mapped by LSA as “NonJD Wasterwater Treatment” located to the east of the pipeline in the same area as the upland habitat.

Developed. The pipeline extends southeast from the marsh and ruderal uplands into developed areas of the refinery, which include unvegetated dirt roads and paved roads and surfaces. These areas support sparse non-native, invasive type plant species including blue gum eucalyptus (*Eucalyptus globulus*), black mustard (*Brassica nigra*), and sweet fennel (*Foeniculum vulgare*).

3.2.2 Amorco Marine Terminal

This Project area is within Open Water habitat type, as depicted in Figure 4 and described below. There are a few minor components that will be upgraded as part of the Proposed Project that are located within the developed areas of the terminal on land; however, these areas are paved and developed and provide no habitat for special status species.

Open Water. The Amorco wharf is located within the Carquinez straight in open water. The Amorco wharf is located within Shallow Bay and Bay Flat habitat (SFEI 2017).

Developed. The portion of the Amorco Marine Terminal onshore is characterized by unvegetated dirt roads and paved roads and surfaces. These areas support sparse non-native, invasive type plant species including oleander (*Nerium oleander*) and tobacco tree (*Nicotiana glauca*).

3.3 Wildlife

Wildlife species known or expected to occur in the study area include tidal marsh and/or freshwater wetland obligates, as well as generalists that have adapted to human-modified landscapes throughout the San Francisco Bay Area. Common wildlife species known or expected to occur in each vegetation or cover type are briefly discussed below.

***Open Water*.** Open water habitat within the study area includes the open estuarine waters of Suisun Bay and associated tidal channels extending into the marsh, the Carquinez Strait, the eastern edge of the Bio-Oxidation Pond, and freshwater wastewater treatment features (i.e., pond next to Bioassay Lab and Clean Canal). Suisun Bay supports numerous native fish species and provides foraging and loafing habitat for various species of ducks, gulls, terns, cormorants, and other waterbirds. Diving ducks, such as greater scaup (*Aythya marila*) and ruddy duck (*Oxyura jamaicensis*), are likely to forage in the waters adjacent to Avon Marine Terminal. Dabbling ducks, such as mallard (*Anas platyrhynchos*), American wigeon (*Anas Americana*), and green-winged teal (*Anas crecca*), are likely to forage within the marsh and water treatment features.

***Marsh*.** Marsh within the study area provides high-quality habitat for a variety of bird species including great egret (*Ardea alba*), snowy egret (*Egretta thula*), northern harrier (*Circus cyaneus*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), marsh wren (*Cistothorus palustris*), salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), Suisun song sparrow (*Melospiza melodia maxillaris*), and red-winged blackbird (*Agelaius phoeniceus*). The high saline content and regular inundation of brackish marsh precludes regular use by amphibians, reptiles, and mammals, but species from these taxa that use adjacent uplands and developed areas (see below) likely forage in the marsh on an incidental basis. Common bat species, such as big brown bat (*Eptesicus fuscus*) and Brazilian free-tailed bat (*Tadarida brasiliensis*), likely forage over the marsh at night.

***Ruderal and Shrub Uplands*.** The dense shrub cover and scattered trees growing on the levees and berms within the study area provide nesting and foraging habitat for bird species, such as white-tailed kite (*Elanus leucurus*), red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), western scrub-jay (*Aphelocoma californica*), and northern mockingbird (*Mimus polyglottos*). Exposed concrete rubble or other hard surfaces provide basking habitat for western fence lizards (*Sceloporus occidentalis*) and the dense shrub cover may support common amphibians and reptiles, such as Sierran treefrog (*Pseudacris sierra*), common garter snake (*Thamnophis sirtalis*), and gopher snake (*Thamnophis sirtalis*). Mammal species expected to occur in scrub and levee slopes include California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), northern raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*) as well as the non-native Norway rat (*Rattus norvegicus*) and house mouse (*Mus musculus*).

Developed. The barren roads, road margins, and dirt parking lots within the study area provide nesting habitat for killdeer (*Charadrius vociferous*). The various structures and infrastructure (e.g., light poles, wires, pipelines, and steel tanks) provide perch and nest sites for common birds, such as black phoebe (*Sayornis nigricans*), house finch (*Haemorhous mexicanus*), and cliff swallow (*Petrochelidon pyrrhonota*). Western fence lizards likely use exposed road beds, concrete areas, and other human-constructed hard surfaces. Most of the same mammal species mentioned above under ruderal and shrub uplands also forage and move through developed portions of the study area.

Avon Marine Terminal

Bent 68

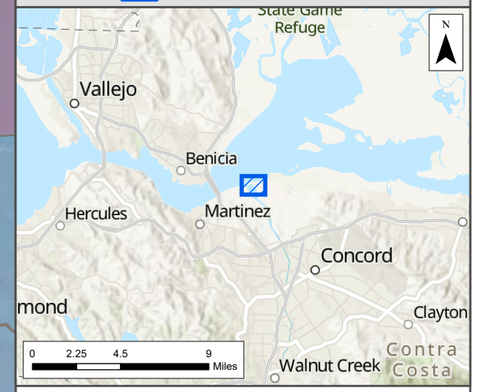
Bent 163

Bent 328

Martinez Refinery

Source: San Francisco Estuary Institute (SFEI)

DETAIL AREA



- Bent Location
- Existing Pipeline (Work Location)

LSA Survey Data

- Brackish Marsh
- Non-Wetland Waters
- NonJD Wastewater Treatment
- Upland

California Aquatic Resource Inventory (from SFEI)

- Bay Flat
- Deep Bay
- Lagoon
- Marsh
- Marsh Flat
- Panne
- Shallow Bay
- Shrub Upland*
- Tidal Unnatural

*Field-mapped non-aquatic habitat

N

0 250 500 1,000 Feet

Figure 3
Avon Marine Terminal Habitat and Vegetation

Sheet 1 of 1

Marathon Martinez Refinery
150 Solano Way
Martinez, CA 94553

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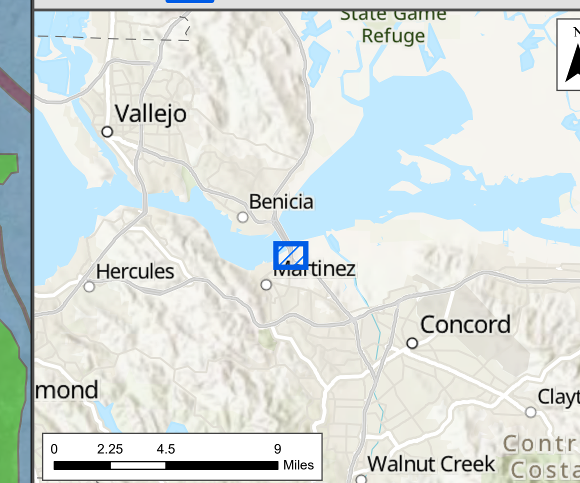
DETAIL AREA



- Dolphin Work Locations

California Aquatic Resources Inventory (from SFEI)

- Bay Flat
- Deep Bay
- Lagoon
- Marsh
- Marsh Flat
- Panne
- Shallow Bay
- Tidal Unnatural

N

0 250 500 1,000
Feet

Figure 4
Amorco Marine Terminal
Habitat and Vegetation

Sheet 1 of 1

Marathon Martinez Refinery
150 Solano Way
Martinez, CA 94553

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FILE: C:\Users\gordon.li\Documents\OneDrive - ERM\Documents\Marathon Refinery\GIS\aprx\Marathon_Bio Figure 4 Amorco Veg.aprx, REVISED: 04/27/2021 , SCALE: 1:6,000 when printed at 11x17

3.4 Site Visit Observations

3.4.1 Plants and Wildlife

Plant and wildlife species observed during the 8 April 2021 site visit are provided in Table 1. No special status plant species were observed. No Ridgway's rails were detected during the protocol-level surveys. However, other species detected during those surveys are included in Table 1.

Table 1: Plant and Wildlife Species Observed During Site Visit

Common Name	Scientific Name	Status[1]
Plants		
Black mustard	*Brassica nigra*	Not ranked
California bulrush	*Schoenoplectus californicus*	Not ranked
Common reed	*Phragmites australis*	Not ranked
Blue elderberry	*Sambucus nigra*	Not ranked
Blue gum eucalyptus	*Eucalyptus globulus*	Not ranked
Bristly ox-tongue	*Helminthotheca echioides*	Not ranked
Cardoon	*Cynara cardunculus*	Not ranked
Coyote bush	*Baccharis pilularis*	Not ranked
Giant reed	*Arundo donax*	Not ranked
Fat-hen	*Atriplex prostrata*	Not ranked
Himalayan blackberry	*Rubus armeniacus*	Not ranked
Hottentot fig	*Carpobrotus edulis*	Not ranked
Jaumea	*Jaumea carnosa*	Not ranked
Narrowleaf cattail	*Typha angustifolia*	Not ranked
Pampas grass	*Cortaderia selloana*	Not ranked
Perennial pepperweed	*Lepidium latifolium*	Not ranked
Pickleweed	*Salicornia pacifica*	Not ranked
Russian olive	*Olea europaea*	Not ranked
Salt grass	*Distichlis spicata*	Not ranked
Sweet fennel	*Foeniculum vulgare*	Not ranked
Stinkwort	*Dittrichia graveolens*	Not ranked
Water hemlock	*Cicuta maculata*	Not ranked
Birds		
American coot	*Fulica americana*	MBTA
American white pelican	*Pelecanus erythrorhynchos*	SSC
California black rail	*Laterallus jamaicensis coturniculus*	ST
Cliff swallow	*Petrochelidon pyrrhonota*	MBTA
Common raven	*Corvus corax*	MBTA
European starling	*Sturnus vulgaris*	Not protected
Great blue heron	*Ardea herodias*	MBTA
Great egret	*Ardea alba*	MBTA
Mallard	*Anas platyrhynchos*	MBTA
Mourning dove	*Zenaida macroura*	MBTA
Northern harrier	*Circus cyaneus*	SSC
Northern mockingbird	*Mimus polyglottos*	MBTA

Common Name	Scientific Name	Status[1]
Northern shoveler	*Spatula clypeata*	MBTA
Osprey	*Pandion haliaetus*	MBTA
Purple finch	*Haemorhous purpureus*	MBTA
Red-tailed hawk	*Buteo jamaicensis*	MBTA
Red-winged blackbird	*Agelaius phoeniceus*	Not listed
Salt marsh common yellowthroat	*Geothlypis trichas sinuosa*	SSC
San Francisco common yellowthroat	*Geothlypis trichas sinuosa*	SSC
Short-eared owl	*Asio flammeus*	SSC
Sora	*Porzana carolina*	MBTA
Suisun song sparrow	*Melospiza melodia maxillaris*	SSC
Tricolored blackbird	*Agelaius tricolor*	ST
Turkey vulture	*Cathartes aura*	MBTA
Virginia rail	*Rallus limicola*	MBTA
White-tailed kite	*Elanus leucurus*	FP

[1] FP = California Fully Protected, MBTA = Migratory Bird Treaty Act, SSC = California Species of Special Concern, ST = California Threatened

Bird nesting activity was observed at three locations during the April site visit. A cliff swallow colony was present at one of the steel holding tanks at the north end of the Martinez Refinery (38.036843°, -122.077805°). A red-tailed hawk nest with an incubating adult was observed within the Martinez Refinery. The nest is in a mature eucalyptus tree along Solano Way (Appendix A, Photograph 13; 38.030146°, -122.071705°). An osprey nest with an incubating adult was observed at the Amorco Marine Terminal at the top of a structure (Appendix A, Photograph 14; 38.035654°, -122.123077°).

Soras were detected during the Ridgway's rail surveys at every survey point on the west side of the Avon Wharf. They were foraging, calling, swimming, and defending territories. While this species is not listed by state or federal agencies, the high concentration in a single location is notable.

3.4.2 Vegetation and Cover Types

Detailed vegetation mapping was completed in 2014 for a prior project in the area directly beneath the pipeline from the Avon Marine Terminal to the refinery and included a 200-foot buffer. Observations during the 8 April 2021 site visit included verification of the habitat mapped directly beneath the pipeline; no notable changes in vegetation or cover type were identified.

Habitats mapped in the California Aquatic Resources Inventory were also field-verified. Non-paved areas northeast of the Martinez Refinery were mapped during the site visit. Habitats present in the Project area include open water, estuarine emergent wetland (saltmarsh), shrub upland, ruderal, and developed. Paved areas within the refinery were not mapped.

4. SPECIES ACCOUNTS

ERM developed a list of 126 federal and state-listed threatened and endangered species and California state-listed SSC that occur or potentially occur in the Project vicinity. Based on a review of the distribution and habitat requirements of these species and the habitat conditions within the Project area, ERM determined that 92 of these species will not be affected by the proposed Project. These 92 species are included in Appendix C with a brief analysis for the reason each is not expected to be affected by the Project or occur within the Project area.

The remaining 34 species with potential to occur in the Project vicinity are presented in Table 2. Figures 5 and 6 depict the CNDDB occurrences for Avon and Amorco, respectively. Using information generated from literature reviews, the list of special-status species with the potential to occur was further refined to reflect the species that may occur within the Project area. The likelihood of special-status species occurrence was determined based on natural history parameters, including but not limited to, the species' range, habitat, foraging needs, migration routes, and reproductive requirements, using the following general categories:

- *Present* – Reconnaissance-level, focused, or protocol-level surveys documented the occurrence or observation of a species in the Project area.
- *Seasonally present* – Individuals were observed in the Project area, but are only present in the area during certain times of the year.
- *Likely to occur (on site)* – The species has a strong likelihood to be found in the Project area prior to or during construction but has not been directly observed to date during project surveys. The likelihood that a species may occur is based on the following considerations: suitable habitat that meets the life history requirements of the species is present on or near the Project area; migration routes or corridors are near or within the Project area; records of sighting are documented on or near the Project area; and there is an absence of invasive predators. The main assumption is that records of occurrence have been documented within or near the Project area, the Project area falls within the range of the species, suitable habitat is present, but it is undetermined whether the habitat is currently occupied.
- *Potential to occur* – There is a possibility that the species can be found in the Project area prior to or during construction, but has not been directly observed to date. The likelihood that a species may occur is based on the following conditions: suitable habitat that meets the life history requirements of the species is present on or near the Project area; migration routes or corridors are near or within the Project area; and there is an absence of invasive predators. The main assumption is that the project area falls within the range of the species, suitable habitat is present, but no records of sighting are located within or near the project area and it is undetermined whether the habitat is currently occupied.
- *Unlikely to occur* – The species is not likely to occur in the Project area based on the following considerations: lack of suitable habitat and features that are required to satisfy the life history requirements of the species (e.g., absence of foraging habitat; lack of reproductive areas, and lack of sheltering areas); presence of barriers to migration/dispersal; presence of predators or invasive species that inhibit survival or occupation (e.g., the presence of bullfrogs or invasive fishes); lack of hibernacula, hibernation areas, or estivation areas on site.
- *Absent* – Suitable habitat does not exist in the Project area, the species is restricted to or known to be present only within a specific area outside of the Project area, or focused or protocol-level surveys did not detect the species.

Table 2: Federally and State-listed Species of Special Concern With Potential to Occur at the Project Area

Common Name	Scientific Name	Status[1]	Potential for Species to Occur in the Project Area	Species with Potential to Occur by Location	
				Avon	Amorco
Plants					
Soft bird's-beak	*Chloropyron molle* ssp. *molle* (formerly *Cordylanthus mollis* ssp. *mollis*)	FE, 1B	Potential to occur. Brackish marsh habitat present.	☒	☐
Bolander's water-hemlock	*Cicuta maculata* var. *bolanderi*	2B	Likely to occur. Brackish marsh habitat present.	☒	☐
San Joaquin spear scale	*Triplex joaquinana*	1B	Potential to occur. Brackish marsh habitat present.	☒	☐
Coulter's goldfields	*Lasthenia glabrata ssp. Coulteri*	1B	Likely to occur. Brackish marsh habitat present.	☒	☐
Delta tule pea	*Lathyrus jepsonii*	1B	Likely to occur. Brackish marsh habitat present.	☒	☐
Mason's lilaeopsis	*Lilaeopsis masonii*	1B	Likely to occur. Brackish marsh habitat present.	☒	☐
Delta mudwort	*Limosella australis*	2B	Likely to occur. Brackish marsh habitat present.	☒	☐
Suisun Marsh aster	*Symphiotrichum lentum*	1B	Likely to occur. Brackish marsh habitat present.	☒	☐
Saline clover	*Trifolium hydrophilum*	1B	Potential to occur. Brackish marsh habitat present.	☒	☐
Fish					
Green sturgeon (southern DPS[2])	*Acipenser medirostris*	FT, CH	Likely to occur. Known to migrate through Suisun Bay, may occur in open water habitat within Project area.	☒	☒
White sturgeon	*Acipenser transmontanus*	SSC	Likely to occur. Known to migrate through Carquinez Strait, may occur in waters within Project area.	☒	☒
Pacific lamprey	*Entosphenus tridentatus*	SSC	Likely to occur. Range includes Carquinez Strait in brackish water marshes. May occur in open water habitat within Project area.	☒	☒
Delta smelt	*Hypomesus transpacificus*	FT, SE, CH	Potential to occur. Open water habitat and tidal channels present.	☒	☒
Western river lamprey	*Lampetra ayresii*	SSC	Likely to occur. Known to migrate through Carquinez Strait, may occur in open water habitat within Project area.	☒	☒
Steelhead (California Central Valley DPS)	*Oncorhynchus mykiss* irideus pop. 8	FT	Seasonally present. Known to migrate through Suisun Bay, may occur in open water habitat within Project area.	☒	☒
Steelhead (Central California Coast DPS)	*Oncorhynchus mykiss* pop. 9	FT	Seasonally present. Known to migrate through Suisun Bay, may occur in open water habitat within Project area.	☒	☒

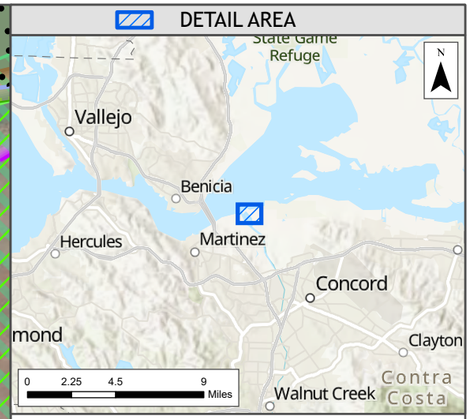
Common Name	Scientific Name	Status[1]	Potential for Species to Occur in the Project Area	Species with Potential to Occur by Location	
				Avon	Amorco
Chinook salmon (Central Valley fall/late fall-run ESU[3]	*Oncorhynchus tshawytscha* pop. 13	SSC	Seasonally present. Known to migrate through Carquinez Strait, may occur in open water habitat within Project area.	☒	☒
Chinook salmon (Central Valley spring-run ESU)	*Oncorhynchus tshawytscha* pop. 6	FT, ST	Seasonally present. Known to migrate through Suisun Bay, may occur in open water habitat within Project area.	☒	☒
Chinook salmon (Sacramento River winter-run ESU)	*Oncorhynchus tshawytscha* pop. 7	FE, SE	Seasonally present. Known to migrate through Suisun Bay, may occur in open water habitat within Project area.	☒	☒
Sacramento splittail	*Pogonichthys macrolepidotus*	SSC	Potential to occur. Range includes Carquinez Strait in brackish water marshes. May occur in open water habitat within Project area.	☒	☒
Longfin smelt	*Spirinchus thaleichthys*	ST	Likely to occur. May occur in open water habitat within Project area.	☒	☒
Amphibians and Reptiles					
Western pond turtle	*Actinemys marmorata*	SSC	Unlikely to occur. May occur but unlikely to occur in brackish habitat present in Project area.	☐	☐
Birds					
Tricolored blackbird	*Agelaius tricolor*	ST, SSC	Present. Occur in tidal/brackish marsh within Project area.	☒	☐
Short-eared owl	*Asio flammeus*	SSC	Present. Occur in tidal/brackish marsh within Project area.	☒	☐
Northern harrier	*Circus hudsonius*	SSC	Present. Observed in tidal/brackish marsh within Project area.	☒	☐
White-tailed kite	*Elanus leucurus*	FP	Present. Occur in tidal/brackish marsh within Project area.	☒	☐
Salt marsh common yellowthroat	*Geothlypis trichas sinuosa*	SSC	Present. Occur in tidal/brackish marsh within Project area.	☒	☐
California black rail	*Laterallus jamaicensus coturniculus*	ST, SSC	Present. Occur in tidal/brackish marsh within Project area.	☒	☐
Suisun song sparrow	*Melospiza melodia maxillaris*	SSC	Present. Occur in tidal/brackish marsh within Project area.	☒	☐
San Pablo song sparrow	*Melospiza melodia samuelis*	SSC	Potential to occur. Known to occur in tidal/brackish marsh within Project area.	☒	☐
American white pelican	*Pelecanus erythrorhynchos*	SSC	Present. Known to forage and rest in coastal bay habitats such as those present in the Project area.	☒	☒
Ridgway's (formerly California clapper) rail	*Rallus obsoletus*	FE, SE, FP	Potential to occur. May occur in tidal/brackish marsh within Project area.	☒	☐

Common Name	Scientific Name	Status[1]	Potential for Species to Occur in the Project Area	Species with Potential to Occur by Location	
				Avon	Amorco
Mammals					
Salt marsh harvest mouse	*Reithrodontomys raviventris*	FE, SE, FP	Potential to occur. May occur in tidal/brackish marsh within Project area.	☒	☐
Suisun shrew	*Sorex ornatus sinuosus*	SSC	Potential to occur. May occur in tidal/brackish marsh within Project area.	☒	☒
Marine Mammals					
Gray whale	*Eschrichtius robustus*	FE, MMPA	Unlikely to occur. Species occasionally enter the Central Bay but unlikely to occur within Project area.	☐	☐
Humpback whale	*Megaptera novaeangliae*	FE, MMPA	Unlikely to occur. Species occasionally enter the Central Bay but unlikely to occur within Project area.	☐	☐
Harbor porpoise	*Phocoena phocoena*	MMPA	Unlikely to occur. Species occasionally enter the Central Bay but unlikely to occur within Project area.	☐	☐
Harbor seal	*Phoca vitulina*	MMPA	Potential to occur. May occur as far upstream as Suisun Bay.	☒	☒
California sea lion	*Zalophus californianus*	MMPA	Potential to occur. May occur as far upstream as Suisun Bay.	☒	☒

[1] FE = federally endangered, FT = federally threatened, CH = critical habitat designated, ST = California state threatened, SE = California state endangered, SSC = California species of special concern, FP = California protected species, 1B = California endangered or threatened, 2B = CA endangered or threated, common elsewhere, MMPA = Oher Status, Protected under the Marine Mammal Protection Act

[2] DPS = distinct population segment

[3] ESU = evolutionary significant unit



- Bent Location
- Existing Pipeline (Work Location)

NOAA Critical Habitat (Polygons)
- Delta smelt
- Green sturgeon

NOAA Critical Habitat (Lines)
- Steelhead

California Natural Diversity Database
- California Ridgway's rail
- California black rail
- Delta tule pea
- Mason's lilaeopsis
- Suisun Marsh aster
- Suisun song sparrow
- Longfin smelt
- Salt-marsh harvest mouse
- Saltmarsh common yellowthroat

Note: NOAA Critical Habitat Steelhead occurs throughout the bay waterway.

N

0 250 500 1,000 Feet

Figure 5
Avon Marine Terminal Critical Habitat and CNDDB

Sheet 1 of 1

Marathon Martinez Refinery
150 Solano Way
Martinez, CA 94553

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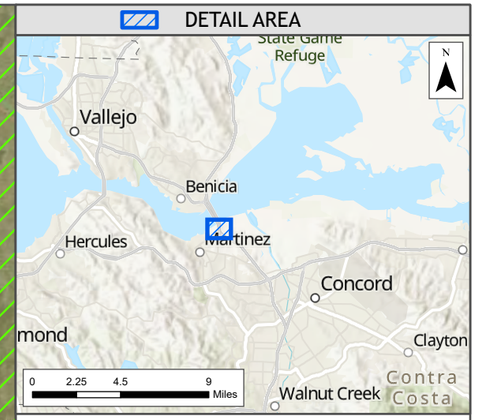

NOAA Critical Habitat (Polygons)
- Delta smelt
- Green sturgeon

California Natural Diversity Database
- California black rail
- Longfin smelt
- Salt-marsh harvest mouse

Note: NOAA Critical Habitat Steelhead occurs throughout the bay waterway.

N

0 250 500 1,000
Feet

Figure 6
Amorco Marine Terminal Critical Habitat and CNDDB

Sheet 1 of 1

Marathon Martinez Refinery
150 Solano Way
Martinez, CA 94553

Environmental Resources Management
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4.1 Plants

4.1.1 Soft Bird's Beak

Status and Biology. Soft bird's-beak was federally listed as endangered on 20 November 1997 (62 Federal Register [FR] 61916) and State-listed as rare in July 1979. Critical habitat was designated for this species on 12 April 2007 (72 FR 18517). Soft bird's-beak is an annual, 4- to 16-inch-tall annual herb in the Orobanchaceae (broomrape) family. Soft bird's-beak blooms from July through November, depending on environmental conditions (USFWS 2013).

Soft bird's-beak is restricted to tidal marshes in San Pablo and Suisun Bays (USFWS 2013), where it occurs in the high marsh or upper middle marsh zones (Peinado et al. 1994). Only the Point Pinole population of soft bird's-beak occurs where freshwater influence is absent, while all other populations occur in brackish conditions (USFWS 2013). The plant is associated with pickleweed, salt grass, fleshy or marsh jaumea, alkali heath (*Frankenia salina*), and seaside arrowgrass (*Triglochin maritime*). Soft bird's-beak occurs on peaty clay soils or mineral sediments (Ruygt 1994). It tends to colonize areas where the density of their host plant thins due to disturbance or other causes, allowing soft bird's-beak to compete as seedlings for light. Suitable areas include edges of host plant stands, where plant density thins, including edges of salt pannes (Ruygt 1994). Rapid invasion of tidal brackish marsh by perennial pepperweed is a known threat to the persistence of soft bird's-beak colonies.

Potential for Occurrence: Potential to Occur. This species is known from fewer than 15 extant occurrences (CNPS 2020). The closest extant occurrence to the study area is a 2005 specific area record within the Concord Naval Weapons Station, approximately 1.5 miles to the east

Within the Project area, patches of low-growing transitional marsh species, including the host species pickleweed, salt grass, and jaumea, provide the best-quality habitat for soft bird's-beak. Areas dominated by brackish marsh species, such as western goldenrod (*Euthamia occidentalis*), saltmarsh fleabane (*Pluchea odorata*), alkali bulrush, bulrush, common reed, and cattail, do not provide habitat for the species due to the tall vegetation height and associated shading. There is one mapped CNDDB occurrence that overlaps with the Amorco area (Figure 6); this occurrence is listed as extirpated. Despite the presence of the primary host plants for soft bird's-beak, the species is currently absent from the Project area based on the results of a focused survey conducted by LSA in 2020 (LSA 2014a). To ensure proper survey timing, LSA confirmed blooming at a known reference soft bird's-beak population at Point Pinole Regional Shoreline (Richmond, Contra Costa County) in August 2020. An additional field survey will be conducted each year prior to construction to verify its absence.

1.1.1 Bolander's Water-hemlock

Status and Biology. Bolander's water-hemlock is a California state-listed rare species. It is a perennial herb in the Apiaceae (Carrot) family and blooms between July and September. Bolander's water-hemlock occurs in fresh or brackish water, within coastal marsh and swamp habitats in coastal salt marsh and wetland-riparian communities (CNPS 2020).

Potential for Occurrence: Likely to Occur. There is a CNDDB mapped occurrence of this species located on the shore approximately 2,000 feet east of the Amorco Wharf (Figure 6). The brackish marsh located within the Project area provides suitable habitat for Bolander's water-hemlock. This species is likely to occur at Avon.

4.1.2 San Joaquin spearscale

Status and Biology. San Joaquin spearscale is a California state-listed rare species. It is an annual herb in family Chenopodiaceae with a blooming period of April through October. San Joaquin spearscale is endemic to California and typically inhabits alkali grasslands and meadows or the margins of alkali scrub. It occasionally occurs in wetlands (CNPS 2020).

Potential for Occurrence: Potential to Occur. San Joaquin spearscale can occur in wetland habitats, which are present within the Project area. This species has potential to occur at Avon.

4.1.3 Coulter's Goldfields

Status and Biology. Coulter's goldfields is a California state-listed rare species. It is an annual herb in the Apiaceae family and blooms between February and June. Coulter's goldfields inhabits coastal salt marshes and swamps, playas, and vernal pools in coastal salt marsh and wetland-riparian communities (CNPS 2020).

Potential for Occurrence: Likely to Occur. The brackish marsh located within the Project area provides suitable habitat for Coulter's goldfields. This species is likely to occur at Avon.

4.1.4 Delta Tule Pea

Status and Biology. Delta tule pea is a California state-listed rare species. It is a perennial herb in the family Fabaceae with a blooming period of May through July/September. Delta tule pea is endemic to California where it grows in a number of habitat types including forest and estuary. It is found mainly in the Sacrament-San Joaquin River Delta on brackish and freshwater marsh and slough edges. It can take root in these habitats and climb to adjacent upland and riparian areas. Delta tule pea depends on a cycle of flooded and dry periods in freshwater or brackish wetlands and can bloom as late as September depending on environmental conditions (NBHCP 2020).

Potential for Occurrence: Likely to Occur. There are CNDDB mapped occurrences of the Delta tule pea approximately 500 feet east of the Avon pipeline (Figure 5).The brackish marsh and slough edges located within the Project area provide suitable habitat for delta tule pea, and are within its primary range of the Sacramento-San Joaquin River Delta. This species is likely to occur at Avon within the Project area.

4.1.5 Mason's Lilaeopsis

Status and Biology. Mason's Lilaeopsis is a California state-listed rare species. Mason's Lilaeopsis is a small perennial herb in the Apiaceae (Carrot) family and blooms between April and November. It is endemic to California and present only in the Sacramento-San Joaquin River Delta and shores of the San Francisco and Suisun Bays. It inhabits freshwater and brackish marshes and other estuary habitat (CNPS 2020).

Potential for Occurrence: Likely to Occur. There is a CNDDB mapped occurrence of this species approximately 800 feet west of the Avon pipeline (Figure 5). Mason's Lilaeopsis is restricted to the estuarine and brackish marsh habitat on the shores of San Francisco and Suisun Bays. The brackish marsh habitat located within the Project area provides suitable habitat and this species is likely to occur at Avon.

4.1.6 Delta Mudwort

Status and Biology. Delta mudwort is California state-listed rare species. It is a perennial herb with a blooming period of May through August. The Delta mudwort usually inhabits mud banks, freshwater or brackish marshes and swamps, and riparian scrub.

Potential for Occurrence: Likely to Occur. The brackish marsh habitat located within the Project area provides suitable habitat for this species and it is likely to occur at Avon.

4.1.7 Suisun Marsh Aster

Status and Biology. Suisun Marsh aster is a California state-listed rare species and federal SSC. It is a perennial herb in the Asteraceae family with a blooming period from April/May to November. Suisun Marsh aster occurs in freshwater-marsh and brackish-marsh habitats limited to Suisun Bay and

Sacramento-San Joaquin River delta (CNPS 2020). There are CNDDB mapped occurrences of the species to the west of the Avon pipeline (Figure 5).

Potential for Occurrence: Likely to Occur. Suisun marsh aster exclusively inhabits the freshwater and brackish marsh habitats along Suisun Bay. The brackish marsh habitat located within the Project area provides suitable habitat and this species is likely to occur at Avon.

4.1.8 Saline Clover

Status and Biology. Saline clover is a California state-listed rare species. It is an annual herb in family Fabaceae (Legume family) with a blooming period from April to June. Saline clover is endemic to central coastal California and inhabits brackish marshes, vernal pools and alkaline soils in valley and foothill grasslands (CNPS 2020).

Potential for Occurrence: Potential to Occur. The brackish marsh habitat located within the Project area provides suitable habitat and this species has potential to occur at Avon.

4.2 Fish

4.2.1 Green Sturgeon – Southern Distinct Population Segment

Status and Biology. The green sturgeon is comprised of two federally identified distinct population segments (DPSs): the northern DPS and the southern DPS. The northern DPS spawns in the Klamath River, California and Rouge River, Oregon. This DPS is not federally listed (CDFW 2020d). The southern DPS spawns in the Sacramento, Yuba, and Feather Rivers and primarily resides in the Sacramento and San Joaquin Delta. In addition, southern DPS green sturgeon were also identified in the Stanislaus River, which may indicate spawning in the San Joaquin River system (CDFW 2020d). The southern DPS green sturgeon was federally listed as threatened on 7 April 2006 (71 FR 17757), which took effect on 6 June 2006 (NOAA Fisheries 2020d).

Critical habitat for the southern DPS green sturgeon was designated by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) on 9 October 2009 (74 FR 52300) and took effect on 9 November 2009. This designation includes all waters of San Francisco Bay Estuary and the Sacramento/San Joaquin Delta, which includes the proposed Project area (NOAA Fisheries 2020d).

The green sturgeon spends more time in the marine environment than other sturgeon species, with the majority of their time spent in coastal or offshore waters. However, this species frequently enters estuaries and bays, such as the San Francisco Bay Estuary, to feed during the summer (CDFW 2020d). Adults and juveniles are benthic feeders, with juveniles in the San Francisco Bay Estuary known to feed on opossum shrimp (*Neomysis mercedis*) and amphipods (*Corophium sp*.) (Radtke 1966, cited in Moyle 2002).

Until maturity, green sturgeon will spend summer in bays or brackish water areas feeding, then migrate to marine habitats for the remainder of the year. Once mature, which occurs at approximately 15 years of age, green sturgeon will migrate from the marine environment to freshwater river systems to spawn. Migration into the freshwater system for the southern DPS occurs from mid-February through early May and some individuals leave directly after spawning while others will spend the summer in the freshwater system and migrate downstream in autumn (CDFW 2020d; NOAA Fisheries 2020d). Spawning occurs in deep, fast, cool waters in the upper Sacramento, Yuba, and Feather Rivers and after hatching will spend approximately one year migrating down to the Sacramento/San Joaquin River Delta and estuary. Juveniles then spend an additional few years rearing in the delta or estuary before dispersing to saltwater (Beamesderfer and Webb 2002; CDFW 2020d; NOAA Fisheries 2020d).

Potential for Occurrence: Likely to Occur. The open waters of Carquinez Strait serve as a green sturgeon migratory corridor between the Pacific Ocean and upstream spawning habitat in Sacramento and, potentially, San Joaquin River systems. In addition, the areas near the Project area may provide

foraging habitat for adult and juvenile green sturgeon (NMFS 2011). Additionally, all waters of the San Francisco Bay Estuary and the Sacramento/San Joaquin Delta, including the Project area, are critical habitat for this species, as depicted on Figures 5 and 6). The open waters within and adjacent to the Project area at Avon and Amorco provide migratory and possibly rearing/foraging habitat for this species throughout the year and it is likely to occur at the Project area.

4.2.2 White Sturgeon

Status and Biology. The white sturgeon is not a federal or state listed species; however, the species is a California SSC and therefore should be considered in the proposed Project BTR (CDFW 2020e). This species is primarily an estuary and river resident of the North America west coast, found in the Sacramento/San Joaquin River system (California), the Columbia River system (Oregon and Washington), and the Fraser River system (British Columbia). Other small populations of this species may be found in rivers along the west coast, but spawning had not been documented and therefore it is unknown if these are reproducing populations (CDFW 2020e).

White sturgeon mature at approximately 10 to 16 years of age and males are able to spawn every 2 years following maturity while females spawn every 2 to 4 years following maturity. Before maturation, white sturgeon spend their time in the San Francisco Bay Estuary, with some individuals spending small portions of their time in coastal waters outside the estuary (CDFW 2020e). After maturity, adult white sturgeon will migrate into the freshwater river system in winter and spawn from February through June. After spawning, adults return to the San Francisco Bay Estuary while juveniles spend approximately one year migrating downstream to the estuary (CDFW 2020e).

Potential for Occurrence: Likely to Occur. The open waters of Carquinez Strait serve as a white sturgeon migratory corridor between the San Francisco Bay Estuary and upstream spawning habitats in the Sacramento/San Joaquin River system. In addition, the areas near the Project site may provide foraging habitat for adult and juvenile white sturgeon (CDFW 2020e). Therefore, the open waters within and adjacent to the Project area at Avon and Amorco provide migratory and possibly rearing/foraging habitat for this species throughout the year and it is likely to occur at the Project area.

4.2.3 Pacific Lamprey

Status and Biology. The Pacific lamprey is both a California SSC and a USFWS Species of Concern, but is not federally or state listed. It has been determined that listing this species is not currently warranted because the lamprey still occupies much of its native range, just at reduced population numbers (CDFW 2020f).

Historically, the Pacific lamprey was thought to be found wherever salmon and steelhead were found, with all three fishes having similar life histories. Since research has begun into the distribution of this species, it has been identified in the Sacramento/San Joaquin River system, the Eel River, the Klamath/Trinity River system, the Columbia River, and the Fraser River along the west coast of North America, below passage barriers (Streif 2007).

Pacific lampreys spend approximately 1 to 3 years in the Pacific Ocean maturing to adults. During that time, they can be found as far as 62 miles from shore and in depths up to 2,600 feet, parasitizing various fish species (Streif 2007). Following this maturation period, adult Pacific lampreys migrate up freshwater systems to spawn and die. It is unknown if there is natal stream fidelity in this species. Migrations occur from February to June, mostly at night. Some populations spawn as soon as adults reach the cool, gravel-bottomed spawning streams in March to July. However, some populations, such as the Klamath River population, overwinter in the freshwater system and spawn the following March to July (Streif 2007; CDFW 2020f).

The larvae (ammocoetes) which hatch from the eggs drift downstream to suitable sandy habitat, where they rear for approximately 3 to 7 years as filter feeders. Following the ammocoetes stage, Pacific lampreys metamorphose into juveniles over the course of months and migrate the rest of the way downstream to the Pacific Ocean, where they begin to mature into adults. Typically, the

metamorphosis occurs from July to October, with juveniles migrating to the ocean in late fall to spring (Streif 2007; CDFW 2020f).

Potential for Occurrence: Likely to Occur. The open waters within and adjacent to the Project area at Avon and Amorco provide migratory habitat for adult Pacific lamprey traveling to upstream spawning habitats in Sacramento/San Joaquin River tributaries. Adult Pacific lamprey will likely travel through the Project area between February and June. Juveniles may migrate downstream through Carquinez Strait and the Project area from late fall to spring. This species is likely to occur within the Project area at Avon and Amorco.

4.2.4 Delta Smelt

Status and Biology. The delta smelt was both federally and state-listed listed as threatened in 1993, however the California listing was changed to endangered in 2009 (CDFW 2020b).

This species occurs in the upper San Francisco Bay-Delta/Sacramento- San Joaquin estuary, including Suisun Bay and Carquinez Strait, and is considered euryhaline, meaning the species can tolerate a wide salinity range. Typically, delta smelt are found in fresh or brackish water, right near the mixing zone between freshwater and saltwater (CDFW 2020b). However, their location does vary with time of year. Delta smelt spawn in the spring (February to May) in freshwater channels and sloughs, with preferred spawning habitat including submerged tree roots, branches, and emergent vegetation for egg attachment (Moyle 2002; CDFW 2020b). Delta smelt spawning if known to occur in the Sacramento River and in Barker, Lindsey, Cache, Georgiana, Prospect, Beaver, Hog, and Sycamore sloughs (USFWS 1993). In the summer, adults and juveniles migrate to low salinity zones. The fall is typically spent in low salinity zones, with juveniles maturing to adults. Finally, winter is spent migrating back to freshwater areas for spawning in spring (CDFW 2020b).

Distribution of delta smelt is dependent on the conditions of the estuary. During drought years when freshwater outflow may be low, smelt can be found higher up in the Sacramento River while in times of high freshwater outflows, smelt can be found lower in Suisun Bay. The reason for this change in distribution is thought to be due to changes in food organisms, toxic substances, disease, competition, and predation (Moyle 2002).

Critical habitat for delta smelt was designated on 19 December 1994 and includes the Carquinez Strait waters within and adjacent to the Project area (CDFW 2020b). Critical habitat for this species is depicted on Figures 5 and 6.

Potential for Occurrence: Potential to Occur. Delta smelt are known to occur in Suisun Bay and may occur in the open waters within and adjacent to the Project area near Avon and Amorco throughout the year.

4.2.5 Western River Lamprey

Status and Biology. The western river lamprey is a California SSC, but is not federally or state listed. The United States federal government was petitioned to list the western river lamprey on 27 January 2003, but this request was determined to be not warranted in 2004 (Miller et al. 2003; USFWS 2020d). This species is known to occupy habitat from Alaska to the Sacramento/San Joaquin River system in California, but population numbers are thought to be low (USFWS 2020d).

There is limited information on the western river lamprey life history, but it is thought that adults only spend approximately 10 weeks during the summer in marine waters, close to shore and the surface. From May to July, this species migrates from their freshwater river system to nearshore marine surface waters to become parasites on other fishes (Page and Burr 1991; CDFW 2020d).

In the fall, the adult western river lampreys return to the freshwater system, migrating upstream to gravel riffles in streams to spawn. It is unknown if there is natal stream fidelity in this species. In the Sacramento/San Joaquin River system, spawning is thought to occur from April to May. Following spawning, adults die (Page and Burr 1991; CDFW 2020d). Once the ammocoetes hatch, they drift

downstream to sandy substrate, where they bury themselves and begin filter feeding. This stage lasts for an unknown period of time, but is assumed to be 2 to 7 years similar to other lamprey species. Following the ammocoetes stage, western river lampreys metamorphose into the juvenile stage and migrate the remainder of the way downstream (Page and Burr 1991; CDFW 2020d).

Potential for Occurrence: Likely to Occur. The open waters within and adjacent to the Project area near Avon and Amorco provide migratory habitat for adult western river lamprey traveling to upstream spawning habitats in Sacramento/San Joaquin River tributaries. Adult western river lamprey will likely travel through the Study area in fall. Juveniles may migrate downstream through Carquinez Strait and the proposed Project area from May to July. Avon and Amorco support habitat for this species within the Project area and it is likely to occur.

4.2.6 Steelhead—California Central Valley Distinct Population Segment

Status and Biology. The California Central Valley DPS of steelhead was federally listed as threatened on 19 March 1998 (63 FR 13347) and was reaffirmed on 5 January 2006 (71 FR 833). This DPS includes natural spawning populations of anadromous steelhead below impassable barriers in the Sacramento and San Joaquin Rivers and tributaries, as well as hatchery-spawned fish from the Coleman National Fish Hatchery (NFH) Program and the Feather River Fish Hatchery Program. It has also been proposed to include the Mokelumne River Hatchery Program fish (81 FR 72759; NOAA Fisheries 2020e).

Critical habitat for this DPS was designated on 2 September 2005 and does not include the proposed Project area (NOAA Fisheries 2020e). The waters of Suisun Bay are a primary migration corridor, but no critical habitat occurs within hydrologic units within San Francisco Bay (NMFS 2015).

Central Valley steelhead are strictly a winter-run species, entering freshwater tributary streams of the Sacramento and San Joaquin Rivers from December and February to spawn between February and April. Typically, juveniles will spend 1 to 2 years in their freshwater streams before migrating to the ocean in December through May (California Trout 2019b).

Potential for Occurrence: Seasonally present. The open waters within and adjacent to the Project area at Avon and Amorco provide migratory habitat for adult California Central Valley steelhead. Adults migrating to and from upstream spawning habitat in the Sacramento and San Joaquin River tributaries may pass through the Study area between December and April. Juveniles are expected to migrate downstream through the proposed Project area between December and May, with a peak in March, and may also use the terminals for resting habitat (California Trout 2019b). Avon and Amorco support habitat for this species where they are seasonally present within the Project area.

4.2.7 Steelhead—Central California Coast Distinct Population Segment

Status and Biology. The central California coast DPS of steelhead was federally listed as threatened on 18 August 1997 (62 FR 43937) and the threatened status was reaffirmed on 5 January 2006 (71 FR 834) and 14 April 2014 (79 FR 20802). This DPS includes all naturally spawned anadromous populations below impassable barriers in California streams from the Russian River to Aptos Creek and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. Also included in the DPS are the Don Clausen Fish Hatchery Program and the Kingfisher Flat Hatchery Program (NOAA Fisheries 2020c).

Critical habitat for this DPS was designated on 2 September 2005, with an effective date of 2 January 2006. Critical habitat is adjacent to the Project area but not within, as it is located within all waters of San Pablo Bay west of the Carquinez Bridge and all waters of San Francisco Bay to the Golden Gate (NMFS 2015).

All central California coast steelhead are winter-run, which typically begin their spawning migration as adults during the fall/winter, when freshwater flows are at their highest. Generally, this is between the months of December and February. Spawning occurs within a few weeks to a few months from when they enter freshwater, around February to April (McEwan and Jackson 1996; Moyle 2002; Leidy

2007). Steelhead may not die after spawning like Pacific salmon. Adults therefore may migrate back to the ocean and return to spawn again for multiple years. Juvenile central California coast steelhead typically spend 2 years or up to 4 years in a freshwater river system before migrating downstream to the ocean (California Trout 2019a).

Potential for Occurrence: Seasonally present. The open waters within and adjacent to the Project area at Avon and Amorco provide migratory habitat for adult central California coast steelhead. Adults migrating to and from upstream spawning habitat in Suisun Bay tributaries (e.g., Lower Walnut Creek, also referred to as Pacheco Creek) may pass through the Study area, typically between December and April. Juveniles may migrate downstream through Carquinez Strait at any time throughout the year and may also use the terminals for resting habitat. Avon and Amorco support habitat for this species where they are seasonally present within the Project area.

4.2.8 Chinook Salmon—Central Valley Fall / Late Fall-run Evolutionarily Significant Unit

Status and Biology. The Central Valley fall/late fall-run evolutionarily significant unit (ESU) of Chinook salmon is not currently federally or state listed, but was classified as a Species of Concern on 15 April 2004 (69 FR 19975) and is considered a California SSC by CDFW (Moyle et al. 1995; Butte County Association of Governments 2019). The ESU includes naturally spawned populations of fall and late fall-run Chinook salmon in rivers throughout the California Central Valley, from the Pit and McCloud Rivers at the north end of the Central Valley to Kings River at the south end of valley, including the Sacramento River, San Joaquin River, and their tributaries. Hatchery-spawned fall/later fall-run Chinook salmon in the Sacramento River are also included in this ESU (Butte County Association of Governments 2019).

Critical habitat for the Central Valley fall/late fall-run ESU of Chinook salmon has not been designated.

Adult fall-run Chinook salmon begin migrating from the ocean from July through December and spawn from October to November, while the late fall-run immature adults migrate upstream from October through April, finish maturation to adults, then spawn in February and March (Moyle 2002; Butte County Association of Governments 2019). Larval Chinook salmon typically emerge after 3 to 4 months. For fall-run salmon, fry typically emerge from December to March and downstream migration to the ocean occurs from December through June. Late fall-run Chinook fry emerge from April through June and typically migrate to the ocean the following April (Butte County Association of Governments 2019).

Potential for Occurrence: Seasonally present. Open waters within and adjacent to the Project area at Avon and Amorco provide habitat for upstream-migrating adult Central Valley fall/late fall-run Chinook salmon during the summer to winter and downstream-migrating juveniles during winter and spring. In addition, the submerged portions of the terminals may provide cover and a resting habitat for migrating Chinook salmon. Avon and Amorco support habitat for this species where they are seasonally present within the Project area.

4.2.9 Chinook Salmon—Central Valley Spring-run Evolutionarily Significant Unit

Status and Biology. The Central Valley spring-run ESU of Chinook salmon was federally listed as threatened on 16 September 1999 (64 FR 50393); the threatened status was reaffirmed on 28 June 2005 (70 FR 37159). This ESU was also listed as a California threatened species on 5 February 1999. The ESU includes all naturally spawned populations of spring-run Chinook salmon in the Sacramento River and its tributaries, including the Feather River, as well as the Feather River Hatchery spring-run Chinook program (NOAA Fisheries 2020a).

Critical habitat for the Central Valley spring-run ESU of Chinook salmon was designated on 2 September 2005 (70 FR 52488), with an effective date of 2 January 2006. Critical habitat is present within waters of Suisun Bay and the Carquinez Strait, at the proposed Project area (NMFS 2015).

Adult spring-run Chinook salmon enter rivers from the ocean in late March through September, with the peak migratory period from May through June. Spawning occurs from late August through October in just a few streams in the Sacramento and Klamath drainages (Moyle 2002). Juveniles emerge from November through March, with some migrating downstream soon after emergence and others waiting until the following fall as yearlings. Migrating adult spring-run Chinook salmon are present in the Sacramento River between March and July (NMFS 2011; CDFW 2020a).

Potential for Occurrence: Seasonally present. Open waters within and adjacent to the Project area at Avon and Amorco provide habitat for upstream-migrating adult Central Valley spring-run Chinook salmon during the spring and early summer and downstream-migrating juveniles during late summer and early fall. In addition, the submerged portions of the terminals may provide cover and a resting habitat for migrating Chinook salmon. Additionally, all waters of the San Francisco Bay Estuary and the Sacramento/San Joaquin Delta, including the Project area, are critical habitat for this species, as depicted on Figures 5 and 6. Avon and Amorco support habitat for this species where they are seasonally present within the Project area.

4.2.10 Chinook Salmon—Sacramento River Winter-run Evolutionarily Significant Unit

Status and Biology. The Sacramento River winter-run ESU of Chinook salmon was federally listed as endangered on 4 January 1994 (59 FR 440) and the endangered status was reaffirmed on 28 June 2005 (70 FR 37160). This ESU is also listed as endangered by California state. The ESU includes all naturally spawned populations of winter-run Chinook salmon in the Sacramento River and its tributaries and the artificial propagation program at the Livingston Stone NFH. In 21 October 2016, a revision was proposed to include the captive broodstock program maintained at Livingston Stone NFH as part of the ESU for this species (81 FR 72761; NOAA Fisheries 2020b).

Critical habitat for this ESU was designated on 16 June 1993 (58 FR 33212), and includes: the Sacramento River from Keswick Dam, Shasta County, to Chipps Island at the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco-Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (NOAA Fisheries 2020b). Therefore, the proposed Project area does include critical habitat for the Sacramento River winter-run Chinook salmon.

Adult Sacramento River winter-run Chinook salmon enter San Francisco Bay from November through May, and spawn primarily from mid-April to mid-August, peaking in May and June, in the Sacramento River reach between Keswick Dam and the Red Bluff Diversion Dam (NMFS 2011). Juveniles migrate to the Pacific Ocean only after rearing in freshwater for 4 to 7 months, and occur in the delta from September through June (CDFW 2020a).

Potential for Occurrence: Seasonally present. Open waters within and adjacent to the Project area at Avon and Amorco provide habitat for upstream-migrating adult Sacramento River winter-run Chinook salmon from winter to early summer and downstream-migrating juveniles from fall through late spring. In addition, the submerged portions of the Amorco Marine Terminal may provide cover and a resting habitat for migrating Chinook salmon. Critical habitat for this species is present at the Project area as depicted on Figures 5 and 6. Avon and Amorco support habitat for this species where they are seasonally present within the Project area.

4.2.11 Sacramento Splittail

Status and Biology. The Sacramento splittail is a California SSC. This species was previously federally listed as threatened, but was delisted on 22 September 2003 and on 5 October 2010 it was determined that the species did not need to be relisted (USFWS 2017). It has been determined that the Sacramento splittail has not experienced a significant decline in abundance that would warrant listing.

Formerly, the Sacramento splittail's range included lakes, backwaters, and pools in the entire Sacramento/San Joaquin River system. However, the current range of the Sacramento splittail is the San Francisco Bay Estuary, including shallow areas of the bay, and the lower portions of the Sacramento/San Joaquin River Delta (Bay-Delta; Page and Burr 2011; USFWS 2017).

Spawning in this species peaks from March through April on submerged vegetation. However, individuals of this species fractionally spawn, indicating that they release eggs and sperm more than one time during a season. Therefore, spawning lasts longer than the peak months. One of the largest spawning locations for this species is the Yolo Bypass near Davis, California (USFWS 2017). Yearly spawning is most successful when winter flows flood large areas of the Bay-Delta (Daniels and Moyle 1983). After hatching, larvae and juveniles remain in shallow, weedy areas, then migrate to deeper waters once mature.

Potential for Occurrence: Potential to Occur. The Sacramento splittail has the potential to be present in the Carquinez Strait and the open waters within and adjacent to the Project area at Avon and Amorco throughout the year. Adults and juveniles may use the submerged portions of the Project area as a resting and foraging habitat, congregating under the terminals. However, juveniles are most likely to be found closer to shore in the flooded marsh areas instead of the open water near the Project area. Avon and Amorco support habitat for this species and the species has potential to occur within the Project area.

4.2.12 Longfin Smelt

Status and Biology. The longfin smelt was listed in California as threatened in 2009. Populations of longfin smelt are present along the coast of California, including the San Francisco Estuary and Sacramento/San Joaquin Delta, collectively referred to as the Bay-Delta, the Eel River estuary, the Klamath River Estuary, and Humboldt Bay (CDFW 2020c). On April 2, 2012, the Bay-Delta DPS was federally listed as a candidate species (77 FR 19756). However, on April 9, 2009, it was determined by the USFWS that federal listing of this DPS was not warranted and the federal candidate status was removed (USFWS 2020c). No critical habitat has been designated.

Similar to the delta smelt, longfin smelt are euryhaline and can tolerate wide ranges of salinity. However, the use of habitats throughout the lifetime of this species is still poorly understood. In general, the Bay-Delta population of longfin smelt is thought to be anadromous, with adults migrating from marine or brackish waters to freshwater to spawn. Spawning was originally thought to occur mostly over sand, gravel, or rocky substrate and occasionally submerged plants, but a recent study discovered a large population of breeding longfin smelt in the highly modified marshes of Coyote Creek, a San Francisco Estuary tributary (Lewis 2019). This finding indicates that the habitat usage of this species is still under study.

Longfin smelt usually live for 2 years in the marine environment, migrate to a brackish or freshwater area to spawn, and then die (Moyle 2002). Spawning in the Bay-Delta occurs November to May, with peak spawning from January to April (Moyle 2002; CDFW 2020c). Longfin smelt larvae and juveniles are then transported broadly in the Bay-Delta by high flows and currents, which facilitate dispersal.

Potential for Occurrence: Likely to Occur. Longfin smelt is mapped by CNDDB as overlapping with Avon and Amorco (Figures 5 and 6). Longfin smelt are known to occur in Carquinez Strait and has potential to occur in the open waters within and adjacent to the Project area at Avon and Amorco throughout the year.

4.3 Amphibians and Reptiles

4.3.1 Western Pond Turtle

Status and Biology. The western pond turtle was listed as a federal SCC and a California SSC in 1996 (Reese 1996). The western pond turtle is the only native freshwater turtle on the Pacific Coast with populations in western Washington through western Oregon and California with declining populations in Southern California.

Western pond turtles are a solitary, semi-aquatic species that spend most of their lives in water but require terrestrial habitats for nesting. They occur in both permanent and intermittent water sources including marshes, streams, rivers, ponds, and lakes. Mating occurs during the spring and sometimes into the fall, followed by nesting from May to July. Nests are laid by females in nests constructed under the mud near a water source and nestlings winter in the nest, emerging the following spring in warmer weather (Morey 2000).

Potential for Occurrence: Unlikely to Occur. Marshes, open water, and canals provide potential habitat for the western pond turtle during both spring mating season and winter nesting season. The species may occur in brackish waters; however, it is unlikely to occur at the Project area.

4.4 Birds

4.4.1 Tricolored Blackbird

Status and Biology. The tricolored blackbird was listed as a California SSC in 1990 (CDFW 2008). They are permanent residents of California but make long migrations during breeding season (March through July) and in winter, within their range. Breeding colonies have been observed in 46 California counties since 1930, with the largest residing in the Central Valley. Wintering populations move extensively throughout California in their non-breeding season. Major wintering concentrations occur in the Sacramento-San Joaquin River Delta and coastal areas.

Breeding and nesting requirements for the tricolored blackbird include open, accessible water, a protected nesting substrate, and suitable foraging space. Nests are often found in freshwater marshes and increasingly in Himalayan Blackberry as well as agricultural fields. With the loss of native wetland and upland habitats, tricolored blackbirds increasingly rely on artificial habitats for foraging where shallow irrigation, mowing, or grazing keeps vegetation at an optimal height. They do, however, continue to rely on remnant native habitats, including wet and dry vernal pools, seasonal wetlands, riparian scrub habitats and open marsh edges for foraging when available (CDFW 2008). Loss of native habitat from human activities currently poses the greatest threat for tricolored blackbirds.

Potential for Occurrence: Present. Marshes within and adjacent to the Project area at Avon provides habitat and foraging space for tricolored blackbirds during the breeding and winter seasons. This species was observed in March 2021.

4.4.2 Short-eared Owl

Status and Biology. The short-eared owl is a California SSC (CDFG 1992). The species occurs across North America and is year-round in certain area within California. Numbers fluctuate annually in response to “bust or boom” cycles of the owls’ primary prey. Small resident populations occur in the Sacramento-San Joaquin River Delta, but recent breeding from the San Joaquin Valley have been episodic in response to prey cycles. Abundance and size of short-eared owl populations are also subject to periods of drought, which tend to reduce the number of resident and breeding populations state-wide.

Nesting short-eared owls require open country that supports concentrations of rodents and vegetative cover for protection from predators. Suitable habitats include salt and freshwater marshes, irrigated alfalfa or grain fields, and ungrazed grasslands.

Potential for Occurrence: Present. The marsh habitat at Avon supports foraging habitat; this species was observed at the Project area.

4.4.3 Northern Harrier

Status and Biology. The northern harrier was designated a California SSC in 1990 (CDFG 2008). Since the 1940s, breeding populations of the northern harrier have declined significantly due to loss of wetland and native grassland habitat. Populations are observed year-round in California; while some breeding populations may be resident, the species occurs much more abundantly during migration and winter than during the breeding season, which extends from March through August. Breeding populations are still observed throughout California including in Suisun Marsh at Grizzly Island and the San Joaquin Valley (Loughman and McLandress 1994).

Northern harriers breed and forage in a variety of treeless habitats with adequate vegetative cover, suitable prey, and perches. In California, suitable habitats include freshwater marshes, brackish and saltwater marshes, wet meadows, weedy borders of lakes, rivers and streams, annual and perennial grasslands, weed fields, ungrazed pastures, croplands, sagebrush flats, and desert sinks. Harriers nest on the ground in undisturbed areas with dense vegetation (CDFG 2008).

Potential for Occurrence: Present. Brackish marsh, scattered groves of trees in the ruderal uplands, and human-made structures in the developed areas within the Project area at Avon provide suitable nesting and foraging habitat and perch sites for the northern harrier and it is likely to occur at the Project area. This species was observed during the April 2021 site visit.

4.4.4 White-tailed Kite

Status and Biology. The white-tailed kite is a California Fully Protected Species (CDFW 2005). The species is a yearlong California resident in coastal and valley lowlands but inhabits herbaceous and open stages of most habitats. White-tailed kite foraging activity occurs in undisturbed, open grasslands, meadows, farmlands and wetlands (CDFW 2005).

Breeding season for white-tailed kites occurs from February to October, with a peak from May to August. Nests are constructed near the top of dense oak, willow or other tree stands, located near open foraging areas (CDFW 2005).

Potential for Occurrence: Present. The brackish marsh habitat at Avon provides suitable foraging space for the white-tailed kite; this species was observed at the Project area.

4.4.5 Salt Marsh Common Yellowthroat

Status and Biology. The salt marsh common yellowthroat is a California SSC (CDFG 1992). In California, the species breeds through much of the state except in higher mountains and southern deserts. The current California range of the salt marsh common yellowthroat includes four main areas: coastal riparian and wetland area of western Marin County, the tidal marsh system of San Pablo Bay, the tidal marsh system of southern San Francisco Bay, and coastal riparian and wetland areas in San Mateo County (CDFG 2008a).

The breeding season for the species occurs from mid-March to late July. Breeding habitats include woody swamps, brackish marsh, and freshwater marsh, with 60 percent of yellowthroats occupying brackish marsh. Yellowthroats build open nests that are well concealed, typically near the ground in grasses, herbaceous vegetation, cattails, tules and some shrubs (CDFG 2008a).

Potential for Occurrence: Present. There is a CNDDB mapped occurrence for this species east of the Avon pipeline (Figure 5). The brackish marsh located within the Project area at Avon provides suitable habitat for salt marsh common yellowthroat. This species was observed in March 2021.

4.4.6 California Black Rail

Status and Biology. The California black rail was listed as state-threatened on 27 June 1971 (CCR Title 14, Section 670.5). It is also a California fully protected species. The California black rail is a USFWS species of concern, but is not federally listed. Populations of California black rails have been increasing in the Suisun Bay area (Spautz 2005).

California black rails occur primarily in tidal salt, brackish and freshwater marshes, preferring marshlands with unrestricted tidal influence (Evens et al. 1991). Dominance of pickleweed (*Salicornia* spp.) is often cited as a characteristic of tidal salt marshes where black rails are found although this may reflect the habitat conditions for the San Francisco bay west of the Carquinez Strait (Evens et al. 1991). California black rails appear to prefer tidal salt marshes with heavy canopy of pickleweed and an open structure below the canopy for nesting and accessibility.

Breeding season of California black rails begins as early as February, although most activity starts around mid-March with a peak between April and May and extending through mid-July. Rails conceal their nests in dense vegetation, often in stands of pickleweed and tall grasses, near the upper limits of tidal flooding zone.

Potential for Occurrence: Present. There are CNDDB mapped occurrences of this species at the Avon Project area (Figure 5) and south of the Amorco wharf (Figure 6). This species is known to occur in the tidal marshes along Suisun Bay within 0.3 mile north of the study area. Osowski (2011) found breeding black rails in the Point Edith State Wildlife Area, which is 0.5 mile northeast of the study area. Pacheco Slough and the Tesoro Golden Eagle Refinery intervene between the Point Edith State Wildlife Area and the study area. All other occurrences within 5 miles of the study area are in marshes around the margins of Suisun Bay. All of these occurrences are in areas with strong tidal action, consistent with the observation of Spautz et al. (2006) that of the tidal marsh breeding birds that they studied in the San Pablo and Suisun bays, the black rail was “the most tidal-marsh dependent.” This species This species was observed in March 2021.

4.4.7 Suisun Song Sparrow

Status and Biology. The Suisun song sparrow is a California SSC (CDFG 1992). The species is endemic in California, but its year-round range is confined to tidal salt and brackish marsh around the Carquinez Strait and Suisun Bay (CDFW 2008a).

The song sparrow occurs in nearly every tidal marsh in Suisun Bay but prefers areas with dense vegetation for nesting sites, song perches and refuge from predators. Some open areas in the vegetation are required for foraging (CDFW 2008a). The breeding season occurs from early March to July.

Potential for Occurrence: Present. There are mapped CNDDB occurrences for the Suisun song sparrow in several places within the Project area (Figures 5 and 6). Habitat for Suisun song sparrow occurs within the tidal brackish marshes around Suisun Bay and Carquinez Strait where it is a resident species. This species This species was observed in March 2021.

4.4.8 San Pablo Song Sparrow

Status and Biology. The San Pablo song sparrow is a California SSC and is phenotypically distinct from the Suisun song sparrow to the east. The species is California endemic with a range confined to tidal and muted tidal salt marshes around the San Pablo Bay.

The San Pablo song sparrow occurs in virtually every tidal salt marsh in San Pablo Bay, though densities vary based on habitat suitability. The species requires dense vegetation for nesting sites, song perches, and cover from predators. The breeding season occurs from early March to July.

Potential for Occurrence: Potential to Occur. Habitat for the San Pablo song sparrow is restricted to the tidal brackish marshes around San Pablo Bay. This species has potential to occur at the Avon Project area.

4.4.9 American White Pelican

Status and Biology. The American white pelican is a California SSC but is not state or federally listed. In California, this species historically had a large breeding population in the Central Valley and Salton Sea. Now, the only large breeding population in California is on large lakes in the Klamath Basin (CDFG 2008b).

In the San Francisco Bay Estuary, American white pelicans are frequent on salt ponds, coastal bays, inlets, estuaries, and sloughs from August to December. They can also be observed on coastal waters, including the San Francisco Bay, and in the Central Valley, Salton Sea, and Colorado River drainage in winter months. Migrations occur in spring and fall and individuals may use water bodies as resting sites during these times (CDFG 2008b).

During February to March, adults migrate to isolated islands in inland freshwater lakes or islands in ephemeral freshwater wetlands for breeding. There are currently approximately 60 known breeding populations. Once at the breeding site, adults create a shallow depression on gravel, sand, or soil to build their nest and lay eggs from March to April. Young are fed fish by the parents until they fledge (CDFG 2008b).

Potential for Occurrence: Present. The American white pelican has the potential to use the surface waters within and adjacent to the Project area at Avon and Amorco throughout the year, but most frequently from August to December. Adults may migrate through the Project area in spring and fall months. This species was observed during the April 2021 site visit.

4.4.10 Ridgway's Rail

Status and Biology. The Ridgway's rail (formerly the California clapper rail) was federally listed as endangered on 13 October 1970 (35 FR 1604). It is also State-listed as endangered and a California Fully Protected Species. Ridgway's rails primarily occur in tidal salt and brackish marshes with dense stands of pickleweed and cordgrass (*Spartina spp*.). Components of high-quality marsh habitat for Ridgway's rails include dendritic tidal channels suitable for foraging and densely vegetated adjacent uplands that provide cover from predators during the highest tides. Channel density has been shown to be the most important landscape feature to positively influence Ridgway's rail density (Liu et al. 2012). Large, contiguous marshes with low perimeter-area ratios also support high Ridgway's rail densities (Liu et al. 2012).

Ridgway's rail pair bonding and nest building are generally initiated by mid-February. Nesting may begin as early as late February to early May and may extend through August. There appears to be a break in nesting between mid-May and late June in the North Bay, a period that corresponds to the highest summer tides.

In saline emergent wetlands, Ridgway's rails nest mostly in lower zones near tidal sloughs and where cordgrass is abundant (Harvey 1980; Zembal and Massey 1983). Ridgway's rails build a platform concealed by a canopy of woven cordgrass stems or pickleweed and salt marsh gum-plant (Harvey 1990). Nests are constructed only as high as necessary to prevent inundation while preserving a natural cover of vegetation. Ridgway's rail nests are woven to the surrounding vegetation that allows for flotation during extreme tidal events. Ridgway's rails also use dead drift vegetation as a platform (Harvey 1990). In fresh or brackish water, Ridgway's rails construct nests in dense cattail or bulrush (Harvey 1990).

Predators known to prey on Ridgway's rails and their eggs include gopher snake (*Pituophis catenifer*), great blue heron (*Ardea herodias*), peregrine falcon (*Falco peregrinus*), great horned owl (*Bubo virginianus*), short-eared owl (*Asio flammeus*), barn owl, red-tailed hawk, northern harrier, common raven, northern raccoon, and California ground squirrel (Johnston 1956, cited in USFWS 2013). Non-native predators include Norway rat (*Rattus norvegicus*), red fox (*Vulpes vulpes*), domestic cat (*Felis catus*), and feral pigs (*Sus scrofa*).

Potential for Occurrence: Potential to Occur. There is one CNDDB occurrence of Ridgway's rail overlapping with the Avon pipeline (Figure 5); the most recent update for this record was a sighting in 2006. Other occurrences within 5 miles of the study area are in marshes around the margins of or on islands in Suisun Bay.

Previous to the CNDDB occurrence that overlaps with the Avon pipeline, California Ridgway's rail had been detected in the marshes within the northern part of the study area—but not in the Project area—between 1992 and 1994. WRA, Inc. has conducted several Ridgway's rail surveys in the Project vicinity since 2008, with only one individual "detected approximately 340 feet from WMU [Waste Management Unit] 31 across the CWC [Clean Water Canal] in the Point Edith Wildlife Area" on 17 March 2009 (WRA 2009). This individual appeared to be alone, however, based on the lack of responses to its "kek" calls, which are typically given by unmated males (Eddleman and Conway 1998). In addition, PRBO Conservation Science (now Point Blue) surveyed the Point Edith Wildlife Area for Ridgway's rail in 2005 and 2006 and detected only two individuals in 2006 (Liu et al. 2007), suggesting that the species is absent in some years and present in very low numbers in others.

Protocol-level surveys in the Project vicinity (i.e., marshes along Lower Walnut Creek and Waterfront Road) between 2011 and 2014 did not detect any Ridgway's rails (WRA 2011b, 2012b, 2013b; LSA 2014, 2014b). The Project area and adjacent marsh do not currently appear to support breeding California Ridgway's rails; protocol-level surveys conducted in 2021 did not detect any Ridgway's rails in or adjacent to the Project area (LSA 2021) (see Appendix B for survey results).

4.5 Mammals

4.5.1 Salt Marsh Harvest Mouse

Status and Biology. The salt marsh harvest mouse was federally listed as endangered 13 October 1970 (35 FR 1604). It is also State-listed as endangered and a California Fully Protected Species.

Salt marsh harvest mice are divided into two subspecies. *R. r. raviventris* is found in Corte Madera, Richmond, and the southern portion of San Francisco Bay, while *R. r. halicoetes* is found in San Pablo and Suisun Bays.

Salt marsh harvest mice inhabit mid- to upper elevations of tidal and diked salt marshes dominated by dense pickleweed and other halophyte, such as fat hen, alkali heath, and salt grass. Vegetated levees and other grassy upland habitats adjacent to marshes are also critical as they provide shelter from predators during high tides and flooding. High-quality marsh habitat is comprised of deep (23 to 29 inches tall) and dense pickleweed, intermixed with fat hen and alkali heath (Shellhammer 1982). The species requires non-submerged, salt tolerant vegetation to escape the high tide (Shellhammer et al. 1982). During these periods of high tides, populations of salt marsh harvest mice tend to concentrate in high marsh areas (Fisler 1965). The salt marsh harvest mouse has also been found in the top zone and transitional zones of tidal marshes that rarely flood. A recent study in Suisun Marsh north of Suisun Bay (Solano County) demonstrated that marsh microhabitats dominated by a variety of both native and non-native halophytic species (e.g., fat hen, alkali heath, salt grass, Baltic rush, prickly lettuce) can be just as productive for salt marsh harvest mice as pickleweed-dominated habitats (Sustaita et al. 2011). The species will also move into adjoining grasslands during the highest winter tides. Grasslands are utilized as habitat only when new grass growth affords suitable cover in spring and summer months (Fisler 1965; Shellhammer 1982).

The diet of salt marsh harvest mice consists of seeds, grasses, leaves, plant stems, forbs, and insects. Salt marsh harvest mice tend to eat fresh green grasses in the winter and pickleweed and saltgrass during the rest of the year (Fisler 1965). The mice can tolerate high salinities in both their food and drink. The northern subspecies can drink both sea and fresh water (Fisler 1965).

Breeding occurs from spring through autumn. Reproductive activity for females ranges from March to November. Males are reproductively active from April to September. The breeding season for the northern subspecies starts in May (Fisler 1965). Salt marsh harvest mice build nests on the ground

amongst the marsh vegetation or use old nests from ground-nesting birds. Nests are usually small and built of grass and sedge.

Potential for Occurrence: Potential to Occur. The CNDDB includes several salt marsh harvest mouse records in the study area vicinity, including the tidal brackish marsh within the study area itself (Figures 5 and 6). This area is identified by the CNDDB as “Avon-Port Chicago Marsh” and includes the entire Point Edith Wildlife Area, where the species was first reported in 1971 and captured throughout the 1980s and 1990s. Salt marsh harvest mouse was last reported from the Project area in September 1998 (CNDDB 2014).

For the purposes of this BTR, all tidal brackish marsh and adjacent uplands within 100 meters of the Project area at Avon are considered potential habitat for salt marsh harvest mouse. Large expanses of tall, dense pickleweed that typically characterize high-quality salt marsh habitat are absent from the Project area but the tidal brackish marsh within and adjacent to the Avon pipeline is similar to that west of the mouth of Pacheco Creek where salt marsh harvest mouse have previously been reported. As with California Ridgway’s rail, habitat quality is reduced within the Project area but the presence of salt grass and ruderal upland vegetation may provide seasonal dispersal and foraging habitat for salt marsh harvest mice potentially occurring in the nearby Point Edith Wildlife Area.

4.5.2 Suisun Shrew

Status and Biology. The Suisun shrew is a California SSC. Its geographical range is restricted tidal and brackish marsh communities along the north shore of the San Pablo and Suisun bays.

The breeding season for Suisun shrew begins in late February and peaks in April and May, with a second smaller breeding peak in late summer and early fall as young of the previous spring begin to breed (Bolster 1998). Suisun shrews prefer areas of low, dense vegetation that provide adequate cover, nesting places and an abundance of prey. Contiguous upland habitats provide refuge during flooding of salt marshes.

Potential for Occurrence: Potential to Occur. The brackish marsh located within the Project area at Avon provides suitable habitat for the Suisun shrew and the species has potential to occur.

4.6 Marine Mammals

Marine mammals and their habitat is described in detail in the Environmental Impact Reports (EIRs) prepared by the California State Land Commission (CSLC) for the renewal of the 30-year operational leases for the Avon and Amorco Marine Terminals (CSLC, 2014 and 2015). As reported in the EIRs, several marine mammal species are known to migrate, forage, and rest in the San Francisco Bay. Only a few of these travel as far upstream as the Central Bay, and even fewer make it as far east as the Suisun Bay in the vicinity of the Project area. Gray whale and humpback whale occasionally enter the Central Bay to feed during seasonal migrations. The harbor porpoise also occasionally feeds in the Central Bay. Since the gray whale, humpback whale, and harbour porpoises are unlikely to occur, they are not discussed in detail in the sections below. Harbor seal and California sea lion both venture as far upstream as Suisun Bay, and are known to use wharfs and other features for haul-out and cover sites in Suisun and San Pablo Bays. In general, however, most marine mammals prefer the deep, cold waters of the Central Bay, and very few make it as far upstream as the Project area.

4.6.1 Harbor Seal

Status and Biology. Harbor seals have the widest distribution of any pinniped and are found throughout the northern hemisphere in temperate and arctic environments. Harbor seals are resident breeders in the San Francisco Bay and use hundreds of sites in coastal and nearshore habitats to rest or haul-out, including major haul-out and pupping sites located in the Central and South Bays at the Castro Rocks near the Richmond-San Rafael Bridge, Yerba Buena Island by the San Francisco-Oakland Bay Bridge, Corte Madera, and Mowry Slough in the South Bay. In general, haul-out sites

are located on intertidal sand bars, estuarine mudflats, intertidal rocks and reefs, sandy, cobble, and rocky beaches, islands, logbooms, docks, and floats.

Potential for Occurrence: Potential to Occur. Harbor seals spend most of their time in the Central and South Bay but are known to travel as far east as Suisun Bay, where the primary haul-out side is Ryer Island, approximately 3.8 miles northwest of the Project Area (Coastal Conservancy 2008).

4.6.2 California Sea Lion

Status and Biology. California sea lions are the most common eared seal in waters of the state. Male sea lions migrate to the San Francisco Estuary to forage while female California sea lions remain in waters near breeding rookeries south of Santa Barbara. Haul-out sites for this species occur throughout the San Francisco Bay, with the most popular being the one at San Francisco's Pier 39. In general, haul-out sites are located on jetties, offshore rocks, islands, logbooms, marina docks, wharfs, and navigation buoys.

Potential for Occurrence: Potential to Occur. California sea lions spend most of their time in the Central and South Bay, but are known to travel as far east as Suisun Bay.

5. HABITAT

5.1 Sensitive Natural Communities

Of the Project areas, only the Avon Marine Terminal is within a mapped natural community. The portion of the pipeline that traverses over land from the wharf to the Martinez Refinery passes through the following natural communities mapped by CDFW:

- *Phragmites australis—Arundo donax*, Common and giant reed marshes (not state-ranked)
- *Bolboschoenus maritimus*, Salt marsh bulrush marshes (state rank 3)
- Arid West freshwater emergent marsh (not state-ranked)
- Urban (not state-ranked)

5.2 Critical Habitat

The open waters of Suisun Bay within the study area have been designated as critical habitat for Sacramento River winter-run Chinook salmon (58 FR 33212), delta smelt (59 FR 65256), Central Valley spring-run Chinook salmon (NMFS 2015), and green sturgeon (74 FR 52300). Primary constituent elements of designated critical habitat for these species include the estuarine water column, which includes suitable depth, sediment, and water quality; and adequate food resources and foraging habitat (NMFS 2011). In addition, all waters and submerged lands below ordinary high water of Suisun Bay within the study area have been designated as critical habitat for delta smelt (59 FR 65256). Primary constituent elements for delta smelt include physical habitat, water, river flow, and salinity concentrations required to maintain delta smelt habitat for spawning, larval and juvenile transport, rearing, and adult migration.

The Project areas do not overlap critical habitat for Central Valley steelhead.

5.3 Essential Fish Habitat

As mentioned above, the Suisun Bay waters within the Study area are considered EFH for a variety of fish species covered under the Pacific Coast Groundfish and Pacific Salmon Fishery Management Plans, including the following species associated with estuaries: leopard shark, spiny dogfish, California skate, starry flounder, English sole, and Chinook salmon, among others. Groundfish species occur in various marine habitat types from intertidal areas to the depths of the continental slope, on sand or mud bottoms, in rocky reef areas, or in the water column. Anadromous salmonids, such as Chinook and coho salmon, are managed under the Pacific Salmon Fishery Management Plan. These species use freshwater streams and rivers for spawning. Young salmon then migrate to the ocean for feeding and growth and return to their natal waters to spawn. Avon and Amorco Project areas are both located within EFH.

6. AVOIDANCE AND MINIMIZATION MEASURES

For Project actions that would have a potential impact on biological resources, avoidance and minimization measures (AMMs) were considered for incorporation into the Project's design and as best management practices (BMPs) to avoid or reduce impacts on biological resources. AMMs that Marathon will implement as part of the proposed Project to avoid or reduce potential impacts are described below. Measures in the 2018 NLAA Programmatic Biological Opinion[2] will also apply to the Project.

BIO AMM 01—Demarcation of Limits of Work. Limits of work will be clearly demarcated in the field. All Project-related activity will be confined to the designated work areas; no entry into adjacent areas will be allowed by Project personnel. Upon Project completion, material used to mark the work boundary will be removed.

BIO AMM 02—Weed Spread Prevention. Boots, clothing, and equipment are to be free from soils and plant parts prior to entering work areas.

BIO AMM 03—Nesting Bird Survey. Should construction activities commence during the nesting bird season of February 1 through August 31, an experienced biologist will conduct a survey for special-status birds and nesting birds within the work areas including a 300-foot buffer. Where accessible, active nests will be recorded using a handheld GPS unit. Should an active nest be discovered, an avoidance buffer will be implemented and a biological monitor will be required on-site during construction activities that could cause high-noise levels in the vicinity of the nest. Should a nesting bird(s) display signs of agitation, work in the immediate area will be paused to allow the bird(s) to re-acclimate to ambient urban noise levels. Resumption of construction activities will be at the professional discretion of the biological monitor.

BIO AMM 04—California Ridgway's Rail Survey. Surveys will be conducted for California Ridgway's rails in accordance with the USFWS Survey protocol for the species. If California Ridgway's rails are detected during the survey, no work within 700 feet of Ridgway's rail calling centers (identified via compass bearing and distance estimate during surveys) will occur between February 1 and August 31, unless otherwise approved by USFWS and CDFW.

BIO AMM 05—Spill and Accidental Discharge Prevention. Marathon and its contractors will be responsible for structure operations in a manner that minimizes the risk of spills or the accidental discharge of fuels or hazardous materials. Marathon and its contractors will, at a minimum, ensure that:

- All employees handling fuels and other hazardous materials are properly trained.
- All equipment is in good operating order and inspected on a regular basis.
- Hazardous materials, including chemicals, fuels, and lubricating oils, will not be stored within 200 feet of a wetland or water body. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas.

BIO AMM 06—Emergency Spill and Containment Plan. In the event of an accidental spill, the Facility Oil Spill Contingency Plan will be implemented. Site-specific provisions will be listed on the Safe Work Permit and included within the job plan maintained on-site.

At a minimum, Marathon and its contractors will:

[2] The *U.S. Army Corps of Engineers Proposed Additional Procedures and Criteria for Permitting Projects under a Programmatic Determination of Not Likely to Adversely Affect Select Listed Species in California (the 2018 NLAA Program)* identifies procedures and project criteria jointly developed by the USACE and NMFS. The USACE will use the procedures and criteria for applicable projects for five years.

- Ensure that each construction crew (including clean-up crews) has sufficient supplies of absorbent and barrier materials on site to allow the rapid containment and recovery of spilled materials, and that each construction crew knows the procedure for reporting spills.
- Ensure that each construction crew has sufficient tools and material on site to stop leaks.
- Know the contact names and telephone numbers for all Marathon refinery contacts and local, state, and federal agencies (including, if necessary, the U.S. Coast Guard and the National Response Center) that might need to be notified in the event of a spill.
- Follow the requirements of those agencies in cleaning up the spill, excavating and disposing of soils or other materials contaminated by a spill, and collecting and disposing of waste generated during spill cleanup.

BIO AMM 07—General Work Site Best Management Practices. The following measures will be employed by Marathon and its contractors to avoid and minimize impacts to water quality and other beneficial characteristics of wetlands at the Project area:

- No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction-related materials or wastes, oil or petroleum products, or other organic or earthen material will be allowed to enter into or be placed where it may be washed by rainfall or runoff into marshes or open water/ditches adjacent to the work areas.
- All personnel and their equipment will be required to stay within the designated construction area to perform job-related tasks and will not be allowed to enter wetlands, drainages, and habitat of listed species.
- Pets will not be allowed in or near the construction area.
- Firearms will not be allowed in or near the construction area, except for armed Marathon security officers who may periodically patrol work sites. No intentional killing or injury of wildlife will be permitted.
- The construction site will be maintained in a clean condition. All trash (e.g., food scraps, cans, bottles, containers, wrappers, cigarette butts, and other discarded items) will be placed in closed containers and properly disposed of off-site.
- After construction is completed, final cleanup will include removal of all stakes, temporary fencing, flagging, and other refuse generated by construction. Vegetation will not be removed or disturbed in the cleanup process.

BIO AMM 08—Storm Water Pollution Prevention Plan (SWPPP). While the Project itself does not trigger a construction storm water plan requirement, the Project will adhere to and implement the requirements of the respective existing SWPPPs. (Martinez Refinery, Avon Marine Terminal, and Amorco Marine Terminal). Applicable measures in each SWPPP will be incorporated into the construction plans by a qualified specialist and implemented prior to construction.

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8. LIST OF PREPARERS AND CONTRIBUTORS

ERM-West, Inc.

Janet Liver – Project Manager

Sarah Cromie – Senior Biologist

Monte Alves – Senior Biologist

Juliane Baquiran – Biologist

Leigh Ann Boswell – Biologist

Ariana Jensen – Biologist

Kimberley Corwin – Biologist

Gordon Li – GIS Specialist

APPENDIX A SITE PHOTOGRAPHS

Photograph 1: The 26 Line over open water at the end of the Avon Marine Terminal, facing northeast.

Photograph 2: The 26 Line over open water and the paved access road on the wharf, facing southeast.

Photograph 3: The 26 Line adjacent to the walkway along the Avon Marine Terminal, facing northeast.

Photograph 4: The 26 Line adjacent to the walkway along the Avon Marine Terminal, facing south.

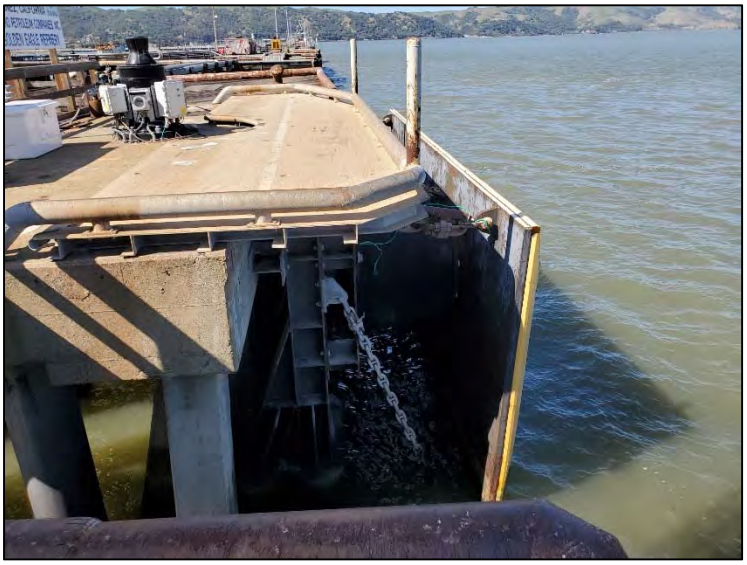
Photograph 5: The wharf structure of the Amorco Marine Terminal extending offshore, facing northwest.

Photograph 6: Amorco Marine Terminal wharf looking towards land.

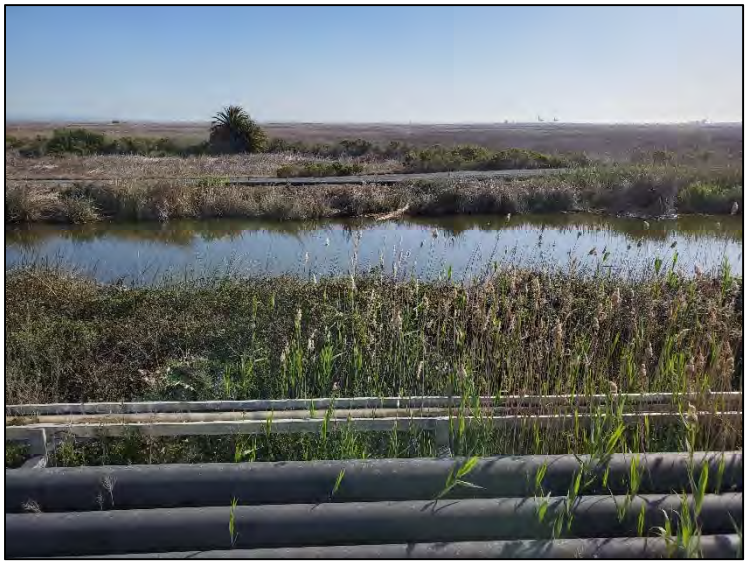
Photograph 7: Dolphin A-81 at the Amorco Marine Terminal where a new super cone fender will be mounted.

Photograph 8: Dolphin A-76 at the Amorco Marine Terminal, where concrete and piling repairs are planned.

Photograph 9: Dolphin A-77 at the Amorco Marine Terminal, where concrete and piling repairs are planned, looking east.



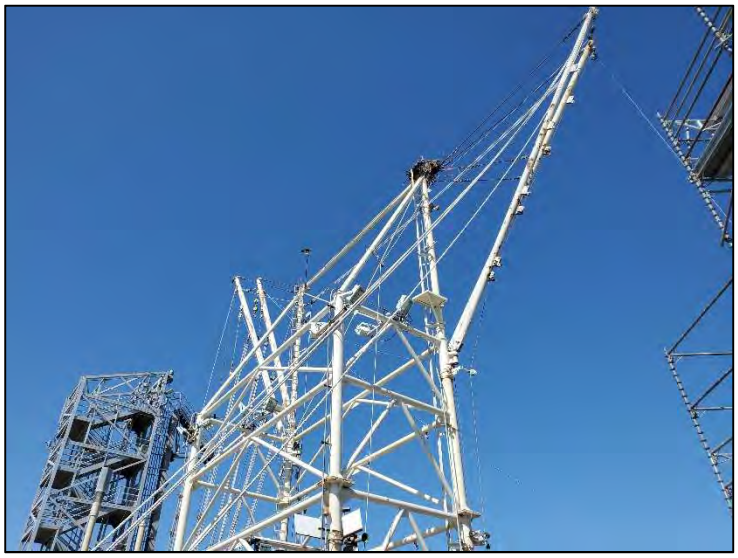
Photograph 10: Dolphin A-77 at the Amorco Marine Terminal, where concrete and piling repairs are planned, looking west.



Photograph 11: Canal and saltmarsh wetland east of the 26 Line along the Avon Marine Terminal, facing east.

Photograph 12: Saltmarsh wetland, ruderal areas, and open water west of the 26 Line along the Avon Marine Terminal, facing west.

Photograph 13: Red-tailed hawk nest in a eucalyptus tree at the Martinez Refinery (left) and closer view of the nest (right).



Photograph 14: Osprey nest at the Amorco Marine Terminal.

APPENDIX B PROTOCOL LEVEL SURVEY FOR CALIFORNIA RIDGWAY'S RAIL

CARLSBAD
FRESNO
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

April 29, 2021

Angela Galarreta, M.S.
Fish and Wildlife Biologist
Section 10 Permit Biologist
U.S. Fish and Wildlife Service
Bay-Delta Fish and Wildlife Office
650 Capitol Mall, Sacramento CA 95814

Subject: Results of 2021 "California" Ridgway's (Clapper) Rail Survey, Avon MOTEMS Compliance Project, Martinez, California

Dear Ms. Galaretta:

On behalf of our client, Tesoro Marketing & Refinery LLC, a wholly owned subsidiary of Marathon Petroleum Corporation (MPC), LSA and our subconsultant Avocet Research Associates (ARA) have completed a protocol-level survey for "California" Ridgway's (Clapper) Rail (*Rallus obsoletus obsoletus*; RIRA) for the 2021 breeding season at the above-referenced project site. As a follow-up to the 2014, 2015, and 2016 surveys which produced negative results, the purpose of the 2021 survey was to determine whether breeding RIRA are present or absent from tidal and brackish marsh habitat in and/or within 700 feet of the Avon Wharf approachway area (i.e., Areas A, B, and C). The 2021 field protocol was based on the survey proposal submitted via e-mail from ARA and approved by you via e-mail on December 16, 2020.

Existing Conditions

The project area is located on the southern shoreline of Suisun Bay near the mouth of Lower Walnut Creek and consists of the existing Avon Marine Oil Terminal (Terminal) and approachway. The total length of the approachway from its southern terminus to the Terminal is about 5,700 feet. The loading and embarking point on the approachway is at a location called Land's End, approximately 2,500 feet south of the Terminal. Brackish marsh north of Land's End is subject to tidal action, while areas to the south (including marsh surfaces underneath the approachway) are non-tidal due to the presence of a topographically elevated area at Land's End. Some non-tidal areas south of Land's End remain subject to occasional seasonal ponding from rainfall.

Vegetation within the tidal brackish marsh north of Land's End is dominated by the non-native common reed (*Phragmites australis*), with smaller stands of alkali bulrush (*Bolboschoenus maritimus*), fat-hen (*Atriplex prostrata*) and pickleweed (*Sarcocornia pacifica*) interspersed throughout. Marsh vegetation in the non-tidal areas to the south includes bulrush (*Schoenoplectus americana* and *S. californica*) and cattail (*Typha* sp.) in the areas subject to freshwater influence and salt grass (*Distichlis spicata*), fat-hen, and small stands of pickleweed in alkaline uplands. The open

field adjacent to and east of the southern end of the trestle, located near WMU 31, is dominated by salt grass, but also contains dense stands of stinkwort (*Dittrichia graveolens*), an invasive non-native herb.

Summary of Ridgway's (Clapper) Rail Occurrences in Vicinity

RIRA have previously been detected in the marshes adjacent to the northern end of the project area between 1992 and 1994 (CNDDB 2014; Occurrence No. 88). In addition, Wetlands Research Associates, Inc. (WRA) has conducted several protocol-level RIRA surveys in the project vicinity since 2008, with only one individual "detected approximately 340 feet from WMU 31 across the Clean Water Canal in the Point Edith Wildlife Area" on March 17, 2009 (WRA 2009). This individual appeared to be alone, however, based on the lack of responses to its "kek" calls typically given by unmated males (Eddleman and Conway 1998). PRBO Conservation Science (now Point Blue) surveyed the Point Edith Wildlife Area for RIRA in 2005 and 2006 and only detected two individuals in 2006 (Liu et. al. 2007), suggesting that the species is absent in some years and present in very low numbers in others. As described in LSA's letter reports (dated May 5, 2014, June 1, 2015, and June 23, 2016 respectively), RIRA were not detected during the course of protocol-level field surveys along the Avon Wharf approachway conducted in 2014, 2015, and 2016. Recent protocol-level surveys in the project vicinity (i.e., other areas in the refinery; marshes along Lower Walnut Creek and Waterfront Road) have not detected any RIRA (LSA 2014b; WRA 2011, 2012, 2013, 2014, 2015, 2016). In addition, LSA biologists have conducted general wildlife surveys and compliance monitoring in the vicinity of the project area since 2007 and have not detected (aurally or visually) any RIRA.

Methods

Prior to conducting surveys, LSA's subcontractor ARA (lead biologist = Mary Anne Flett) established 6 preliminary listening stations along the approachway between its southern terminus and the Suisun Bay shoreline using Google Earth aerial imagery. Final listening stations were established in the field during the first survey and recorded using a Garmin GPSMAP® 76 receiver (see attached Maps 1 and 2).

Mary Anne Flett, Emily Strauss, and Max Brier from ARA conducted four surveys between January 22 and March 31, 2021 (see Table A). Surveys were conducted in accordance with the June 2015 presence/absence protocol (USFWS 2015), as approved in the survey proposal.

All surveys were conducted with trained observers covering the 6 stations, which were spaced approximately 200 meters (≈ 656 feet) apart along or adjacent to the Avon Wharf approachway, using the same survey points as in 2014, 2015, and 2016. The first two surveys (January 22 and 23 and February 5 and 6) were passive call-count surveys and were conducted following the approved survey protocol (i.e., the trained observer listened passively during the 2-hour time period at each sample point) recording all/any rails detected aurally or visually. Active call-count surveys were conducted at each station during the remaining two surveys (March 11 and March 29 and 30) under Mary Anne Flett's USFWS 10(a)(1)(A) recovery permit and California Department of Fish and Wildlife (CDFW) MOU authorizing the use of recorded calls to solicit RIRA vocalizations. During the active surveys, three different RIRA call types (clattering duet, kek, and kek-burr) were broadcast during a 30-second time period at 15-minute intervals, in accordance with the approved survey protocol.

Observers played calls using iPhones with attached external UE Boom speakers (calibrated for the proper decibel levels) and recorded all/any rails detected aurally or visually. According to the protocol, playback is to be stopped immediately if a clapper rail predator (e.g., northern harrier, great blue heron, short-eared owl, cat, etc.) approaches within 100 m of the survey station or a RIRA location. A feral cat was observed entering the marsh at Station 2 during the final survey (March 31). The observer noticed the cat as soon as he arrived at the station; therefore, it was surveyed passively (no taped calls played) on the fourth survey to avoid the possibility of endangering any RIRA, if present.

Each survey began 45 minutes to one hour before sunset or sunrise and followed all other standard requirements for RIRA surveys, including appropriate tide, time of day, wind, and weather.
In the event that a RIRA was detected at any of the points, no more surveys would be conducted and work in the area would be stopped until USFWS has been contacted and a plan of action is in place.

Table A: 2021 Ridgway's Rail Survey Dates, Times, and Weather

Date	Sunrise/Sunset	Start	End	Environmental Conditions	Rail Detections[1]
January 22	1721	1615	1815	50% Clouds, wind 1-3 mph, 55°F, tide 1.6-2.2'	1 BLRA, 4-8 VIRA, >4 SORA
January 23	1722	1622	1822	Clear, wind 0.5 mph, 54.5° F, tide 0.7-1.5'	>5-7 VIRA, >6 SORA
February 5	1737	1637	1837	clear, wind 1-3 mph, 62°F, tide 1.3-2.9'	2-3 BLRA, >10 VIRA, 6-9 SORA
February 6	1738	1638	1838	clear, wind 0.7 mph, 62°F, tide 0.4-1.9'	6 BLRA, >7-9 VIRA, 6-9 SORA
March 11	0625	0540	0720	95% Clouds, wind 6-9 mph, 42°F, tide 2.0-2.4'	4-7 BLRA, 5 VIRA, SORA
March 29	1929	1829	2005	Clear, wind 1-2 mph, 68°F, tide 2.4-1.1'	2 BLRA

Date	Sunrise/Sunset	Start	End	Environmental Conditions	Rail Detections[1]
March 31	1931	1831	2008	Clear, wind 0.8 mph, 78.5°, tide 4.0-2.8'	1 BLRA, VIRA, SORA

[1] VIRA = Virginia rail; SORA = Sora; BLRA = California black rail

Results

No RIRA were detected during any of the surveys. California Black Rails (*Laterallus jamaicensis coturniculus*; BLRA) were heard from Stations 2, 3, 4, and 6. BLRA are state-listed as a Threatened species. One or two birds near Station 6 were located west of and very close to the wharf, within 15 meters, and the others were within 20-40 meters. A few were 50 meters from the wharf. Several of the rails repeatedly uttered the "kik-kik-kerr" call throughout the survey, which is the primary vocalization during the breeding season, presumably given by a male (Reynard 1974, cited in Eddelman et. al. 1994). The detection of this species in the Point Edith Wildlife Area is not surprising given numerous detections in the same vicinity by WRA in 2011 (WRA 2011), as well as high abundances in the Suisun Bay region previously documented by other researchers (Evens and Nur 2002).

Virginia Rail (*Rallus limicola;* VIRA) and Sora (*Porzana carolina;* SORA) were detected on every complete survey of the site (Table A).

Other special status species detected during surveys included large flocks (25-50 birds) of Tricolored Blackbirds (*Agelaius tricolor*) that were detected from winter through the final survey at the end of March. The blackbirds are state-listed as Threatened in California and breeding habitat exists for them in dense blackberry thickets along the channel east of the wharf and elsewhere in the area. White-tailed Kite (*Elanus leucurus*), Northern Harrier (*Circus cyaneus*), San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*), Short-eared Owls (*Asio flammeus*), and Suisun song sparrow (*Melospiza melodia maxillaris*) were also detected during the RIRA surveys. These species are listed as California Bird Species of Special Concern (Shuford and Gardali 2008). Soras were detected on every survey in a location very close to the west side of the wharf (between the access road and the wharf near Station 4) in a small, freshwater pond surrounded by dense cattails. They were foraging, calling, swimming, and defending territories. Though not listed by the state or federal governments, the high concentration of them in a single location is notable and care should be taken to protect them during wharf maintenance activities.

Ambient noise levels were relatively low at all stations except Station 4 during all four surveys. Ambient noise at Station 4 was high on all four surveys due to the presence of a generator powering a pump on the west side of the access trestle. LSA and ARA do not believe this noise adversely affected detection of rails, however, as observers were still able to detect VIRA, BLRA and/or SORA calling from the emergent marsh vegetation during surveys.

Conclusions

Based on the above results, we conclude that RIRA are currently absent from the project area. These results are only valid for the 2021 breeding season. Additional surveys will be conducted in 2022. Please contact me or Mary Anne Flett with ARA if you have any questions and/or require further information regarding this letter report and associated results.

Sincerely,

LSA ASSOCIATES, INC.

Ross A. Dobberteen, Ph.D.

Principal

AVOCET RESEARCH ASSOCIATES, LLC.

Mary Anne Flett,

Senior Wildlife Biologist

USFWS T&E permit #TE-233373-1.1

CDFW MOU SC7407

Attachments: Map 1 – California Clapper Rail Listening Stations (North)

Map 2 – California Clapper Rail Listening Stations (South)

cc: Anne Partmann, Tesoro

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Map 1

I:\TSO1401\GIS\Maps\ClapperRailSurvey\2015\FieldMaps\ClapperRailSurvey_wGrid_UTM.mxd (2/5/2015)

Map 2

I:\TSO1401\GIS\Maps\ClapperRailSurvey\2015\FieldMaps\ClapperRailSurvey_wGrid_UTM.mxd (2/5/2015)

APPENDIX C SPECIAL STATUS SPECIES NOT EXPECTED TO OCCUR AT THE PROJECT AREA

Common Name	Scientific Name	Status[1]	Potential for Species to Occur at the Project Area
Plants			
Bent-flowered fiddle neck	*Amsinckia lunaris*	1B	Absent. Cismontane woodland and coastal bluffs absent from Project area.
Mt. Diablo manzanita	*Arctostaphylos auriculata*	1B	Absent. Rocky chaparral absent from Project area.
Contra Costa manzanita	*Arctostaphylos manzanita ssp. Laevigata*	1B	Absent. Rocky chaparral absent from Project area.
Pallid manzanita	*Arctostaphylos pallida*	1B	Absent. Chaparral and woodland habitat absent from Project area.
Alkali milk-vetch	*Astragalus tener var. tener*	1B	Absent. Vernal pools and valley grassland absent from Project area.
Heartscale	*Atriplex cordulata var. cordulata*	1B	Absent. Sandy valley and foothill grassland habitat absent from Project area.
Brittlescale	*Atriplex depressa*	1B	Absent. Vernal pools and valley grassland absent from Project area.
Vernal pool smallscale	*Atriplex persistens*	1B	Absent. Vernal pools and valley grassland absent from Project area.
Big-scale balsamroot	*Balsamorhiza macrolepis*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Big tarplant	*Blepharizonia plumosa*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Mt. Diablo fairy-lantern	*Calochortus pulchellus*	1B	Absent. Chaparral and woodland habitat absent from Project area.
Chaparral harebell	*Campunula exigua*	1B	Absent. Chaparral habitat absent from Project area.
Tiburon paintbrush	*Castilleja affinis* var. *neglecta*	FE, ST, 1B	Absent. Valley and foothill grassland habitat absent from Project area.
Congdon's tarplant	*Centromadia parryi ssp. congdonii*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Pappose tarplant	*Centromadia parryi ssp. Parryi*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Hispid salty bird's-beak	*Chloropyrom molle ssp. hispidum*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Franciscan thistle	*Cirsium andrewsii*	1B	Unlikely to occur. Coastal scrub and grassland habitat absent from Project area.
Suisun thistle	*Cirsium hydrophilum var. hydrophilum*	FE, 1B	Unlikely to occur. Bog habitat absent from Project area. Outside species' known occurrences in Suisun marsh near Grizzly Island Wildlife Area.
Mt. Diablo bird's beak	*Cordylanthus nidularius*	1B	Unlikely to occur. Chaparral habitat absent from Project area.
Hospital Canyon larkspur	*Delphinium californicum ssp. Interius*	1B.2	Absent. Valley and foothill woodland habitat absent from Project area.
Western leatherwood	*Dirca occidentalis*	1B	Absent. Woodland, riparian forest habitats absent from Project area.
Dwarf downingia	*Downingia pusilla*	2B	Absent. Valley and foothill grassland habitat absent from Project area.
Mt. Diablo buckwheat	*Eriogonum truncatum*	1B	Absent. Valley and foothill woodland habitat absent from Project area.

Common Name	Scientific Name	Status[1]	Potential for Species to Occur at the Project Area
Lime Ridge eriastrum	*Eriastrum ertterae*	1B.1	Absent. Sandy chaparral habitat absent from Project area.
Jepson's coyote-thistle	*Eryngium jepsonii*	1B	Absent. Vernal pool and grassland habitat absent from Project area.
Contra Costa wallflower	*Erysimum capitatum* var. *angustatum*	FE, SE, 1B	Absent. Dune habitat absent from Project area. Outside species' known range at Antioch Dunes National Wildlife Refuge.
Fragrant fritillary	*Fritillaria liliacea*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Santa Cruz tarplant	*Holocarpha macradenia*	1B	Unlikely to occur. Coastal prairie/grassland habitat absent from Project area.
Diablo helianthella	*Helianthelia castanea*	1B	Unlikely to occur. Coastal scrub and grassland habitat absent from Project area.
Brewer's western flax	*Hesperolinon breweri*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Carquinez goldenbush	*Isocoma argute*	1B	Unlikely to occur. Alkali flats and grassland habitat absent from Project area.
Contra Costa goldfields	*Lasthenia conjugens*	FE, 1B	Absent. Vernal pool habitat absent from Project area.
Legenere	*Legenere limosa*	1B	Absent. Vernal pool habitat absent from Project area.
Jepson's leptosiphon	*Leptosiphon jepsonii*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Showy golden madia	*Madia radiata*	1B	Unlikely to occur. Coastal scrub and grassland habitat absent from Project area.
Hall's bush-mallow	*Malacothamnus hallii*	1B	Unlikely to occur. Coastal scrub and grassland habitat absent from Project area.
Oregon meconella	*Meconella oregano*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Marsh microseris	*Microseris paludosa*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Woodland woollythreads	*Monolopia gracilens*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Lime Ridge navarretia	*Navarretia gowenii*	1B	Absent. Chaparral habitat absent from Project area.
Baker's navarretia	*Navarretia leucocephala ssp. bakeri*	1B	Absent. Vernal pools and valley grassland absent from Project area.
Antioch Dunes evening-primrose	*Oenothera deltoids* ssp. *Howellii*	1B	Absent. Dune habitat absent from Project area. Outside species' known range at Antioch Dunes National Wildlife Refuge.
Mt. Diablo phacelia	*Phacelia phacelioides*	1B	Absent. Chaparral habitat absent from Project area.
Bearded popcornflower	*Plagiobothrys hystriculus*	1B	Absent. Vernal pool swales and valley grassland absent from Project area.
California alkali grass	*Puccinellia simplex*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Rock sanicle	*Sanicula saxatilis*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Chaparral ragwort	*Senecio aphanactis*	2B	Absent. Chaparral habitat absent from Project area.
Keck's checkerbloom	*Sidalcea keckii*	1B	Absent. Valley and foothill grassland habitat absent from Project area.

Common Name	Scientific Name	Status[1]	Potential for Species to Occur at the Project Area
Long-styled sand-spurrey	*Spergularia macrotheca* var. *longistyla*	1B	Absent. Alkaline marsh and meadow habitat absent from Project area.
Most beautiful jewelflower	*Streptanthus albidus ssp. pera*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Mt. Diablo jewelflower	*Streptanthus hispidus*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Slender-leaved pondweed	*Stuckenia filiformis ssp. alpine*	2B	Absent. Freshwater pond habitat absent from Project area.
Two-fork clover	*Trifolium amoenum*	FE, 1B	Absent. Valley and foothill grassland habitat absent from Project area.
Coastal triquetrella	*Triquetrella californica*	1B	Unlikely to occur. Coastal scrub habitat absent from Project area.
Caper-fruited tropidocarpum	*Tropidocarpum capparideum*	1B	Absent. Valley and foothill grassland habitat absent from Project area.
Oval-leaved viburnum	*Viburnum ellipticum*	2B	Absent. Lower cismontane forest habitat absent from Project area.
Invertebrates			
Lange's metalmark butterfly	*Apodemia mormo langei*	FE	Absent. Dune habitat absent from Project area. Outside species' known range along San Joaquin River.
Conservancy fairy shrimp	*Branchinecta conservation*	FE	Absent. Vernal pools absent from Project area.
Vernal pool fairy shrimp	Branchinecta lynchi	FT	Absent. Vernal pools absent from Project area.
San Bruno elfin butterfly	*Callophrys mossii bayensis*	FE	Absent. Coastal scrub habitat absent from Project area.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	Absent. Elderberry shrubs absent from Project area. Project area outside species' known range.
Delta green ground beetle	*Elaphrus viridis*	FT	Absent. Only known to occur at Jepson Prairie in Solano County.
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	Absent. Vernal pools absent from Project area.
Callippe silverspot butterfly	*Speyeria callippe callippe*	FE	Absent. Grassland with larval host plant (Viola pedunculata) absent from Project area.
California freshwater shrimp	*Syncaris pacifica*	FE	Absent. Project area outside species' known range (perennial coastal streams in Marin, Sonoma, and Napa Counties).
Fish			
Sacramento perch	*Archoplites interruptus*	SSC	Absent. Current habitat located in Clear Lake and Alameda Creek, away from Project area.
Amphibians and Reptiles			
California tiger salamander (central California DPS)	*Ambystoma californiense*	FT, ST	Absent. Seasonal freshwater aquatic habitat and grassland absent from Project area.
Northern California legless lizard	*Anniella puchra*	SSC	Absent. Sandy coastal scrub habitat absent from Project area.

Common Name	Scientific Name	Status[1]	Potential for Species to Occur at the Project Area
Alameda whipsnake	*Masticophis lateralis euryxanthus*	FT, ST, CH	Absent. Chaparral and scrub communities absent from Project area.
Coast horned lizard	*Phrynosoma blainvillii*	SSC	Absent. Scrubland, grassland, and sand dune habitat absent from Project area.
Foothill yellow-legged frog	*Rana boylii*	SSC	Absent. Freshwater aquatic habitat absent from Project area.
California red-legged frog	*Rana draytonii*	FT, SSC, CH	Absent. Freshwater aquatic habitat absent from Project area.
Giant garter snake	*Thamnophis gigas*	FT, ST	Absent. Freshwater aquatic habitat absent from Project area, also outside species' known range.
Birds			
Burrowing owl	*Athene cunicularia*	SSC	Absent. Open grassland habitat absent from Project area.
Golden eagle	*Aquila chrysaetos*	FP	Absent. Grassland and forested habitats absent from Project area.
Swainson's hawk	*Buteo swainsoni*	ST	Absent. Open grassland habitat absent from Project area.
Western snowy plover	*Charadrius nivosus nivosus*	FT	Absent. Sandy beach/dune habitat absent from Project area.
Yellow rail	*Coturnicops noveboracensis*	SSC	Unlikely to occur. Dense grass vegetation absent from Project area. Outside of rare species' occurrences documented in Suisun Marsh.
American peregrine falcon	*Falco peregrinus anatum*	FP	Absent. Open habitat with cliffs or tall buildings for nesting absent from Project area.
Bald eagle	*Haliaeetus leucocephalus*	SE, FP	Absent. Grassland and forested habitats absent from Project area.
Yellow-breasted chat	*Icteria virens*	SSC	Absent. Dense forested habitat absent from Project area.
Loggerhead shrike	*Lanius ludoyicianus*	SSC	Absent. Shrub/grassland and low forested habitats absent from Project area.
Alameda song sparrow	*Melospiza melodia pusillula*	SSC	Absent. Outside of species expected range near Alameda.
California least tern	*Sternula antillarum browni*	FE, SE, FP	Absent. Sandy beaches, alkali flats, or other hard-pan surfaces absent from Project area.
Mammals			
Pallid bat	*Antrozous pallidus*	SSC	Absent. Desert and forested habitat absent from Project area. Project work will be completed during daylight hours.
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC	Absent. Forested habitat absent from Project area. Project work will be completed during daylight hours.
Western red bat	*Lasiurus blossevillii*	SSC	Absent. Forested habitat absent from Project area. Project work will be completed during daylight hours.
San Francisco dusky footed woodrat	*Neotoma fuscipes annectens*	SSC	Absent. Oak woodland and chaparral habitat absent from Project area.
Big free-tailed bat	*Nyctinomops macrotis*	SSC	Absent. Rocky cliff habitat absent from Project area. Project work will be completed during daylight hours.

Common Name	Scientific Name	Status[1]	Potential for Species to Occur at the Project Area
American badger	*Taxidea taxus*	SSC	Absent. Open areas, specifically grasslands, absent from Project area.
San Joaquin kit fox	Vulpes macrotis mutica	FE, ST	Absent. Open areas, specifically grasslands, absent from Project area.

[1] FE = federally endangered, FT = federally threatened, CH = critical habitat designated, ST = California state threatened, SE = California state endangered, SSC = California species of special concern, FP = California protected species, 1B = California endangered or threatened, 2B = CA endangered or threated, common elsewhere

DPS = distinct population segment

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Via E-mail

June 23, 2016

Katherine Sun
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W-2605
Sacramento, CA 95825-1846

Subject: Results of 2016 "California" Ridgway's (Clapper) Rail Survey, Avon MOTEMS Compliance Project, Martinez, California

Dear Ms. Sun:

On behalf of our client, Tesoro Marketing & Refinery LLC, LSA has completed a protocol-level survey for "California" Ridgway's (Clapper) Rail (*Rallus obsoletus obsoletus*; CCR) for the 2016 breeding season at the above-referenced project site. As a follow-up to the 2014 and 2015 surveys which produced negative results, the purpose of the 2016 survey was to determine whether breeding CCR are present or absent from tidal and brackish marsh habitat in and/or within 700 feet of the project area (i.e., Areas A, B, and C). The 2016 field protocol was based on the survey proposal (submitted via e-mail on January 22, 2016) from Avocet Research Associates (ARA) as approved by you via e-mail.

Existing Conditions

The project area is located on the southern shoreline of Suisun Bay near the mouth of Lower Walnut Creek and consists of the existing Avon Marine Oil Terminal (Terminal) and approachway. The total length of the approachway from its southern terminus to the Terminal is about 5,700 feet. The loading and embarking point on the approachway is at a location called Land's End, approximately 2,500 feet south of the Terminal. Brackish marsh north of Land's End is subject to tidal action, while areas to the south (including marsh surfaces underneath the trestle) are non-tidal due to the presence of a topographically elevated area at Land's End. Some non-tidal areas south of Land's End remain subject to occasional seasonal ponding from rainfall.

Vegetation within the tidal brackish marsh north of Land's End is dominated by the non-native common reed (*Phragmites australis*), with smaller stands of alkali bulrush (*Bolboschoenus maritimus*), fat-hen (*Atriplex prostrata*) and pickleweed (*Sarcocornia pacifica*) interspersed throughout. Marsh vegetation in the non-tidal areas to the south includes bulrush (*Schoenoplectus americana* and *S. californica*) and cattail (*Typha* sp.) in the areas subject to freshwater influence and salt grass (*Distichlis spicata*), fat-hen, and small stands of pickleweed in alkaline uplands. The open field adjacent to and east of the southern end of the trestle, located near WMU 31, is dominated by salt grass, but also contains dense stands of stinkwort (*Dittrichia graveolens*), an invasive non-native herb.

Summary of Ridgway's (Clapper) Rail Occurrences in Vicinity

CCR have previously been detected in the marshes adjacent to the northern end of the project area between 1992 and 1994 (CNDDB 2014; Occurrence No. 88). In addition, Wetlands Research Associates, Inc. (WRA) has conducted several protocol-level CCR surveys in the project vicinity since 2008, with only one individual "detected approximately 340 feet from WMU 31 across the Clean Water Canal in the Point Edith Wildlife Area" on March 17, 2009 (WRA 2009). This individual appeared to be alone, however, based on the lack of responses to its "kek" calls typically given by unmated males (Eddleman and Conway 1998). PRBO Conservation Science (now Point Blue) surveyed the Point Edith Wildlife Area for CCR in 2005 and 2006 and only detected two individuals in 2006 (Liu et al. 2007), suggesting that the species is absent in some years and present in very low numbers in others. As described in LSA's letter reports (dated May 5, 2014 and June 1, 2015, respectively), CCR were not detected during the course of protocol-level field surveys conducted in 2014 and 2015. Recent protocol-level surveys in the project vicinity (i.e., other areas in the refinery; marshes along Lower Walnut Creek and Waterfront Road) have not detected any CCR (LSA 2014b; WRA 2011, 2012, 2013, 2014, 2015, 2016). In addition, LSA biologists have conducted general wildlife surveys and compliance monitoring in the vicinity of the project area since 2007 and have not detected (aurally or visually) any CCR.

Methods

Prior to conducting surveys, LSA established 6 preliminary listening stations along the approach way trestle between its southern terminus and the Suisun Bay shoreline using Google Earth aerial imagery. Final listening stations were established in the field during the first survey and recorded using a Garmin GPSMAP® 76 receiver (see Figure 1).

LSA subcontractor Mary Anne Flett and Emily Strauss from ARA, and an LSA wildlife biologist (J. Foreman), conducted four surveys between January 27 and April 8, 2016 (see Table A). Surveys were conducted in accordance with the field protocol that was based on the approved survey proposal. All surveys were conducted with trained observers covering the 6 stations, which were spaced approximately 200 meters (≈ 656 feet) apart along or adjacent to the Avon Wharf alignment, using the same survey points as in 2014 and 2015. The first survey on January 25 was a passive call-count and was conducted following the approved survey protocol (i.e. the trained observer listened passively during the 10-minute time period at each sample point) recording all/any rails detected aurally or visually. Active call-count surveys were conducted at each station during the remaining three surveys under Mary Anne Flett's USFWS 10(a)(1)(A) recovery permit and California Department of Fish and Wildlife (CDFW) MOU authorizing the use of recorded calls to solicit CCR vocalizations. During the active surveys, calls were broadcast in accordance with the approved survey protocol (i.e., 5 minutes of passive listening, followed by 1 minute of broadcast calls, and completed with 4 minutes of passive listening at each sample point, using iPhones with attached Marantz and/or UE Boom speakers) recording all/any rails detected aurally or visually. Each survey began one hour before sunset or sunrise and followed all other standard requirements for CCR surveys, including appropriate tide, time of day, wind, and weather. In the event that a CCR was detected at any of the points, no more surveys would be conducted and work in the area would be stopped until USFWS has been contacted and a plan of action is in place.

Table A: 2016 Clapper Rail Survey Dates, Times, and Weather

Date	Sunrise/Sunset	Start	End	Weather Conditions	Rail Detections[1]
January 28	1726	1644	1818	100% Clouds, wind 1-2 mph, 59°F	VIRA, SORA
March 6	0631	0615	0750	35% clouds, wind 6 mph, 55°F	3 VIRA, 2 SORA
March 19	1919	1910	2023	50% Clouds, wind 0-0.5mph, 56°F	1 BLRA
April 3	1933	1825	1952	40% Clouds, wind 1-5 mph, 59°F	No detections

[1] VIRA = Virginia rail; SORA = Sora; BLRA = California black rail

Results

No CCR were detected during any of the surveys. Virginia rail (*Rallus limicola;* VIRA) and Sora (*Porzana carolina;* SORA) were detected on the first and second surveys (Table A). A majority of the birds were heard from Stations 1–4 (south of Land's End), where the greater cover of freshwater emergent vegetation provides higher quality habitat for these species. In addition, one California black rail (*Laterallus jamaicensis coturniculus*; BLRA) was detected calling during the third survey on March 19. The aurally identified BLRA was located approximately within 20-40 meters (≈ 130 feet) ESE of Station 6. The rail repeatedly uttered the "kik-kik-kerr" call, which is the primary vocalization during the breeding season, presumably given by a male (Reynard 1974, cited in Eddelman et al. 1994). BLRA are state-listed as a Threatened species. The detection of this species in the Point Edith Wildlife Area is not surprising given numerous detections in the same vicinity by WRA in 2011 (WRA 2011), as well as high abundances in the Suisun Bay region previously documented by other researchers (Evens and Nur 2002).

Other species of interest detected during surveys include white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), San Francisco common yellowthroat (*Geothlypis trichas sinuosa*) and Suisun song sparrow (*Melospiza melodia maxillaris*). These species are listed as California Bird Species of Special Concern (Shuford and Gardali 2008).

Ambient noise levels were relatively low at all stations except Station 5 during all four surveys. Ambient noise at Station 5 was high on all four surveys due to the presence of a generator powering a pump on the west side of the access trestle. LSA and ARA do not believe this noise adversely affected detection of rails, however, as VIRA, BLRA and/or SORA were heard calling from the emergent marsh vegetation during three of the four surveys.

Conclusions

Based on the above results, we conclude that CCR are currently absent from the project area. These results are only valid for the 2016 breeding season. Additional surveys will be conducted in 2017. Please contact me or Mary Anne Flett with ARA if you have any questions and/or require further information regarding this letter report and associated results.

Sincerely,

LSA ASSOCIATES, INC.

Ross A. Dobberteen, Ph.D.
Principal

AVOCET RESEARCH ASSOCIATES, LLC.

Mary Anne Flett

Attachments: Figure 1 – California Clapper Rail Listening Stations (North)
Figure 2 – California Clapper Rail Listening Stations (South)

cc: Peter Carroll, Tesoro

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LSA

LEGEND

Study Area

Clapper Rail Listening Station

FIGURE 1

N

0 175 350

FEET

Avon Marine Terminal
MOTEMS Compliance Project

Clapper Rail Listening Stations (North)

SOURCE: Aerial Imagery from USGS (04/2011).

I:\TSO1401\GIS\Maps\ClapperRailSurvey\2016\Figure 1_ClapperRailListeningStations.mxd (6/23/2016)

LSA

LEGEND

Study Area

Clapper Rail Listening Station

FIGURE 2

N

0 175 350

FEET

Avon Marine Terminal
MOTEMS Compliance Project

Clapper Rail Listening Stations (South)

SOURCE: Aerial Imagery from USGS (04/2011).

I:\TSO1401\GIS\Maps\ClapperRailSurvey\2016\Figure 2_ClapperRailListeningStations.mxd (6/23/2016)

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MEMORANDUM

DATE: March 16, 2021

TO: Jan Werner and Anne Partmann, Marathon

FROM: Ross A. Dobberteen, Ph.D.

SUBJECT: Results of October 2020 Soft Bird's-Beak Field Survey along the Avon Wharf Approachway

Per your request, LSA Associates, Inc. (LSA) submits this memorandum summarizing the results of our focused survey in October 2020 for the federally-protected soft bird's-beak (*Chloropyron molle* ssp. *molle*) under the Avon Wharf approachway.

Methods

On October 13, 2020, LSA's senior-level biologist, David Muth, surveyed seasonal wetland and tidal brackish marsh habitat beneath and within 20 feet on either side of the Avon Wharf approachway. The survey entailed walking on the approachway, as well as along portions of the western and eastern sides of the approachway. Binoculars were used as-needed to scan areas beneath and beside the approachway for soft bird's-beak. Although all vegetation was scanned, the survey focused on areas supporting soft bird's-beak host plants: pickleweed (*Salicornia pacifica*), salt grass (*Distichlis spicata*), and jaumea (*Jaumea carnosa*), bare ground, and areas of sparse vegetation. The survey was conducted during a low tide which allowed complete visual coverage of all marsh vegetation under the approachway.

Before and after the survey along the approachway, Mr. Muth went to find a known reference population of soft bird's-beak located near Hastings Slough east of the refinery along Waterfront Road; he unable to find soft bird's-beak at this location. On October 14, Mr. Muth visited another reference population at Point Pinole Regional Shoreline in Richmond to ensure appropriate survey timing for the project area. Soft bird's-beak individuals were observed at this location; therefore, October was a suitable time to survey for this species under the Avon Wharf approachway.

Results

LSA did not detect any soft bird's beak plant under the Avon Wharf approachway despite the presence of host species of the soft bird's beak plant, as well as suitable tidal and seasonal salt marsh habitat.

Please do not hesitate to contact me if you have questions and/or require further information regarding this memo.