1 3.4 BIOLOGICAL RESOURCES

<table>
<thead>
<tr>
<th>BIOLOGICAL RESOURCES – Would the Project:</th>
<th>Potentially Significant Impact</th>
<th>Less Than Significant with Mitigation</th>
<th>Less Than Significant Impact</th>
<th>No Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?</td>
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<td>b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?</td>
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<td>c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?</td>
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<td>d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?</td>
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<td>e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?</td>
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<td>f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?</td>
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2 3.4.1 Environmental Setting

The Project site is located on the southern shore of the San Joaquin River (River) upstream (east) of the confluence with the Sacramento River, and approximately 2 miles west of the Antioch Bridge (see Figure 2.2-1 above). The property is bordered to the west and east by remnant sand dune systems comprising the Sards and Stamm units of the Antioch Dunes National Wildlife Refuge (Refuge), owned and maintained by the U.S. Fish and Wildlife Service (USFWS) (see Figure 2.2-2 above).

The CEQA analysis presented below is based on an October 3, 2014, site visit and technical reports prepared by Wood Biological Consulting, Inc. (2014) and Weston...
Solutions, Inc. (2014). The subject property is highly industrialized, supporting paved and dirt lots surrounding the Plant facility. Only scattered vegetation is present, and it is restricted primarily to the perimeter of the property. Fairly dense vegetation is present on the River bank in front of the Plant directly opposite of the existing wharf facility. Based on the site survey literature, and air photo review, no submerged aquatic vegetation was noted along the shoreline immediately across from the wharf; however, such habitat is present to the west.

3.4.1.1 Habitats

The existing vegetation on the shoreline, River bank and upland portions of the Project study area is characterized as post-disturbance and has been recolonized by native and non-native herbs, forbs, shrubs, vines and trees. Beyond the top of the River bank, the ground is ruderal or barren as a result of routine disturbance. The vegetation types and wildlife habitats in the study area are described below.

Subtidal Zone

The subtidal zone in the Project study area has a substrate consisting of loose rock, sand and sediment. Water depth at the wharf is around 9.8 meters (32 feet) increasing to about 10.7 meters (35 feet) with high tide. No rooted submerged aquatic vegetation is present along the shoreline directly opposite of the wharf. However, patches of emergent shoreline vegetation are present near the Refuge at the western end of the study area, and beyond the plant’s western and eastern boundaries. This vegetation is comprised predominantly of hardstem bulrush (also known as common tule).

The vegetation type conforms to the Hardstem Bulrush Marsh (Schoenoplectus acutus) herbaceous alliance as described in Sawyer et al. (2009; CA vegetation code number 52.122.01). The Hardstem Bulrush Marsh alliance has been assigned a rarity ranking of G5/S4, indicating that this alliance may or may not be endemic to California and is presumed to be secure statewide (Sawyer et al. 2009). It would be classified as riverine, aquatic bed, permanently flooded wetland following Cowardin et al. (1979).

Although tidally influenced, the aquatic habitat of the River in the Project area is predominantly a freshwater environment, especially during the winter months when Delta outflows are around 32,000 cubic feet per second (USFWS 2002). Salt-water intrusion occurs during the summer months, making the system somewhat brackish. However, the shoreline vegetation is indicative of freshwater conditions.

The River supports a wide range of wildlife species. A total of 32 fish species have been collected during sampling conducted at the adjacent Refuge, including the special-
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status species Delta smelt, longfin smelt, Sacramento splittail, Chinook salmon, steelhead, hardhead (USFWS 2002). Other special-status fish species known from the Project vicinity include North American green sturgeon and Sacramento perch (California Natural Diversity Database [CNDDB] 2014).

Wildlife known to inhabit the aquatic environment in the Project vicinity include such mammals as northern river otter, common muskrat, mountain beaver, harbor seal and California sea lion, and reptile species such as Pacific pond turtle. A wide variety of resident and migratory waterfowl are also commonly encountered in the open water habitat of the River.

Littoral Zone

The littoral zone is the near-shore environment of seas, lakes or rivers. In areas subject to tidal action, it extends from the high water mark, which is only briefly inundated, to the shoreline, which is permanently submerged. It includes the intertidal zone.

In the Project study area, the littoral zone is very narrow to absent due to the steepness of the River bank and armoring. Directly opposite the wharf, the littoral zone is armored with loose rock and is mostly unvegetated. A small area (approximately 2,500 square feet) supporting littoral species is present immediately east of the walkway; native species detected include soft rush, large leather-root, whorled marsh-pennywort, arroyo willow, sneezeweed, and the special-status species Suisun marsh aster; it is also the habitat in which the special-status species Mason’s lilaeopsis and Delta mudwort may occur. Vegetation in the littoral zone is better developed west of the western end of the wharf.

Vegetation in the littoral zone on site does not conform to any particular natural association described in Sawyer et al. (2009). However, marsh vegetation at the water’s edge would be considered as riverine emergent non-persistent wetland following Cowardin et al. (1979).

Wildlife expected to occur, at least periodically, in this habitat include northern river otter, common muskrat, mountain beaver, Pacific tree frog, garter snake, California legless lizard, and Pacific pond turtle. Herons and egrets such as great blue heron, great egret, snowy egret, black-crowned night heron, and green-backed heron may perch in trees near open water and forage on the shoreline.

River Bank

Within the Project study area, the River bank has a substrate consisting of exposed loose imported rock and sand of local sources. Situated just above the high-tide line are
dense patches of the invasive species giant reed; several clumps of the invasive species pampas grass are present at the western end of the study area.

The upper reaches of the River bank on the site are covered with sandy earthen fill, which supports a moderate canopy of young to middle-aged trees with an understory of non-native annual grasses and forbs. The dominant tree canopy is comprised of coast live oaks. Other native woody plants present include black walnut, Oregon ash, California rose, and toyon, along with the native vine wild cucumber. Dense patches of the invasive non-native species Himalayan blackberry and Hottentot fig are also present on the River bank. Open areas of the River bank are dominated by non-native annual grasses and forbs such as ripgut brome, wild oats, wild lettuce, white sweetclover, yellow starthistle, English plantain, sweet fennel, and summer mustard, among others.

Historically, the vicinity of the study area supported oak woodland (USFWS 2002). However, currently, due to the highly modified nature of the vegetation on the River bank, the vegetation does not conform to any particular natural association described in Sawyer et al. (2009). Vegetation on the River bank would be regarded as upland, and has no status as a special-status natural community.

Despite the highly industrialized nature of the study area, the presence of open water and adjacent natural marshland and upland habitats greatly increases the potential for wildlife species to use the shoreline vegetation. Trees on site are likely to provide cover, foraging and nesting habitat for a variety of birds. Large diameter oak trees provide excellent nesting habitat for raptors, including red-tailed hawk, red-shouldered hawk, and American kestrel. A variety of passerine species can be expected to occur and nest in trees, shrubs and vines on site such as black phoebe, white-crowned sparrow, western scrub-jay, Anna’s hummingbird, song sparrow, yellow-rumped warbler, house finch, and other passerine species. Mammals expected to move through this habitat in the study area include raccoon, Virginia opossum, striped skunk, red fox, and coyote.

Uplands

Extending from the top of the River bank inward are areas devoid of vegetation and ruderal habitat. Ruderal habitat is that from which the native vegetation has been completely removed by grading, cultivation, or other surface disturbances. Left undeveloped, such areas typically become recolonized by invasive exotic species. Scattered native species might recolonize such sites after disturbances have ceased. Ruderal sites are typically dominated by herbaceous species, although scattered woody shrubs and trees may also begin to appear if left undisturbed long enough. Ruderal sites are characteristic of road-sides, fallow agricultural fields, vacant lots, and landslides.
Ruderal habitat is dominated by the same suite of non-native herbaceous annual grasses and forbs found on the River bank. Additional species detected include Russian thistle, telegraph weed, horseweed, Bermuda grass, and hairy vetch, among others. A native shrub, silver lupine, grows in patches of long-fallow ground at the top of the River bank, east of the walkway to the wharf and at the western end of the property. A row of silk-oak trees forms a linear screen along the top of the River bank.

Wildlife species commonly encountered in ruderal habitats include reptiles such as southern alligator lizard, northern alligator lizard, and western fence lizard. Passerines (perching birds) that may forage on disturbed ground or among the scattered trees and shrubs include mourning dove, European starling, Brewer’s blackbird, house finch, northern mockingbird, and western scrub-jay, among others. Burrowing mammals such as Botta’s pocket gopher and California ground squirrel are also expected in the area, along with other rodents such as California vole, deer mouse, brush rabbit, and Norway rat. Mammals that are naturally inured to human habitation and activities include Virginia opossum, raccoon, striped skunk, and mule deer.

Wildlife Movement Corridors

Wildlife corridors (i.e., linear habitats that naturally connect and provide passage between two or more large habitats or habitat fragments) are important for persistence of wildlife over time. The shoreline in the Project study area would be considered part of an extensive wildlife movement corridor. Although over-land movement is restricted by fencing, barren ground, and moderately intense human disturbance in the form of vehicles, pedestrians, and noise, the shoreline is somewhat protected from these limitations. Vegetation on the River bank provides abundant cover for dispersing wildlife, forming a corridor between more extensive areas of undeveloped, natural habitats. Open water also facilitates the movement of numerous aquatic species such as mountain beaver, common muskrat and northern river otter. The River also serves as an important corridor for anadromous fish.

3.4.1.2 Special-Status Biological Resources

An evaluation of the presence or potential for occurrence of special-status plant and animal species\textsuperscript{14} and natural communities within or near the Project site was performed by Wood Biological Consulting, Inc. (2014). An evaluation of potential Project impacts on special-status fish species was performed by Weston Solutions Inc. (2014).

\textsuperscript{14} For purposes of this analysis, the term species includes all taxa of the species, subspecies or variety taxonomic levels.
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1 Special-Status Natural Communities

Special-status natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection under the Federal Clean Water Act (CWA), California Lake and Streambed Alteration Program (LSAP), and/or the Porter-Cologne Water Quality Control Act (Porter-Cologne). A number of plant associations have been designated as rare and these communities are given the highest inventory priority (CNDDB 2014; CDFG 2010). Vegetation alliances given a rarity ranking of G1, G2, or G3 are considered to be of high inventory priority; alliances ranked as G4 or G5 are generally considered common enough to not be of concern (Sawyer et al. 2009; CDFG 2010).

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

One special-status natural community, Hardstem Bulrush Marsh, occurs in the study area. However, Hardstem Bulrush Marsh habitat is not present either in the construction area or along the shoreline immediately opposite of the wharf.

Work in the channel of the River is regulated under the CWA, Rivers and Harbors Act (RHA) and California Fish and Game Code; authorization for the proposed Project must be obtained from the U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW) and Central Valley Regional Water Quality Control Board (CVRWQCB) prior to the initiation of work.

3 Eelgrass Habitat

Impacts to eelgrass habitat in the subtidal zone within the Project area are regulated under the CWA, Magnuson-Stevens Fishery Conservation and Management Act (MSA), and Title 14 of the California Code of Regulations. According to these laws and regulations, any activities which may potentially impact eelgrass habitat must mitigate for those impacts. This requires mitigation for harmful impacts to existing eelgrass beds as well as potential eelgrass habitat. The presence of eelgrass beds is not expected at the Project location; eelgrass has been fully replaced by the native species widgeon grass east of the Carquinez Bridge (Merkel & Associates Inc. 2004).

4 Essential Fish Habitat

The maintenance of healthy fisheries is dependent on the protection of those habitats essential for the growth and reproduction of fish species. The National Marine Fisheries Service (NMFS) and regional fishery management councils are charged with ensuring that fishing activities have a minimal impact on fish habitat. Essential fish habitat (EFH) includes those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The San Joaquin Delta, including the Project site, is designated...
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Critical Habitat

Critical habitat is a term defined under Federal Endangered Species Act (FESA). Critical habitat designations affect only federal agency actions or federally funded or permitted activities. Critical habitat designations do not affect activities by private landowners if there is no federal “nexus”—that is, no federal funding or authorization. Federal agencies are required to avoid “destruction” or “adverse modification” of designated critical habitat. In areas where the species is not present, some Project modifications that would not have occurred without the critical habitat designation may be required.

Based on a review of records maintained by the USFWS (USFWS October 16, 2014) and CDFW (CNDDB 2014), the Project site is located in or near designated critical habitat for North American green sturgeon, Delta smelt, spring-run Chinook, and Central Valley steelhead. In addition, designated critical habitat for two federally listed plant species, Contra Costa wallflower and Antioch Dunes evening primrose overlaps some of the lands on the GP property along the shore and uplands; critical habitat for these species does not overlap the Project construction area.

Locally Protected Trees

Pursuant to the City of Antioch Municipal Code, certain trees are designated as protected. Protected trees include all established indigenous trees with a diameter at breast height (dbh) measuring 25 centimeters (10 inches) or larger, or any other tree species with a dbh measuring 66 centimeters (26 inches) or larger. A protected tree may not be removed without a tree removal permit. Trees meeting the city of Antioch’s definition of a protected tree are expected to be present on site. However, because all Project activities are proposed to be carried out from and in the water, with no activities or staging areas occurring on land, the Project would not require the removal or significant pruning of any protected trees.

Special-Status Plant Species

For purposes of this MND, special-status plant species include those that are listed under the FESA or the California Endangered Species Act (CESA), those that are designated as candidates for listing, those that are listed as rare under the California Native Plant Protection Act, and those that are not listed but would meet the definition of rare or endangered under CEQA. A total of 80 special-status plant species have been recorded from the Project region (California Native Plant Society [CNPS] 2014). The potential for occurrence on site for each of the target species was evaluated. Based on
site conditions and geographic location, the potential for occurrence of 68 special-status plant species can be completely ruled out due to a lack of suitable habitat or substrate, geographic isolation from known populations, or, if suitable habitat is present, they would have been identified during the site survey. Seven target species are not expected to occur on site due to geographic isolation, the presence of only marginally suitable habitat, and/or because they would have been identified during the site survey.

Special-status plant species that could occur on the River bank or subtidal zone in or near the Project site are depicted on Figure 3.4-1. Two special-status species, Delta tule pea and Suisun marsh aster, were detected within the Project study area (see Figure 3.4-2) during the site visit. Special-status plant species detected or potentially occurring within the study area are described below.

Federal/State-Listed, Proposed, or Candidate Plant Species

Antioch Dunes Evening Primrose (Federal/State: Endangered; CNPS: List 1B.1). Antioch Dunes evening primrose (Oenothera deltoides ssp. howellii) is a perennial herb in the primrose family (Onagraceae). Flowering occurs March through September. A native species endemic to California, it is restricted to remnant river bluffs and inland dunes and is found only in Contra Costa and Sacramento counties, growing from sea level to 30 meters (0 to 100 feet) in elevation. The USFWS has designated critical habitat for Antioch Dunes evening primrose.

The eastern and western ends of the study area above the top of bank in the Project study area include marginally suitable habitat for Antioch Dunes evening primrose. There are six records of Antioch Dunes evening primrose within an 8 kilometer (km) (5 mile) radius of the Project site (CNDDB 2014). The nearest records for the species are from both units of the Refuge adjacent to the western and eastern boundaries of the Project study area. Although the eastern portion of the Project study area above the top of bank is located within designated critical habitat, the limits of the proposed activity do not overlap with designated critical habitat for the species. The species was not detected during the present survey and its potential for occurrence is considered low due to the high level of surface disturbance evident.

Contra Costa Wallflower (Federal/State: Endangered; CNPS: List 1B.1). Contra Costa wallflower (Erysimum capitatum var. angustatum\(^{15}\)) is a biennial or short-lived perennial herb in the mustard family (Brassicaceae). Flowering occurs March through July. Contra Costa wallflower is a native species endemic to California. It is restricted to inland dunes and is known only from the Antioch dunes of Contra Costa County, growing at 3 to 20 meters (10 to 65 feet) in elevation.

\(^{15}\) This taxon has been deemed invalid and is now considered a synonym for the common and widespread taxon *E.c. var. capitatum* Nonetheless, is still covered under FESA and CESA until formally delisted.
Figure 3.4-1

Potentially Occurring Special Status Plants

Source: Wood Biological Consulting, Inc.
Figure 3.4-2

Observed Special Status Plants

Source: Wood Biological Consulting, Inc.
The eastern and western ends of the study area above the top of bank study area include marginally suitable habitat for Contra Costa wallflower. There are four records of Contra Costa wallflower within an 8 km (5 mile) radius of the Project site (CNDDB 2014). The nearest records for the species are from both units of the Refuge adjacent to the western and eastern boundaries of the study area. The species was not detected during the present survey and its potential for occurrence is considered low due to the high level of surface disturbance evident.

Other Special-Status Plant Species

**Suisun Marsh Aster** (Federal/State: none; CNPS: List 1B.2). Suisun Marsh aster (*Symphyotrichum lentum*[^16^]) is a perennial, rhizomatous herb belonging to the sunflower family (Asteraceae). Flowering occurs May through November. Suisun marsh aster is a native species endemic to California and found only in Contra Costa, Napa, Sacramento, San Joaquin and Solano counties. It is associated with freshwater and brackish marshes around Suisun Bay, growing from sea level to 3 meters (0 to 10 feet) in elevation. Suitable habitat for Suisun marsh aster is present within the littoral zone of the Project study area. There are 21 records of Suisun marsh aster within an 8 km (5 mile) radius of the Project site (CNDDB 2014); it has been recorded from the shoreline just to the west and east of the Project site. Three populations with a total number of 19 plants were detected in the Project study area during the October 2014 site survey; the locations of these plants are illustrated in Figure 3.4-2.

**Delta Tule Pea** (Federal/State: none; CNPS: List 1B.2). Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*) is a robust perennial vine belonging to the pea family. Delta tule pea is a native species endemic to California and found only in Contra Costa, Napa, Sacramento, San Joaquin, Solano, Sonoma, and Yolo counties. It is associated with freshwater and brackish marshes around Suisun Bay, growing from sea level to 4 meters (0 to 13 feet) in elevation.

Suitable habitat for Delta tule pea is present within the littoral zone of the Project study area. There are 13 records of Delta tule pea within an 8 km (5 mile) radius of the Project site (CNDDB 2014); it has been recorded from the southern shoreline of Sherman Island on the opposite side of the River from the Project site. A single individual was detected at the western end of the Project study area; the location of this plant is illustrated on Figure 3.4-2.

**Mason's Lilaeopsis** (Federal/State: none; CNPS: List 1B.1). Mason's lilaeopsis (*Lilaeopsis masonii*) is a diminutive member of the carrot family (Apiaceae). It is a native species endemic to California and is found only in Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Solano, and Yolo counties. It forms dense to sparse colonies.

[^16^]: Formerly known as *Aster lentus*. 
on exposed muddy streambanks and levees associated with freshwater and intertidal
marshes of the Napa, Sacramento, and San Joaquin rivers and the Point Reyes
Peninsula, growing from sea level to 10 meters (0 to 33 feet) in elevation.

Suitable habitat for Mason's lilaeopsis is present within the littoral zone of the Project
study area. There are 30 records of Mason's lilaeopsis within an 8 km (5 mile) radius of
the Project site (CNDDB, 2014); it has been recorded from the shoreline just to the west
and east of the Project site, on the shoreline of West Island and the northern shore of
the San Joaquin River. The species was not detected during the site survey;
nonetheless, Mason's lilaeopsis has a potential for occurrence on the shoreline area of
the site.

Delta Mudwort (Federal/State: none; CNPS: List 1B.2). Delta mudwort (Limosella
australis; formerly known as L. subulata) is a tufted annual belonging to the figwort
family (Scrophulariaceae). Delta mudwort has been regarded as a rare native species in
California, although recent treatments indicate that it may actually have been
accidentally imported in the ballast of ships from the east coast of North America. Here,
it is found in the San Joaquin-Sacramento River Delta, occurring in Contra Costa,
Sacramento, San Joaquin, and Solano counties.

Suitable habitat for Delta mudwort is present within the littoral zone of the Project study
area. There are ten records of Delta mudwort within an 8 km (5 mile) radius of the
Project site (CNDDB 2014); it has been recorded from the shoreline just to the west of
the Project site and on the northern shore of the San Joaquin River near the Antioch
Bridge. The species was not detected during the present survey; a focused survey for
this diminutive, difficult to find species was beyond the scope of this effort. Delta
mudwort has a potential for occurrence on shoreline areas of the site.

Eel-Grass Pondweed (Federal/State: none; CNPS: List 2B.2). Eel-grass pondweed
(Potamogeton zosteriformis) is an annual aquatic herb belonging to the pondweed
family (Potamogetonaceae). Flowering occurs June through July. Eel-grass pondweed
is a native species but is not endemic to California. It is found only in Contra Costa,
Lake, Lassen, Modoc, and Shasta counties as well as through the western and mid-
western states. It grows in muddy soil of ponds, lakes and streams, growing from sea
level to 1,300 meters (0 to 4,264 feet) in elevation.

Marginally suitable habitat for eel-grass pondweed is present in the subtidal zone of the
Project study area. Eel-grass pondweed has not been recorded from within an 8 km (5
mile) radius of the Project site (CNDDB 2014), and is not expected to occur on site due
to the strength of the prevailing currents in the San Joaquin River channel.
Special-Status Animal Species

Special-status animal species include those listed as Endangered, Threatened, Rare, or as Candidates for listing under FESA or CESA (CDFW 2014a). Other species regarded as having special status include those listed as Special Animals by the CDFW (2014a). Pursuant to the California Fish and Game Code, the following species are protected: golden eagles, migratory birds, non-game birds, raptors, fully protected birds, fully protected mammals, fully protected reptiles and amphibians, and fully protected fish. The California Code of Regulations prohibits the take of fully protected fish, certain fur-bearing mammals, and restricts the taking of amphibians and reptiles. Additionally, marine mammals receive protection under the Marine Mammal Protection Act (MMPA), regardless of whether they are also listed under FESA. The MSA, as amended by the Sustainable Fisheries Act of 1996, established procedures designed to identify, conserve, and enhance EFH for those species regulated under a federal fisheries management plan. The MSA requires federal agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.

In addition, animal species have been assigned global and state rarity rankings (for a definition of these rankings, see Appendix C). Species ranked as S1, S2, or S3 are considered to be critically imperiled, imperiled or vulnerable to extinction within the boundaries of the state (CDFW 2014a). As such, these species may be considered for CEQA purposes to meet the criteria for listing as endangered, threatened or rare under CESA, even if they are not officially designated. Species ranked as S4 or S5 are generally considered common enough to be secure and not at risk of extinction.

A total of 51 special-status animal species have been recorded from the USGS topographic quadrangle maps including and surrounding the Project site (CNDDB 2014; USFWS 2014). The potential for occurrence on site for each of the target species was evaluated. Based on site conditions and geographic location, the potential for occurrence of 13 of the species can be completely ruled out due to a lack of suitable habitat and/or geographic isolation from known populations. Another 22 species are not expected to occur on site due to geographic isolation or the presence of only marginally suitable habitat.

Although not detected during 2014 surveys, 14 of the species could occur within the Project study area. Ten of these are fish species and include North American green sturgeon, Delta smelt, steelhead (Central Valley distinct population segment [DPS] and Central California Coast DPS), Chinook salmon (Central Valley spring-run evolutionarily significant unit [ESU] and Sacramento River winter-run ESU), longfin smelt, Sacramento perch, Sacramento splittail, and hardhead. Also potentially occurring within the study area are Pacific pond turtle, white-tailed kite, song sparrow “Modesto population,”
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1 Suisun song sparrow, and a wide variety of migratory bird species. Two marine mammals, harbor seal and California sea lion, are known to move through the Project vicinity. These species are discussed in more detail below.

4 All of the target special-status animal species evaluated as part of this assessment are summarized in the Biological Assessment prepared for the USACE as part of the Section 7 FESA consultation for the Project (Appendix D).

7 Federal/State-Listed, Proposed, Candidate, or Fully Protected Fish and Wildlife Species

8 **Lange’s metalmark butterfly** (Federal: Endangered; State: none). The USFWS listed Lange’s metalmark butterfly (*Apodemia mormo langei*) (LMB) as endangered on June 1, 1976 (41 Federal Register [FR] 22041-22044). LMB is endemic to California, persisting in the wild only in the 67-acre Refuge. LMB inhabits stabilized dunes and the species’ life cycle is closely tied to its larval food plant, naked stemmed buckwheat (*Erigonum nudum auriculatum*). Adults begin to emerge in early August and the mating flight season can last until mid to late September, a period of approximately 7 weeks (USFWS 1984, Johnson et al. 2007). Peak flight season usually occurs in the last week of August and first week of September (Johnson et al. 2007). Butterflies of both sexes live for approximately 1 week, and feed on the nectar of the buckwheat as well as on butterweed (*Senecio flaccidus var. douglasii*), San Joaquin snakeweed (*Gutierrezia californica*), and silver lupine (*Lupinus albifrons*). During the flight season, eggs are laid on buckwheat stems. The eggs remain dormant until the rainy season and then the hatched larvae feed on new buckwheat growth during winter and spring. The caterpillars pupate in mid-summer at the base of the buckwheat.

23 The aquatic-based Project area does not contain suitable habitat for LMB. Additionally, the area adjacent to the Project area owned by Georgia-Pacific (GP) is heavily disturbed, does not contain the larval host plants for LMB, and does not support the species (Wood Biological Consulting, Inc. 2014). The Project area parcel falls between the two Refuge units – approximately 300 meters (984 feet) from the eastern boundary of the Stamm Unit (western portion of Refuge) and approximately 125 meters (410 feet) from the western boundary of the Sardis Unit (eastern portion of the Refuge). The only known occurrence of LMB is from within the Refuge.

31 **North American Green Sturgeon** (Federal: Threatened; State: Species of Special Concern). The Southern DPS\(^\text{17}\) of the North American green sturgeon (*Acipenser medirostris*) was listed as Threatened under FESA in 2006. Critical habitat for the species was designated by the NMFS in 2009. It is listed as a California Species of Special Concern and is regarded as Vulnerable by the American Fisheries Society.

\(^{17}\)NMFS has relied on the Evolutionarily Significant Unit (ESU) concept and considers DPSs to represent ESUs if the population is reproductively isolated and represents an important component in the evolutionary legacy of the species.
(CDFW 2014a). It has been assigned a global and state ranking of G3/S1S2; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW 2014a).

The Southern DPS consists of the population segment of green sturgeon that uses the Sacramento River and tributaries for spawning; the Sacramento River contains the only known spawning population in the DPS. Mature fish enter and migrate rapidly up the Sacramento River in March and April, where they spawn and then either return to the estuary or over-summer and migrate out of the River with the first fall flow event. They may be found in San Francisco Bay throughout the year, though numbers increase in summer with the return of migrants moving into the estuary for feeding, holding, and spawning.

The Project site is located within critical habitat designated for the Southern DPS of North American green sturgeon by the NMFS. No nearby occurrences of this DPS have been recorded in the CNDDB (2014). Nonetheless, due to the presence of suitable aquatic habitat on site and given that the Project site is located within designated critical habitat, the presence of sturgeon is assumed.

**Steelhead (Central California Coast and Central Valley DPS** (Federal: Threatened; State: Special Animal). There are two populations of steelhead in the Project region. The Central California Coast DPS and the Central Valley DPS of steelhead (*Oncorhynus mykiss*) were both listed as Threatened under FESA in 2006; a 5-year review of these DPS’s was completed in 2011 (NMFS 2011a,b). Critical habitat for these DPS’s was designated by the NMFS in 2005. Steelhead is considered a Special Animal in California and is regarded as Threatened by the American Fisheries Society (CDFW 2014a). It has been assigned a global and state ranking of G5T2Q/S2; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW 2014a). Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

The steelhead is a native, pelagic, anadromous fish that spawns in freshwater and migrates to the open ocean. The Central California Coast DPS includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River (inclusive) to Aptos Creek (inclusive), and the drainages of San Francisco, San Pablo and Suisun Bays eastward to Chippis Island at the confluence of the Sacramento and San Joaquin Rivers; and tributary streams to Suisun Marsh including Suisun Creek, Green Valley Creek, and an unnamed tributary to Cordelia Slough (commonly referred to as Red Top Creek), exclusive of the Sacramento-San Joaquin River Basin.
Critical habitat has been designated for the Central California Coast DPS of steelhead by the NMFS, the nearest of which is the San Pablo Hydrologic Unit 2206; the Project site is not located in or near designated critical habitat. However the Project site is located within suitable habitat for the Central California Coast DPS of steelhead. No occurrences for the Central California Coast DPS of steelhead have been recorded from within an 8 km (5 mile) radius of the Project site (CNDDB 2014). Nonetheless, due to the presence of suitable aquatic habitat on site, the presence of Central California Coast DPS steelhead is assumed.

Critical habitat has been designated for the Central Valley DPS of steelhead by the NMFS. The Project site is located within suitable habitat for the Central Valley DPS of steelhead. One occurrence for the Central Valley DPS of steelhead is recorded from within an 8 km (5 mile) radius of the Project site (CNDDB 2014). This record is a 2012 sighting from the Bouldin Island quadrangle. Due to the presence of suitable habitat on site and given that the Project site is located within designated critical habitat, the presence of Central Valley DPS steelhead is assumed.

Chinook Salmon (Central Valley Spring-Run Fall ESU and Sacramento River Winter-Run ESU) (Federal: Threatened; State: Threatened/Endangered). The Chinook salmon (Oncorhynchus tshawytscha) Central Valley Spring-Run ESU was listed as Threatened under FESA in 2005; a 5-year review of this ESU was completed in 2011 (NMFS 2011e). Critical habitat for this ESU was designated by the NMFS in 2005. This ESU was listed as Threatened under CESA in 1999 (CDFW 2014b). It is regarded as Threatened by the American Fisheries Society. It has been assigned a global and state ranking of G5/S1; species assigned a ranking of S1 are considered imperiled in the state due to its very restricted range, very few populations, or other factors making it very vulnerable to extirpation (CDFW 2014a).

The Sacramento River Winter-Run ESU of Chinook salmon (Oncorhynchus tshawytscha) was listed as Threatened under FESA in 1994 and its status was confirmed in 2014; a 5-year review of this ESU was completed in 2011 (NMFS 2011c). Critical habitat for this ESU was designated by the NMFS in 1993. The ESU was listed as Endangered under CESA in 1989 (CDFW 2014b). It is regarded as Endangered by the American Fisheries Society. It has been assigned a global and state ranking of G5/S1; species assigned a ranking of S1 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW 2014a).

Chinook are anadromous, with adults migrating from the ocean into the freshwater streams and rivers of their birth in order to mate. There are different seasonal “runs” (e.g., spring, summer, fall, or winter) in the migration of Chinook from the ocean to freshwater, even within a single river system. These runs have been identified on the basis of the season in which the adult Chinook enter freshwater to begin their spawning
migration. However, distinct runs also differ in the degree of maturation at the time of river entry, the temperature and flow characteristics of their spawning site, and their actual time of spawning.

The Central Valley spring-run Chinook migrate as immature adults between February and early July, with the peak run occurring in April or May. They spend the summer in deep pools of their natal rivers and spawn in early fall. Spawning females prepare redds (i.e., nest) in gravelly substrate. The emerged fry may spend a few months in their natal stream then outmigrate from December through March with the peak downstream migration occurring November to December.

The Sacramento River winter-run Chinook ESU includes all naturally spawned populations of winter-run Chinook salmon in the Sacramento River and its tributaries in California, as well as two artificial propagation programs. These fish begin their upstream migration in the Sacramento River as immature adults between January and May, with the peak run occurring in March. The young fish appear between July and mid-October, remaining there for five to ten months before moving downstream. Juvenile fish typically enter the Sacramento-San Joaquin Delta from January to April.

Critical habitat has been designated for the Central Valley Spring-Run ESU of Chinook by the NMFS. The Project site is located within suitable habitat for the Central Valley Spring-Run ESU of Chinook. No occurrences for the Central Valley Spring-Run ESU of Chinook have been recorded from within an 8 km (5 mile) radius of the Project site (CNDDB 2014). Nonetheless, due to the presence of suitable habitat on site and given that the Project site is located within designated critical habitat, the presence of Central Valley Spring-Run ESU Chinook is assumed.

The Project site is not located in designated critical habitat for Sacramento River winter-run ESU but is located within suitable habitat. No occurrences for the Sacramento River winter-run ESU of Chinook have been recorded from within an 8 km (5 mile) radius of the Project site (CNDDB 2014). Nonetheless, due to the presence of suitable habitat on site, the presence of Sacramento River winter-run ESU Chinook is assumed.

Delta Smelt (Federal: Threatened; State: Endangered). The Delta smelt (Hypomesus transpacificus) was listed as Threatened under FESA in 1993 and was uplisted from Threatened to Endangered under CESA in 2010 (CDFW 2014b). Critical habitat for the species was designated by the USFWS in 1994. It is also regarded as Threatened by the American Fisheries Society. It has been assigned a global and state ranking of G1/S1; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW 2014a). Delta smelt are found only from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo
Counties. Historically, they occurred from Suisun Bay to Sacramento on the Sacramento River and to Mossdale on the San Joaquin River.

The Project site is located within designated critical habitat and is within suitable habitat for Delta smelt. Two occurrences for Delta smelt have been recorded with an 8 km (5 mile) radius of the Project site. The nearest record is a 2004 sighting at Sherman Island (CNDDDB 2014). Due to the presence of suitable aquatic habitat on site and given that the Project site is located within designated critical habitat, the presence of Delta smelt is assumed.

**Longfin Smelt** (Federal: Candidate; State: Threatened). Although it was determined that the longfin smelt (*Spirinchus thaleichthys*) did not warrant federal listing by the USFWS in 2008, it remains a candidate for listing under FESA. It was listed as Threatened under CESA in 2009 is regarded as Endangered by the American Fisheries Society (CDFW 2014b). It has been assigned a global and state ranking of G5/S1; species assigned a ranking of S1 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW 2014a).

Longfin smelt inhabit the Sacramento-San Joaquin River Delta, San Francisco Estuary and scattered bays and inlets of the Pacific Coast from Monterey to Alaska. In the San Francisco Bay and Delta system, longfin smelt typically spend their first year of life in Suisun Bay and Suisun Marsh. In their second winter, longfin smelt return to the Bay and migrate upstream to spawn. The furthest downstream longfin have been known to spawn is in the upper Suisun Bay around Pittsburg and Montezuma Slough in Suisun Marsh.

Critical habitat for the longfin smelt has not been designated. The Project site is located within suitable habitat for the longfin smelt. Two occurrences for the longfin smelt have been recorded from within an 8 km (5 mile) radius of the Project site (CNDDDB 2014). These include 2012 records from near Rio Vista and Chipps Island. Due to the presence of suitable habitat on site, the presence of longfin smelt is assumed.

**White-Tailed Kite** (Federal: Migratory Bird Treaty Act (MBTA); State: Fully Protected Species). The white-tailed kite (*Elanus leucurus*) is designated as fully protected under the California Fish and Game Code. This species receives additional protection under the MBTA (USFWS 2013). It has been assigned a global and state ranking of G5/S3; species assigned a ranking of S3 are considered vulnerable in the state due to their restricted range, relatively few populations, or other factors making them very vulnerable to extirpation (CDFW 2014a).
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White-tailed kites inhabit open grasslands and savannas. They breed in a variety of habitats including grasslands, cultivated fields, oak woodlands and suburban areas where prey is abundant.

The white-tailed kite is not listed under FESA; as such, no critical habitat has been designated. White-tailed kites are confirmed nesters in Contra Costa County (CNDDB 2014). Marginally suitable nesting habitat is present among the trees on site and in the immediate Project vicinity and there are abundant foraging opportunities in the surrounding undeveloped lands. A nesting occurrence was reported in 2005 from near Pittsburg (CNDDB 2014). Due to the presence of marginally suitable nesting sites, white-tailed kites could occur on or near the site.

Other Sensitive and Locally Rare Wildlife Species

Pacific Pond Turtle (Federal: none; State: Species of Special Concern). The Pacific pond turtle (also known as western pond turtle; *Emys marmorata*) is a California Species of Special Concern (CDFW 2014a). It has been assigned a global and state ranking of G3G4/S3 (CDFW 2014a); species assigned a ranking of S3 are considered vulnerable in California due to their restricted range and relatively few populations.

It is the only fresh-water turtle native to greater California. Pacific pond turtles are habitat generalists, and have been observed in slow-moving rivers and streams (e.g., in oxbows), lakes, reservoirs, permanent and ephemeral wetlands, stock ponds, and sewage treatment plants. It prefers aquatic habitat with refugia such as undercut banks and submerged vegetation, and require emergent basking sites such as mud banks, rocks, logs, and root wads to thermoregulate their body temperature. Pacific pond turtles regularly use upland terrestrial habitats, most often during the summer and winter, especially for oviposition (females), overwintering, seasonal terrestrial habitat use, and overland dispersal. Females have been reported ranging as far as 500 meters (1,640 feet) from a watercourse to find suitable nesting habitat.

Pacific pond turtle is not listed under FESA; as such, no critical habitat has been designated for the species. Marginally suitable aquatic habitat is present on site although no suitable basking or nesting habitat is present. The nearest record is a 1998 sighting from the Dow Chemical wetland mitigation site at the border between Pittsburg and Antioch, approximately 5 km (3.1 miles) west of the Project site. Pacific pond turtle could transit through the Project site along the shoreline.

Suisun Song Sparrow (Federal: MBTA; State: Species of Special Concern). The Suisun song sparrow (*Melospiza melodia maxillaris*) is a California Species of Special Concern (CDFW 2014a) and is protected under the MBTA. The species has been assigned a global and state ranking of G5T2/S2 (CNDDB 2014); species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range,
very few populations, or other factors making them very vulnerable to extirpation
(CDFW 2014a).

The Suisun song sparrow is restricted to Suisun Marsh from the Carquinez Strait east to
the confluence of the Sacramento and San Joaquin Rivers. Suisun song sparrow is not
listed under FESA; as such, no critical habitat has been designated for the species. The
Project area is considered to provide marginally suitable nesting habitat for Suisun song
sparrow consisting of blackberry tangles and dense vegetation. Suisun song sparrow is
known from four records within an 8 km (5 mile) radius of the Project area. The nearest
record is a 1998 sighting from the Dow Chemical wetland mitigation site, approximately
4.5 km (2.8 miles) west of the Project site. It is also known from south Sherman Island
on the opposite side of the River from the Project site. Due to the presence of
marginally suitable habitat on site, its presence cannot be ruled out.

**Song Sparrow “Modesto Population”** (Federal: MBTA; State: Species of Special
Concern). The Modesto population of the song sparrow (*Melospiza melodia*18) is a
California Species of Special Concern (CDFW 2014a) and is protected under the
MBTA. The species has been assigned a global and state ranking of G5/S3 (CNDDB
2014); species assigned a ranking of S3 are considered vulnerable in the state due to
their restricted range, relatively few populations, or other factors making them very
vulnerable to extirpation (CDFW 2014a).

Distinct from the three subspecies that are endemic to the San Francisco Bay region,
the Modesto population inhabits the Central Valley. The Modesto population of song
sparrow is not listed under FESA; as such, no critical habitat has been designated. The
Project area is considered to provide marginally suitable nesting habitat for Suisun song
sparrow in the form of adjacent tules and blackberry brambles. Suisun song sparrow is
known from two records within an 8 km (5 mile) radius of the study area. The nearest
record is a 1901 sighting from the Refuge, approximately 0.8 km (0.5 mile) west of the
Project site. Due to the presence of marginally suitable habitat on site, its presence
cannot be ruled out.

**Special-status and Other Migratory Birds.** In addition to the white-tailed kite and the
two song sparrows discussed above, the Project area supports suitable nesting habitat
for a variety of other special-status and migratory raptors (birds of prey) and passerines
(perching birds). Migratory birds are protected under the MBTA; needless destruction of
nests is generally prohibited under the California Fish and Game Code.

No bird nests were observed on site during the site survey, although a pair of black
phoebes was exhibiting site fidelity at the western end of the wharf; these birds may be

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18 The Modesto population is considered by some to belong to the subspecies *M. m. mailliardi.*
nesting on the underside of the dock. Based on the amount of vegetative cover on site, there is a high potential for the use of this habitat for breeding.

**Sacramento Splittail** (Federal: Candidate; State: Species of Special Concern). The Sacramento splittail (*Pogonichthys macrolepidotus*) is Species of Special Concern in California and is regarded as Vulnerable by the American Fisheries Society (CDFW 2014a). Although it was determined that the species did not warrant federal listing by the USFWS in 2010, it remains a candidate for listing under FESA. It has been assigned a global and state ranking of G2/S2; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW 2014a).

Splittail are generally restricted to brackish waters of the San Francisco estuary and its tributaries and are found most often in slow moving sections of rivers and sloughs including dead end sloughs and shallow edge habitats. Splittail are frequently found in areas subject to flooding because they require flooded vegetation for spawning and rearing in waters at least 1 meter (3.3 feet) deep.

Sacramento splittail is not listed under FESA; as such, no critical habitat has been designated for the species. The Project site is located within suitable habitat for the Sacramento splittail, and the species is considered to potentially occur on site. Sacramento splittail has not been recorded from within an 8 km (5 mile) radius of the Project site (CNDDB 2014). Due to the presence of suitable habitat on site, the presence of Sacramento splittail is assumed.

**Sacramento Perch** (Federal: none; State: Species of Special Concern). The Sacramento perch (*Archoplites interruptus*) is listed as a California Species of Special Concern and is regarded as Threatened by the American Fisheries Society (CDFW 2014a). It has been assigned a global and state ranking of G2/G3/S1; species assigned a ranking of S1 are considered imperiled in the state due to its very restricted range, very few populations, or other factors making it very vulnerable to extirpation (CDFW 2014a).

The Sacramento perch is endemic California, known from 28 localities in the Central Valley, including tributaries to the San Francisco Estuary. Sacramento perch is not listed under FESA; as such, no critical habitat has been designated for the species. The Project site is located within suitable habitat for the Sacramento perch. It has been reported from a single record within an 8 km (5 mile) radius of the Project site. That record is an undated collection of a juvenile fish taken at the intake screens of the Contra Costa Power Plant on the south shore of the San Joaquin River 2.2 km (1.4 miles) east of the Project site. Due to the presence of suitable habitat on site, the presence of Sacramento perch is assumed.
Hardhead (Federal: none; State: Species of Special Concern). The hardhead \(\text{Mylopharodon conocephalus}\) is listed as a California Species of Special Concern and is regarded as Sensitive by the U.S. Forest Service (CDFW 2014a); it is not listed under FESA. It has been assigned a global and state ranking of G2/S3; species assigned a ranking of S3 are considered vulnerable in the state due to their restricted range, relatively few populations, or other factors making them very vulnerable to extirpation (CDFW 2014a).

Hardhead is a large minnow that is widely distributed in small to large streams at low to mid-elevations in the Sacramento-San Joaquin, Russian, and Napa River drainages. Hardhead is not listed under FESA; as such, no critical habitat has been designated for the species. The Project site is located within suitable habitat for the hardhead. It has not been reported from within an 8 km (5 mile) radius of the Project site. Nonetheless, due to the presence of suitable habitat on site, the presence of hardhead is assumed.

California Sea Lion (Federal: MMPA; State: none). The California sea lion \(\text{Zalophus californianus}\) is not listed under either FESA or CESA; however, it is protected under the MMPA.

California sea lions are found from Vancouver Island, British Columbia to the southern tip of Baja California, Mexico. They breed mainly on offshore islands, ranging from southern California’s Channel Islands south to Mexico, although a few pups have been born on Año Nuevo and the Farallon Islands on the central Californian coast (National Oceanic and Atmospheric Administration [NOAA] 2014).

Sandy beaches are preferred for haul out sites, although in California they haul out on marina docks as well as jetties and buoys. California sea lions feed mainly in upwelling areas on a variety of prey such as squid, anchovies, mackerel, rockfish, and sardines. They also take fish from commercial fishing gear, sport-fishing lines, and at fish passage facilities at dams and rivers. Breeding season lasts from May to August while most pups are born from May through July (NOAA 2014). Preferred breeding habitat, haul out sites, are located in shallow coastal waters and estuaries with sandy beaches for pupping.

The California sea lion is not listed under FESA; as such, no critical habitat has been designated for the species. The Project area is located in aquatic habitat in which California sea lion could occur. Occurrence data are not maintained by the CNDDB (2014), and there are no known California sea lion haul out locations within several miles of the Project area. The species may, however, move through or opportunistically forage within the lower San Joaquin River. Due to the periodic presence of California sea lions in the San Joaquin River, their presence in or near the work area is assumed.
Harbor Seal (Federal: MMPA; State: not listed). The harbor seal (*Phoca vitulina*) is not listed under either FESA or CESA; however, it is protected under the MMPA.

Harbor seals are fairly common, non-migratory pinnipeds inhabiting coastal and estuarine waters from Alaska to Baja California, Mexico. They are a year-round resident in the San Francisco Bay Area (Codde et al. 2012). They haul out on rocks, reefs, and beaches, and feed in marine, estuarine, and occasionally fresh waters (Zeiner et al. 1990). Harbor seals are present in estuaries and coastal regions where there is a viable food supply from Central Mexico to Alaska (The Marine Mammal Center [TMMC] 2015). Seal pups are born between February and April on sandy beaches or rocky outcrops (TMMC 2015).

The harbor seal is not listed under FESA; as such, no critical habitat has been designated for the species. The Project site is located in aquatic habitat in which harbor seal could occur. Occurrence data are not maintained by the CNDDB (2014), and there are no known harbor seal haul out locations within several miles of the Project area. The species may however move through or opportunistically forage within the lower San Joaquin River. Due to the periodic presence of harbor seal in the San Joaquin River, their presence in or near the work area is assumed.

3.4.1.3 Invasive Species

Many “non-native” species have been imported for their food, fiber or ornamental values. Most cannot grow without human cultivation. However, some imported plants and animals, no longer constrained by the conditions that keep their populations in check at home, rapidly reproduce and quickly spread. Such species are called invasive. Invasive species threaten the diversity or abundance of native species through competition for resources, predation, parasitism, interbreeding with native populations, transmitting diseases, or causing physical or chemical changes to the invaded habitat. Through their impacts on natural ecosystems, agricultural and other developed lands, and water delivery and flood protection systems, invasive species may also negatively affect human health and/or the economy. Examples of direct impact to human activities include the clogging of navigable waterways and water delivery systems, weakening flood control structures, damaging crops, introducing diseases to animals that are raised or harvested commercially, and diminishing sportfish populations.

Several invasive aquatic species have rapidly spread in California’s waterways and have become a great concern to the State’s aquatic resources. Three freshwater mollusks are of great concern in California. These include the Quagga mussel (*Dreissena rostriformis bugensis*) and Zebra mussel (*Dreissena polymorpha*), which belong to the Drissenidae family, and the New Zealand mudsnail (*Potamopyrgus antipodarum*), a member of the Hydrobiidae family.
In addition to moving downstream with the flow of water, these mollusks are transported by humans moving equipment and objects from one waterbody to another. Adults attach to hulls of watercraft, persist in mud caked on tires, tractor treads, and equipment, and the microscopic larvae can be transported on waders and boots, nets and other fishing gear, bilges, ballasts, live wells, or any equipment that holds water. They can survive out of water for a week or longer.

### 3.4.2 Regulatory Setting

Federal and State laws and regulations pertaining to this issue area and relevant to the Project are identified in Table 3.4-1.

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<tr>
<th>U.S.</th>
<th>Law/Regulation</th>
<th>Description</th>
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| U.S. | Endangered Species Act (FESA) (7 USC 136, 16 USC 1531 et seq.) | The FESA, which is administered in California by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), provides protection to species listed as threatened or endangered, or proposed for listing as threatened or endangered. Section 9 prohibits the “take” of any member of a listed species.  
- Take is defined as “…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”  
- Harass is “an intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering.”  
- Harm is defined as “…significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.”  
When applicants are proposing projects with a Federal nexus that “may affect” a federally listed or proposed species, the Federal agency is required to consult with the USFWS or NMFS, as appropriate, under Section 7, which provides that each Federal agency must ensure that any actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of areas determined to be critical habitat. |
| U.S. | Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801 et seq.) | The MSA is the primary law governing marine fisheries management in U.S. Federal waters. The MSA was first enacted in 1976 and amended in 1996. Amendments to the 1996 MSA require the identification of Essential Fish Habitat (EFH) for federally managed species and the implementation of measures to conserve and enhance this habitat. Any project requiring Federal authorization, such as a USACE permit, is required to complete and submit an EFH Assessment with the application and either show that no significant impacts to the essential habitat of managed species are expected or identify mitigations to reduce those impacts. Under the MSA, Congress defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 USC 1802(10)). The EFH provisions of the MSA offer resource managers a means to heighten consideration of fish habitat in resource management. Pursuant to section 305(b)(2), Federal agencies shall consult with the NMFS regarding any action they authorize, fund, or undertake that might adversely affect EFH. |
| U.S. | Marine Mammal | The MMPA is designed to protect and conserve marine mammals and their habitats. It prohibits takes of all marine mammals in the U.S. with few |
exceptions. The NMFS may issue a take permit under section 104 if the activities are consistent with the purposes of the MMPA and applicable regulations at 50 Code of Federal Regulations (CFR), Part 216. The NMFS must also find that the manner of taking is “humane” as defined in the MMPA. If lethal taking of a marine mammal is requested, the applicant must demonstrate that using a non-lethal method is not feasible.

The MBTA was enacted to ensure the protection of shared migratory bird resources. The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. The responsibilities of Federal agencies to protect migratory birds are set forth in EO 13186. The USFWS is the lead agency for migratory birds. The USFWS issues permits for takes of migratory birds for activities such as scientific research, education, and depredation control, but does not issue permits for incidental take of migratory birds.

Section 10 of the RHA prohibits the creation of any obstruction not affirmatively authorized by Congress to the navigable capacity of any of the waters of the United States. Except where recommended by the Chief of Engineers and authorized by the Secretary of War, it is unlawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of any channel of any navigable waters of the United States.

Section 401 (33 USC 1341) of the CWA specifies that any applicant for a federal permit to conduct any activity which may result in any discharge into the navigable waters of the United States to obtain a certification or waiver thereof from the state in which the discharge originates that such a discharge will comply with state water quality standards.

Section 404 (33 USC 1344) of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands, streams, rivers, lakes, coastal waters or other water bodies or aquatic areas that qualify as waters of the United States.

The Bald and Golden Eagle Protection Act makes it illegal to import, export, take (including molest or disturb), sell, purchase or barter any bald eagle or golden eagle or parts thereof.

Executive Order 13112 requires Federal agencies to use authorities to prevent introduction of invasive species, respond to and control invasions in a cost-effective and environmentally sound manner, and provide for restoration of native species and habitat conditions in invaded ecosystems.

Executive Order 13158 requires Federal agencies to identify actions that affect natural or cultural resources within a Marine Protected Area (MPA) and, in taking such actions, to avoid harm to the natural and cultural resources that are protected by a MPA.
serve as watch lists. Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project site and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may affect a candidate species. The CESA also requires a permit to take a State-listed species through incidental or otherwise lawful activities (§ 2081, subd. (b)).

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<tr>
<th>CA</th>
<th>Lake and Streambed Alteration Program (LSAP; Fish &amp; G. Code, §§ 1600-1616)</th>
<th>The CDFW regulates activities that would interfere with the natural flow of, or substantially alter, the channel, bed, or bank of a lake, river, or stream. These regulations require notification of the CDFW for lake or stream alteration activities. If, after notification is complete, the CDFW determines that the activity may substantially adversely affect an existing fish and wildlife resource, the CDFW has authority to issue a Streambed Alteration Agreement.</th>
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| CA | Other relevant California Fish and Game Code sections | - The California Native Plant Protection Act (Fish & G. Code, § 1900 et seq.) is intended to preserve, protect, and enhance endangered or rare native plants in California. This Act includes provisions that prohibit the taking of listed rare or endangered plants from the wild and a salvage requirement for landowners. The Act directs the CDFW to establish criteria for determining what native plants are rare or endangered. Under section 1901, a species is considered endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered.  
- Fish and Game Code sections 3503 & 3503.5 prohibit the taking and possession of native birds’ nests and eggs from all forms of needless take. These regulations also provide that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nests or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto.  
- Fish and Game Code sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) designate certain species as “fully protected.” Fully protected species, or parts thereof, may not be taken or possessed at any time without permission by the CDFW.  
- Fish and Game Code section 3513 does not include statutory or regulatory mechanism for obtaining an incidental take permit for the loss of non-game, migratory birds.  
- Porter-Cologne Water Quality Control Act (Porter-Cologne; Cal. Water Code, § 13000 et seq.) |

1 Local goals, policies, and/or regulations applicable to this issue area are listed below.

2 Although the Project site itself, which is situated on state lands, is not subject to the policies of the Antioch General Plan, the Plant, located on uplands, is. An overview of the General Plan policies relevant to biological resources is presented below. As stated in the General Plan (City of Antioch 2003), it is the objective of the City of Antioch to preserve natural streams and habitats supporting rare and endangered species of plants and animals. The city of Antioch has established certain policies to support this objective.
## General Plan Policies

<table>
<thead>
<tr>
<th>10.42 Biological Resources Policies</th>
<th>Project Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Comply with the Federal policy of no net loss of wetlands through avoidance and clustered development. Where preservation in place is found not to be feasible (such as where a road crossing cannot be avoided, or where shore stabilization or creation of shoreline trails must encroach into riparian habitats), require 1) on-site replacement of wetland areas, 2) off-site replacement, or 3) restoration of degraded wetland areas at a minimum ratio of one acre of replacement/restoration for each acre of impacted onsite habitat, such that the value of impacted habitat is replaced.</td>
<td>The proposed Project would not impact wetlands.</td>
</tr>
<tr>
<td>b. Preserve in place and restore existing wetlands and riparian resources along the San Joaquin River and other natural streams in the Planning Area, except where a need for structural flood protection is unavoidable.</td>
<td>Existing wetlands and riparian habitat within the study area would not be affected by Project implementation.</td>
</tr>
<tr>
<td>c. Require appropriate setbacks adjacent to natural streams to provide adequate buffer areas ensuring the protection of biological resources, including sensitive natural habitat, special-status species habitats and water quality.</td>
<td>Not applicable: no new development is proposed in the vicinity of wetlands or riparian habitat.</td>
</tr>
<tr>
<td>d. Through the project approval and environmental review processes, require new development projects to protect sensitive habitat areas, including but not limited to, oak woodlands, riparian woodland, vernal pools, and native grasslands. Ensure the preservation in place of habitat areas found to be occupied by state and federally protected species.</td>
<td>No new development is proposed; existing wetlands, riparian habitat and woodland habitat on site would not be affected by Project implementation.</td>
</tr>
<tr>
<td>e. Limit uses within preserve and wilderness areas to resource-dependent activities and other uses compatible with the protection of natural habitats (e.g., passive recreation and public trails).</td>
<td>The proposed Project would not affect any preserves or wilderness areas.</td>
</tr>
<tr>
<td>f. Through the project review process, review, permit the removal of healthy, mature oak trees on a case-by-case basis only where it is necessary to do so.</td>
<td>The proposed Project would not affect any native oak trees.</td>
</tr>
<tr>
<td>g. Preserve heritage trees throughout the Planning Area.</td>
<td>The proposed Project would not affect any heritage trees.</td>
</tr>
<tr>
<td>h. Within areas adjacent to preserve habitats, require the incorporation of native vegetation and avoid the introduction of invasive species in the landscape plans for new development.</td>
<td>The proposed Project is adjacent to the Antioch Dunes National Wildlife Refuge. No landscaping is proposed as part of the Project.</td>
</tr>
<tr>
<td>i. Design drainage within urban areas so as to avoid creating perennial flows within intermittent streams to prevent fish and bullfrogs from becoming established within a currently intermittent stream.</td>
<td>The proposed Project would not increase impervious surfaces and would not contribute to dry-season runoff into any intermittent streams.</td>
</tr>
<tr>
<td>j. Whenever a biological resources survey is undertaken to determine the presence or absence of a threatened or endangered species, or of a species of special concern identified by the U.S. Fish and Wildlife Service or the California Department of Fish and Wildlife, require the survey to follow established protocols for the species in question prior to any final determination that the species is absent from the site.</td>
<td>No focused biological surveys have been performed as part of the proposed Project. The presence of federally and or state protected fish species has been presumed and appropriate impact avoidance, minimization and mitigation measures are proposed, consistent with federal and state laws.</td>
</tr>
</tbody>
</table>
3.4.3 Impact Analysis

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Project implementation could result in significant adverse effects on 10 special-status fish species, including North American green sturgeon, steelhead (Central Valley DPS and Central California Coast DPS), chinook salmon (Central Valley spring-run ESU and Sacramento River winter-run ESU), Delta smelt, longfin smelt, Sacramento perch, Sacramento splittail, and hardhead.

Project implementation could result in significant adverse effects on special-status mammals, reptiles, and birds, including harbor seal, California sea lion, Pacific pond turtle, white-tailed kite, song sparrow “Modesto population,” Suisun song sparrow, and a wide variety of migratory bird species, as described below and in the Biological Assessment (Appendix D).

The closest occurrence of LMB to the Project site is from within the Refuge (over 400 feet away), and there is no suitable habitat for LMB on the uplands directly adjacent to the wharf. Nonetheless, GP Gypsum proposes to conduct all pile-driving activities between October 1 and November 30 to ensure adult LMB are not affected during their flight season (August 1-September 29). Additional information regarding LMB is contained in Appendix D, Biological Assessment.

No special-status plant species occur within the Project work area; however, two special-status species, Suisun Marsh aster and Delta tule pea, occur on the shoreline. Two special-status plant species, Mason’s lilaeopsis and Delta mudwort, could also occur here but were not documented during the site visit. Project implementation would have no direct adverse effects on special-status plant species because all Project work will take place in and from the water, and measures to prevent incidental impacts that could result during the positioning of barges, tugboats or other equipment near the shoreline will be implemented.

The primary impacts to marine mammals and fish are likely to occur from shock or acoustic waves generated from pile removal and installation. Potential impacts to marine species are dependent on sound source levels and frequencies, animal hearing sensitivity, proximity to the sound source, noise duration, and time of operation.

The Project would use both vibratory and impact hammers to drive the piles. Each pile would require approximately 15 minutes of vibratory driving and 100 to 700 blows with an impact hammer to drive the piles to their final elevation (Illingworth & Rodkin 2014). It
is anticipated that an APE 400 vibratory hammer and a Delmag D160 diesel impact hammer would be required to drive the 42-inch, 48-inch, and the 72-inch piles; while the 24-inch and the 30-inch walkway piles would be installed using an ICE 44 vibratory hammer and a Delmag D62 diesel impact hammer (Illingworth & Rodkin 2014). For the vibratory hammer, each pile is estimated to be driven 30 feet in approximately 15 minutes. Impact hammer driving would then be used until the pile reaches its required depth, and is anticipated to result in 20 blows per foot. The Project is anticipated to install one pile per day for the 72-inch piles and up to two piles per day for all other piles. An estimated 24 days of in-water construction is planned.

Hearing sensitivities of marine species vary depending upon their anatomy and physiology. For example, some species, such as marine mammals, seem to be more sensitive to the sound pressure component of sound, while some fish appear to be more sensitive to the particle motion component of sound. Additionally, a species’ hearing sensitivity to sound also varies depending upon the frequency of the sound since not all marine species hear equally well at all frequencies. The Project would be carried out using a combination of vibratory and impact hammers, both of which create underwater impacts. Under typical pile driving conditions, impact hammer driven steel piles may be expected to generate peak sound pressure levels (SPL) within a range of about 180 decibels (dB) to 210 dB, while piles driven by a vibratory hammer may reduce the levels by about 10 dB to 30 dB (Caltrans 2012). Impact hammers may produce higher sound levels than vibratory hammers, but vibratory hammers distribute the sound over a wider range of frequencies due to their non-impulsive nature. Impact pile driving can generally be expected to produce frequencies in the 100 hertz (Hz) to 2 kilohertz (kHz) range, while vibratory hammers are generally in the 400 Hz to 2.5 kHz frequency range (Blackwell 2005).

The NMFS has identified acoustic threshold (received sound level) criteria which marine mammals are predicted to experience changes in their hearing sensitivity, either permanent or temporary hearing threshold shifts. Physiological responses such as auditory or non-auditory tissue injuries are known as Level A Harassment in the MMPA and harm in the FESA. Level A Harassment becomes a concern when the sound levels from man-made sounds reach or exceed the acoustic threshold associated with auditory injury in marine species. A permanent threshold shift (PTS) is a permanent, irreversible increase in an animal’s auditory threshold within a given frequency band or range of the animal’s normal hearing. A temporary threshold shift (TTS) is a temporary, reversible increase in the threshold of audibility at a specific range of frequencies. While TTS is not an injury, it is considered Level B Harassment by the MMPA and harassment by the FESA. Along with TTS, Level B Harassment also includes behavioral impacts. For pinnipeds, NMFS has specified Level A SPL thresholds as 190 dB referenced to (re) 1
micropascal (μPa)\(^{19}\) (root mean squared [rms]\(^{20}\)). The Level B SPL threshold for all marine mammals is 160 dB re 1 μPa (rms).

Generally, the hearing ranges for both the harbor seal (75 Hz to 100 kHz) and California sea lion (100 Hz to 40 kHz) overlap the entire expected frequency range of the pile drivers. Furthermore, the highest sound levels for pile driving would overlap frequencies at which pinniped hearing is most sensitive. The current NMFS acoustic threshold levels, used for most sound sources, do not take into account exposure, duration, sound frequency composition, repetition rate, and a species’ hearing sensitivity. In 2013, NMFS proposed new acoustic threshold levels (that may be finalized and implemented in 2015) that take into account some of these factors, including dividing marine mammals into functional hearing groups.

Hearing capabilities vary considerably between fish species and within fish groups. Fish species within a group may also differ substantially in terms of their hearing structures. Fishes hear when hair cells are directly stimulated by particle motion in the water. Some fishes also have swim bladders or other air sacs that can detect and convert the pressure component of a sound field into particle motion, which directly stimulates the inner ear, allowing the fishes to detect sound. The majority of fishes are hearing generalists, which usually only hear sounds up to 1.5 kHz. As described in Weston Solutions, Inc. (2014), acoustic shock waves from pile driving have been known to cause damage and mortality to fish but relatively little is known about the effects of pile driving on wild fish populations. Studies have shown damage to fish auditory tissues, swim bladder function, and blood vessels in caged specimens when exposed to SPLs greater than 180 dB re 1 μPa (rms).

Investigators have extrapolated from reduced capture rates that unrestrained pelagic species would avoid areas of high SPLs, while video documentation of reef species with greater site fidelity showed only minor behavioral response. Damage to larvae and eggs is of some concern since these are planktonic with little or no ability for avoidance. Effects on planktonic stages have been less studied than effects on adult fish, but evidence points to some potential mortality in the immediate vicinity of high SPLs. Investigators have also concluded that the extent of larval and egg mortality from high SPLs would be less than the loss through natural causes. Injury thresholds for fish are variable, depending on species, size and/or age of the individual. There is insufficient evidence in the literature to establish noise exposure criteria for fish. However, in 2008 the Fisheries Hydroacoustic Working Group devised an Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities that established SPLs of 206 dB-peak and 187 dB-accumulated for all listed fish and 183 dB-accumulated for fish less than 2 grams (Caltrans 2009). The Project’s pile-driving noise impacts to marine

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\(^{19}\) 1 μPa is the reference sound pressure for sound in water.

\(^{20}\) Root-mean-square (rms) is the average of the squared sound pressure over some duration.
mammals and fish were modeled by Illingsworth and Rodkin (2014), which is included as Appendix E and summarized in Tables 3.4-2 and 3.4-3.

Table 3.4-2. Modeled Extent of SPL from Impact Driving of One Pile

<table>
<thead>
<tr>
<th>Modeling Scenario</th>
<th>Distance to Marine Mammal Acoustic Criteria in Meters</th>
<th>Distance to Fish Acoustic Criteria in Meters</th>
<th>Distance to Behavioral Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RMS (dB re: 1uPa) Peak (dB re: 1uPa) Cumulative SEL(^1) (dB re: 1uPa-sec(^2))</td>
<td>RMS (db re:1uPa)</td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>160</td>
<td>180</td>
<td>190</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>510</td>
<td>35</td>
<td>&lt;10</td>
</tr>
<tr>
<td>72-inch Piles (Pile ID: BD 1-4) Estimated 700 Pile Strikes per Pile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>1,970(^2)</td>
<td>130</td>
<td>35</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>510</td>
<td>35</td>
<td>&lt;10</td>
</tr>
<tr>
<td>48-inch Pile (Pile ID: MD 3) Estimated 520 Pile Strikes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>765(^2)</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>200</td>
<td>15</td>
<td>&lt;10</td>
</tr>
<tr>
<td>42-inch Piles (Pile ID: MD 1&amp;2) Estimated 420 Pile Strikes per Pile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>765(^2)</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>200</td>
<td>15</td>
<td>&lt;10</td>
</tr>
<tr>
<td>30-inch Piles (Pile ID: WB 3-5) Estimated 100 Pile Strikes per Pile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>580</td>
<td>40</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>150</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
<tr>
<td>24-inch Piles (Pile ID: WB 2&amp;6) Estimated 360 Pile Strikes per Pile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>510</td>
<td>35</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>130</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
<tr>
<td>24-inch Pile (Pile ID: WB 1) Estimated 160 Pile Strikes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeled Unattenuated</td>
<td>510</td>
<td>35</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Assuming a 10 dB Reduction with Attenuation</td>
<td>130</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
</tbody>
</table>

Notes:
\(^1\) Based on driving of one pile. SEL criteria apply to impact pile driving events that occur during 1 day.
\(^2\) Distance to underwater noise thresholds is constrained by river topography.
Table 3.4-3. Modeled Cumulative SEL Under Various Pile Driving Scenarios

<table>
<thead>
<tr>
<th>Striking Configuration</th>
<th>Total Strikes</th>
<th>Attenuation</th>
<th>Cumulative SEL (dB) at 10 Meters</th>
<th>Distance to 187 dB Cumulative SEL (Metres)</th>
<th>Distance to 183 dB Cumulative SEL (Metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One 72-inch pile</td>
<td>700</td>
<td>Unattenuated</td>
<td>217</td>
<td>620</td>
<td>1,065</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>207</td>
<td>160</td>
<td>275</td>
</tr>
<tr>
<td>MD1 (42-inch) &amp; WB1 (24-inch)</td>
<td>580</td>
<td>Unattenuated</td>
<td>207</td>
<td>145</td>
<td>245</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>197</td>
<td>40</td>
<td>65</td>
</tr>
<tr>
<td>MD2 (42-inch) &amp; WB2 (24-inch)</td>
<td>780</td>
<td>Unattenuated</td>
<td>208</td>
<td>170</td>
<td>290</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>198</td>
<td>45</td>
<td>75</td>
</tr>
<tr>
<td>BD1 (72-inch) &amp; WB3 (30-inch)</td>
<td>800</td>
<td>Unattenuated</td>
<td>217</td>
<td>585</td>
<td>1,005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>207</td>
<td>150</td>
<td>260</td>
</tr>
<tr>
<td>WB4 (30-inch) &amp; WB5 (30-inch)</td>
<td>200</td>
<td>Unattenuated</td>
<td>200</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>190</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>WB6 (24-inch) &amp; MD3 (48-inch)</td>
<td>880</td>
<td>Unattenuated</td>
<td>209</td>
<td>180</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>198</td>
<td>50</td>
<td>80</td>
</tr>
<tr>
<td>WB5 (30-inch) &amp; WB6 (24-inch)</td>
<td>460</td>
<td>Unattenuated</td>
<td>204</td>
<td>95</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attenuated</td>
<td>194</td>
<td>25</td>
<td>40</td>
</tr>
</tbody>
</table>

In addition, The NMFS defined the Hydroacoustic Action Area as the maximum distance around the Project site subject to 150 dB using attenuation, and defined the Acoustic Impact Area as the maximum distance to the 187 dB cumulative SEL level using attenuation. These areas are depicted in Figure 3.4-3.

Special-Status Marine Mammals: Less than Significant with Mitigation. As indicated in Table 3.4-2 above, harbor seals and California sea lions that may be transiting near the wharf during pile extraction and installation activities could be exposed to SPLs exceeding the NMFS Level A (e.g., within a 35 meter radius for the 72-inch piles) and Level B (e.g., within a 1,970 meter radius for the 72-inch piles) take thresholds. Both the sound level and duration of exposure to pile driving would affect the magnitude of effect on these pinnipeds. As a result, the Project could result in a potentially significant impact to harbor seals and California sea lions absent measures to avoid and minimize this potential impact. Informal consultation between the Applicant and NMFS has been ongoing since approximately October 2014. In addition to consultation under FESA, the federal action agency, USACE, recommended the Applicant submit an application for a Minor Impact Letter of Permission (LOP) under Section 10 of the Rivers and Harbors Act. As a requirement of the LOP, the Project must have an overall minimal impact, both individually and cumulatively, on aquatic resources.
Figure 3.4-3  NMFS Hydroacoustic Action Area

Project Area
Acoustic Impact Area* (160 meters)
Action Area (1,970 meters)
*Cumulative SEL of 187dB
To avoid Level A take, sound attenuation techniques, including a “soft-start” procedure and use of a cushion block and bubble curtain, as described in Mitigation Measure (MM) BIO-7, below, would be employed. In particular, the soft-start would gradually ramp up the intensity of the pile strikes such that any pinnipeds in the area would have a chance to leave prior to experiencing hearing damage. A small number of animals, if present, could still be subjected to sounds exceeding 160 dB; however, this level of exposure would not involve physical injury, instead only resulting in behavioral avoidance (Level B take). Implementation of MM BIO-10, below, would reduce the potential exposure by marine mammals to sounds exceeding 160 dB by monitoring an “exclusion zone” around the pile driving and ceasing such activities if marine mammals are detected within the exclusion zone. Additionally, the duration of pile driving activities would be limited (see Section 2, Project Description) and temporary, and the presence of harbor seals and California sea lions in the area is expected to be unlikely due to the absence of suitable haul-out sites.

Given the information above, potential impacts to pinnipeds found near the Project would be less than significant with implementation of MM BIO-7 and MM BIO-10, below.

Special-Status Fish: Less than Significant with Mitigation. Potentially significant adverse impacts on the special-status fish species and EFH listed above may result from pile driving, re-suspension of contaminants entrained in the sediment, disruption of benthic prey organisms, increased turbidity, potential increased predation on migrating salmonids due to structure shadow effects, and contact with construction equipment.

Pile Driving Impacts to Fish: The SPLs generated during unattenuated impact driving of all piles except the 24-inch piles would exceed the adopted 206 dB peak acoustic criteria for injury to fish at a distance of 10 meters. With implementation of the sound attenuation measures described in MM BIO-7, however, the distance to the 206 dB level would be reduced to less than 10 meters for all pile sizes. Even with implementation of sound attenuation, fish that may be present in the Project vicinity could experience cumulative sound exposure levels (SEL) if they were within 275 meters (to the 183 dB threshold) from the sound source, which would be considered a significant impact. Implementation of a work window restriction and soft-start procedure, however, would reduce this potential impact. Specifically, limiting the construction period to between August 1 and November 30 would ensure that non-mobile life stages (eggs and larvae) of special-status fish species would not be present, and implementation of the soft start (slowly increasing the dB from the impact strikes) would allow the mobile phase (juvenile or adult) of any of the special-status species to move out of the area before they would encounter the potentially injurious exposure levels. Finally, hydroacoustic and biological monitoring would be conducted during pile driving to document acoustic field distances and any observable biological effects to fish. Consequently, the impact would be less than significant with implementation of MM BIO-1 and MM BIO-7, which are described in detail below.
Impacts to fish spawning and rearing habitats: The Project would not result in any impacts to spawning or rearing habitat, would not impair migration or reproduction, and is unlikely to cause injury or mortality to special-status fish because it would take place during recommended in-water work windows. Therefore, this impact is considered to be less than significant with implementation of MM BIO-1.

Re-suspension of Contaminants Entrained in the Sediment: Pile driving and equipment operations and movement could stir up contaminants entrained in the sediment, releasing them into the water column and making them available for uptake by aquatic organisms. Sediment contamination in the vicinity of the wharf was investigated in 2009 (Weston 2010 and 2011). Results of vibracore sample analysis indicated that there were no constituents of concern above benchmark levels for toxicity. Therefore, this impact is considered to be less than significant.

Disruption of Benthic Prey Organisms: Disruption of benthic prey organisms may occur in the area of pile removal and replacement. However, the area of effect of the dolphin replacements would be relatively small and unlikely to reduce food resources to a substantial level. Therefore, this impact is considered to be less than significant.

Increased Turbidity: Turbidity in the construction zone is likely to temporarily increase during demolition and pile driving activities due to re-suspension of fine sediments. The amount and extent is difficult to predict, but would likely be limited to the 24 days of in-water work. Turbidity plumes are likely to disperse relatively quickly at the site due to tidal currents in the channel. To reduce this impact, turbidity monitoring would be conducted and work would cease if turbidity was excessive, as described below in MM BIO-6. After mitigation, this impact would be less than significant.

Contact with Construction Equipment: Fish could potentially be injured or killed by contact with construction equipment, especially in shallow, vegetated areas where escape/avoidance would be difficult. This impact would be reduced to a less than significant level by implementation of MMs BIO-1, BIO-2, BIO-3, BIO-5, and BIO-6.

Special-Status Reptiles: Less than Significant with Mitigation. Due to the presence of marginally suitable aquatic habitat in the Project area and the occurrence of the species in the vicinity, the potential exists for the occurrence of resident or transient Pacific pond turtles on site. If present during construction, direct mortality, injury and/or harassment of individuals could result. Significant impacts on special-status reptiles may result from acoustic shock waves generated from pile driving, increased noise and human activity, contact with construction equipment, as discussed above for special status fish. The nature and significance of these impacts would be similar to those for fish. These impacts would be mitigated to a less than significant level with the implementation of MMs BIO-2, BIO-3, BIO-5, BIO-6, BIO-7, and BIO-8.
Special-Status Birds: Less than Significant with Mitigation. As currently proposed, the Project would not require the removal or significant pruning of any trees and therefore would not result in direct impacts on white-tailed kite, Modesto song sparrow, Suisun song sparrow, or other special status bird species. However, Project implementation could have adverse effects on white-tailed kite, if present, by causing nest abandonment, harassment of individual special-status birds, or disruption of breeding activities during project construction. Such impacts are not expected to occur, however, due to the proposed work schedule of August 1 through November 30, which is outside the breeding, nesting, and rearing season. Implementation of MMs BIO-1, BIO-3, BIO-4, BIO-5, and BIO-9 would ensure impacts to birds remain less than significant.

Special-Status Plant Species: Less than Significant with Mitigation. The proposed Project would not require work on the shoreline or upland areas within the Project vicinity, where special-status plants may be found. Incidental impacts of the shoreline and special-status plant populations could occur from wave scour due to equipment, tugboat, and barge operations in the project area. This impact can be mitigated to a less than significant level with the implementation of MMs BIO-2, BIO-3, and BIO-4.

Mitigation Measures:

MM BIO-1: Timing of Work. All in-water work shall be performed within the environmental work window between August 1 and November 30.

MM BIO-2: Restriction on Equipment Movements. To avoid potential impacts to sensitive plants that may occur along the shoreline, boats, barges and any floating or submerged equipment shall be prevented from contacting the shoreline to avoid crushing native vegetation or wildlife.

MM BIO-3: Designation of an Agency-Approved Project Biologist. At least 30 days before initiating Project activates, the Project proponent shall obtain the California Department of Fish and Wildlife’s written approval for a designated Project Biologist. The Project Biologist shall be on site during initial Project activities and as necessary to oversee activities described for pile-driving acoustic monitoring (MM BIO-7) and monitoring of sensitive migratory birds (MM BIO-9).

MM BIO-4: Worker Environmental Awareness Program (WEAP). A WEAP shall be developed and presented by the Project Biologist. The WEAP shall cover the ecology, identification, legal protections afforded all potentially occurring special-status plant and animal species as well as the identified protective measures and implications of non-compliance. All persons employed
or otherwise working on the Project sites shall attend a WEAP presentation prior to performing any work on site.

MM BIO-5: Wildlife Protections. If any wildlife is encountered during the course of construction, said wildlife shall be allowed to leave the construction area unharmed and shall not be flushed, hazed, or herded away from the Project site.

MM BIO-6: In-Water Turbidity Protections. During pile removal activities, turbidity monitoring shall be monitored daily during an ebb tide, at 31 meters (100 feet) upstream and 92 meters (300 feet) downstream of the work site. If downstream turbidity measures are more than 15 Nephelometric Turbidity Units (NTU) above the upstream level, activities shall cease until turbidity levels drop below 15 NTUs above the upstream measurement. All incidents of exceedance of the turbidity standard shall be reported to the California Department of Fish and Wildlife (CDFW) within 24 hours. A turbidity-monitoring log shall be maintained and provided to the CDFW and the State Lands Commission staffs within 5 days from the completion of work.

MM BIO-7: Minimize Underwater Sound From Pile Driving. Underwater sound monitoring shall be performed during pile driving for all piles unless monitoring of the first pile of each size and type demonstrates that the accumulated sound exposure levels (SEL) do not exceed the cumulative exposure threshold of 183 decibels at 10 meters. A hydroacoustic monitoring log shall be kept and a monitoring report shall be submitted to the State Lands Commission staff upon completion of pile driving activities. In addition, underwater sound reduction measures shall be implemented, as follows:

a) Use of an impact hammer cushion block;

b) Use of impact hammers only during daylight hours;

c) Implementation of “soft start” procedures, in which impact strikes gradually increase in energy and frequency of impacts to permit wildlife to vacate the surroundings; and

d) Use of a bubble curtain surrounding piles during pile driving operations.

MM BIO-8: Toxic Substances Protections. To ensure toxic substances are not released into the aquatic environment, the following measures shall be followed:

a) all engine-powered equipment shall be well-maintained and free of leaks of fuel, oil, hydraulic fluid or any other potential contaminant;

b) all engine-powered equipment used and operated from the decks of barges, boats or the wharf shall be positioned over drip-pans;
c) a spill prevention and response plan shall be prepared in advance of the
commencement of work; a spill kit with appropriate clean-up supplies shall
be kept on hand during operations. The kit shall include a floating oil-
absorbent sock that could be immediately deployed and maintained around
the work barges in the event of a spill or any accidental leakage of fuel or
hydraulic fluids;

d) refueling and maintenance or mobile equipment shall not be performed
directly over the waters of the River. Only approved and certified fuel cans
with “no-spill” spring-loaded nozzles shall be used; and

e) All spill cleanup materials or other liquid or solid wastes shall be securely
containerized and labeled in the field during transport by barge to the
contractor’s yard.

**MM BIO-9: Protection of Migratory Birds.** To ensure special-status and other
migratory birds are not harmed during construction, the following measures shall
be followed:

a) If construction activities are scheduled to occur outside of the breeding
season (i.e., September 1 through January 31), no preconstruction
surveys or other mitigation measures are necessary.

b) If construction activities are scheduled to occur during the breeding
season (i.e., February 1 through August 31), a preconstruction nesting
bird survey shall be conducted of the wharf structures, the identified work
area and a buffer zone (see below). The survey should be performed by a
qualified biologist no more than two weeks prior to the initiation of work. If
no active nest is observed, work may proceed without restrictions. An
active nest is one that contains eggs, chicks, or young birds that have not
fledged from the nest.

c) For any active nests found near the construction limits (76 meters [250
feet] for raptors and 33 meters [100 feet] for passerines), the Project
biologist shall map their location and make a determination as to whether
or not construction activities are likely to disrupt the nest or cause nest
failure. If it is determined that construction is unlikely to disrupt incubation,
rearing, or fledging, construction may proceed. If it is determined that
construction may disrupt these behaviors, the no-construction buffer zone
shall be implemented. In general, the buffer zone shall be a minimum of
300 feet from the drip line of the nest tree or nest for raptors and 50 feet
for passerines. The ultimate size of the no-construction buffer zone may
be adjusted by the Project biologist based on the species involved,
topography, lines of sight between the work area and the nest, physical
barriers, and the ambient level of human activity. The buffer zone may be
reduced after consultation and with concurrence from the California
Department of Fish and Wildlife and/or the U.S. Fish and Wildlife Service Division of Migratory Bird Management. If it is determined that construction activities are likely to disrupt an active nest, construction activities within the no-construction buffer zone shall not proceed until the Project biologist determines that the young have left the nest and are foraging independently or the nest is no longer active.

d) If maintenance of a no-construction buffer zone is not practicable, active nests should be monitored by a qualified biologist to document breeding and rearing behavior of the adult birds. If it is determined that construction activities might cause nest abandonment, work shall cease until the young have left the nest and are foraging independently or the nest is no longer active.

**MM BIO-10: Protection of Marine Mammals.** To ensure potential impacts to harbor seals and California sea lions are minimized, the Project Biologist shall monitor for the presence of marine mammals during impact pile driving activities. The following acoustic “exclusion zone” shall be enforced around a pile being driven with an impact hammer:

- 510 meters for 72-inch piles
- 200 meters for 48 and 42-inch piles
- 150 meters for 30 and 24-inch piles

If a harbor seal or California sea lion is observed within the exclusion zone during impact hammer driving, pile driving will stop until the individual(s) moves beyond the limit of the exclusion zone on its own volition. Once the individual(s) moves outside of the exclusion zone, impact pile driving may resume.

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

**Less than Significant Impact.** No riparian habitat or sensitive natural communities occur within the proposed work area. The proposed Project would require the use of barges, tugboats, and other equipment and clothing that could potentially transfer invasive aquatic organisms and diseases between unrelated water bodies. To ensure that impacts to riparian or other sensitive natural communities, including aquatic communities, are minimized, the Applicant would ensure that all barges, tugboats and other equipment would originate from, ports or facilities in the San Francisco Bay Estuary. Currently, the barges anticipated for use on the Project have a home port at the contractor’s yard, 200 Cutting Boulevard, Richmond, CA; the tug boats anticipated for use on the Project are expected to come from Pier 50 in the Port of San Francisco.
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(c) Have a substantial adverse effect on federally protected wetlands as defined by section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant with Mitigation. The proposed Project does not require work in or directly adjacent to any wetlands. Incidental impacts to wetlands on the shoreline would be reduced to a less than significant level with the implementation of MMs BIO-2, BIO-3, BIO-4, and BIO-5, above. One wetland habitat, Hardstem Bulrush Marsh, occurs nearby, but Project implementation would have no direct adverse effects on special-status plant species occurring or potentially occurring there. In addition, work in the channel of the San Joaquin River is regulated under the Clean Water Act, Rivers and Harbors Act and the California Fish and Game Code; authorization for the proposed Project must be obtained from the USACE, CDFW and CVRWQCB prior to the initiation of work.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant with Mitigation. Project implementation is not expected to interfere substantially with the local or regional movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; therefore, impacts would not be considered significant. However, during construction activities, the non-migratory movements of special-status fish and marine mammal species, as well as Pacific salmon freshwater EFH could be temporarily affected by the movement of barges, tugboats and equipment as well as by underwater sound during pile driving, water turbidity, and accidental release of contaminants, as described in detail in the impact analysis for item a), above. Impacts on the movement of any native resident or migratory fish or wildlife species would be less-than significant with the implementation of MMs BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-7, BIO-8, and BIO-9.

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

No Impact. The Project would be consistent with the goals and policies of the City of Antioch General Plan.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?
No Impact. The only approved habitat conservation plan in the vicinity of the proposed Project is the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (Plan). The Project site is located on sovereign land within the limits of the city of Antioch; neither the city of Antioch nor the CSLC is a participant in that Plan. In addition, none of the activities associated with the proposed Project would conflict with the provisions of the Plan, and therefore there would be no impact. No other habitat conservation plans apply to the Project area.

3.4.4 Mitigation Summary

Implementation of the following mitigation measures would reduce the potential for Project-related impacts to Biological Resources to less than significant.

- MM BIO-1. Timing of Work
- MM BIO-2. Restriction on Equipment Movements
- MM BIO-3. Designation of an Agency-Approved Project Biologist
- MM BIO-4. Worker Environmental Awareness Program
- MM BIO-5. Wildlife Protections
- MM BIO-6. In-Water Turbidity Protections
- MM BIO-7. Minimize Underwater Sound From Pile Driving
- MM BIO-8. Toxic Substances Protections
- MM BIO-9. Protection of Migratory Birds
- MM BIO-10. Protection of Marine Mammals