

1 **3.4 BIOLOGICAL RESOURCES**

BIOLOGICAL RESOURCES – Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

2 **3.4.1 Environmental Setting**

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

9 The CEQA analysis presented below is based on an October 3, 2014, site visit and  
 10 technical reports prepared by Wood Biological Consulting, Inc. (2014) and Weston

1 Solutions, Inc. (2014). The subject property is highly industrialized, supporting paved  
2 and dirt lots surrounding the Plant facility. Only scattered vegetation is present, and it is  
3 restricted primarily to the perimeter of the property. Fairly dense vegetation is present  
4 on the River bank in front of the Plant directly opposite of the existing wharf facility.  
5 Based on the site survey literature, and air photo review, no submerged aquatic  
6 vegetation was noted along the shoreline immediately across from the wharf; however,  
7 such habitat is present to the west.

#### 8 3.4.1.1 Habitats

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

#### 14 **Subtidal Zone**

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

22 The vegetation type conforms to the Hardstem Bulrush Marsh (*Schoenoplectus acutus*)  
23 herbaceous alliance as described in Sawyer et al. (2009; CA vegetation code number  
24 52.122.01). The Hardstem Bulrush Marsh alliance has been assigned a rarity ranking of  
25 G5/S4,<sup>13</sup> indicating that this alliance may or may not be endemic to California and is  
26 presumed to be secure statewide (Sawyer et al. 2009). It would be classified as riverine,  
27 aquatic bed, permanently flooded wetland following Cowardin et al. (1979).

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

33 The River supports a wide range of wildlife species. A total of 32 fish species have been  
34 collected during sampling conducted at the adjacent Refuge, including the special-

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<sup>13</sup> For an explanation of global and state rarity rankings, see Appendix C.

1 status species Delta smelt, longfin smelt, Sacramento splittail, Chinook salmon,  
2 steelhead, hardhead (USFWS 2002). Other special-status fish species known from the  
3 Project vicinity include North American green sturgeon and Sacramento perch  
4 (California Natural Diversity Database [CNDDDB] 2014).

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

## 10 **Littoral Zone**

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

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

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

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

## 32 **River Bank**

33 Within the Project study area, the River bank has a substrate consisting of exposed  
34 loose imported rock and sand of local sources. Situated just above the high-tide line are

1 dense patches of the invasive species giant reed; several clumps of the invasive  
2 species pampas grass are present at the western end of the study area.

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

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

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

## 27 **Uplands**

28 Extending from the top of the River bank inward are areas devoid of vegetation and  
29 ruderal habitat. Ruderal habitat is that from which the native vegetation has been  
30 completely removed by grading, cultivation, or other surface disturbances. Left  
31 undeveloped, such areas typically become recolonized by invasive exotic species.  
32 Scattered native species might recolonize such sites after disturbances have ceased.  
33 Ruderal sites are typically dominated by herbaceous species, although scattered woody  
34 shrubs and trees may also begin to appear if left undisturbed long enough. Ruderal  
35 sites are characteristic of road-sides, fallow agricultural fields, vacant lots, and  
36 landslides.

1 Ruderal habitat is dominated by the same suite of non-native herbaceous annual  
2 grasses and forbs found on the River bank. Additional species detected include Russian  
3 thistle, telegraph weed, horseweed, Bermuda grass, and hairy vetch, among others. A  
4 native shrub, silver lupine, grows in patches of long-fallow ground at the top of the River  
5 bank, east of the walkway to the wharf and at the western end of the property. A row of  
6 silk-oak trees forms a linear screen along the top of the River bank.

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

#### 16 **Wildlife Movement Corridors**

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

#### 28 3.4.1.2 Special-Status Biological Resources

29 An evaluation of the presence or potential for occurrence of special-status plant and  
30 animal species<sup>14</sup> and natural communities within or near the Project site was performed  
31 by Wood Biological Consulting, Inc. (2014). An evaluation of potential Project impacts  
32 on special-status fish species was performed by Weston Solutions Inc. (2014).

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<sup>14</sup> For purposes of this analysis, the term species includes all taxa of the species, subspecies or variety taxonomic levels.

1 **Special-Status Natural Communities**

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

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

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

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

20 Eelgrass Habitat

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

29 Essential Fish Habitat

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

1 Pacific salmon freshwater EFH (U.S. Geological Survey [USGS] Hydrologic Unit  
2 1804003; PFMC 1999), West Coast Groundfish EFH, and Coastal pelagic species EFH  
3 (PFMC 2005 and 2011).

#### 4 Critical Habitat

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

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

#### 19 Locally Protected Trees

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

#### 29 **Special-Status Plant Species**

30 For purposes of this MND, special-status plant species include those that are listed  
31 under the FESA or the California Endangered Species Act (CESA), those that are  
32 designated as candidates for listing, those that are listed as rare under the California  
33 Native Plant Protection Act, and those that are not listed but would meet the definition of  
34 rare or endangered under CEQA. A total of 80 special-status plant species have been  
35 recorded from the Project region (California Native Plant Society [CNPS] 2014). The  
36 potential for occurrence on site for each of the target species was evaluated. Based on

1 site conditions and geographic location, the potential for occurrence of 68 special-status  
2 plant species can be completely ruled out due to a lack of suitable habitat or substrate,  
3 geographic isolation from known populations, or, if suitable habitat is present, they  
4 would have been identified during the site survey. Seven target species are not  
5 expected to occur on site due to geographic isolation, the presence of only marginally  
6 suitable habitat, and/or because they would have been identified during the site survey.

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

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

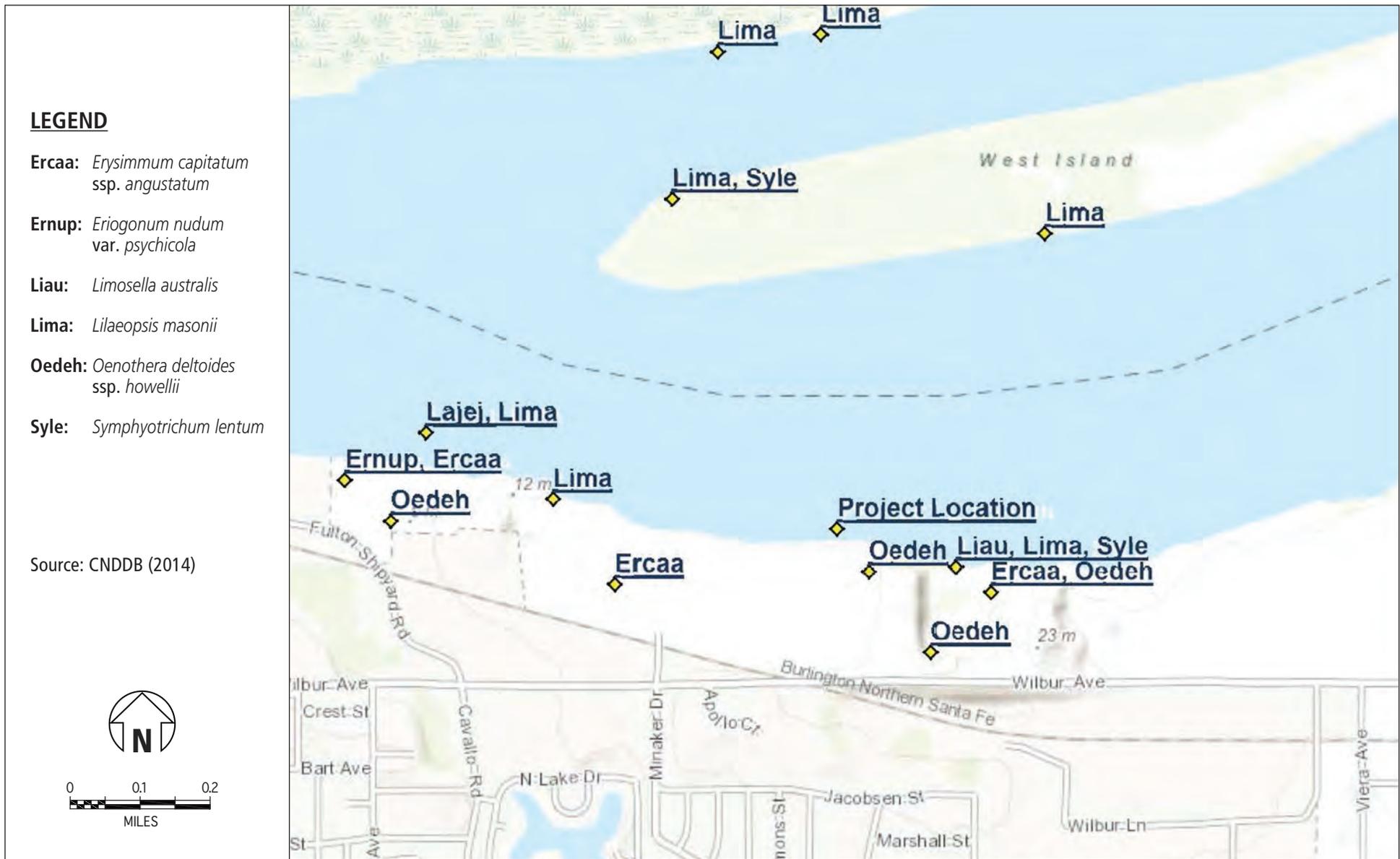
13 **Antioch Dunes Evening Primrose** (Federal/State: Endangered; CNPS: List 1B.1).  
14 Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*) is a perennial herb  
15 in the primrose family (Onagraceae). Flowering occurs March through September. A  
16 native species endemic to California,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

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

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

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<sup>15</sup> 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.

1 The eastern and western ends of the study area above the top of bank study area  
2 include marginally suitable habitat for Contra Costa wallflower. There are four records of  
3 Contra Costa wallflower within an 8 km (5 mile) radius of the Project site (CNDDDB  
4 2014). The nearest records for the species are from both units of the Refuge adjacent to  
5 the western and eastern boundaries of the study area. The species was not detected  
6 during the present survey and its potential for occurrence is considered low due to the  
7 high level of surface disturbance evident.

#### 8 Other Special-Status Plant Species

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

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

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

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

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<sup>16</sup> Formerly known as *Aster lentus*.

1 on exposed muddy streambanks and levees associated with freshwater and intertidal  
2 marshes of the Napa, Sacramento, and San Joaquin rivers and the Point Reyes  
3 Peninsula, growing from sea level to 10 meters (0 to 33 feet) in elevation.

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

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

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

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

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

1 **Special-Status Animal Species**

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

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

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

32 Although not detected during 2014 surveys, 14 of the species could occur within the  
33 Project study area. Ten of these are fish species and include North American green  
34 sturgeon, Delta smelt, steelhead (Central Valley distinct population segment [DPS] and  
35 Central California Coast DPS), Chinook salmon (Central Valley spring-run evolutionarily  
36 significant unit [ESU] and Sacramento River winter-run ESU), longfin smelt, Sacramento  
37 perch, Sacramento splittail, and hardhead. Also potentially occurring within the study  
38 area are Pacific pond turtle, white-tailed kite, song sparrow “Modesto population,”

1 Suisun song sparrow, and a wide variety of migratory bird species. Two marine  
2 mammals, harbor seal and California sea lion, are known to move through the Project  
3 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  
5 summarized in the Biological Assessment prepared for the USACE as part of the  
6 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  
9 Lange's metalmark butterfly (*Apodemia mormo langei*) (LMB) as endangered on June 1,  
10 1976 (41 Federal Register [FR] 22041-22044). LMB is endemic to California, persisting  
11 in the wild only in the 67-acre Refuge. LMB inhabits stabilized dunes and the species'  
12 life cycle is closely tied to its larval food plant, naked stemmed buckwheat (*Erigonum*  
13 *nudum auriculatum*). Adults begin to emerge in early August and the mating flight  
14 season can last until mid to late September, a period of approximately 7 weeks  
15 (USFWS 1984, Johnson et al. 2007). Peak flight season usually occurs in the last week  
16 of August and first week of September (Johnson et al. 2007). Butterflies of both sexes  
17 live for approximately 1 week, and feed on the nectar of the buckwheat as well as on  
18 butterweed (*Senecio flaccidus var. douglasii*), San Joaquin snakeweed (*Gutierrezia*  
19 *californica*), and silver lupine (*Lupinus albifrons*). During the flight season, eggs are laid  
20 on buckwheat stems. The eggs remain dormant until the rainy season and then the  
21 hatched larvae feed on new buckwheat growth during winter and spring. The caterpillars  
22 pupate in mid-summer at the base of the buckwheat.

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

31 **North American Green Sturgeon** (Federal: Threatened; State: Species of Special  
32 Concern). The Southern DPS<sup>17</sup> of the North American green sturgeon (*Acipenser*  
33 *medirostris*) was listed as Threatened under FESA in 2006. Critical habitat for the  
34 species was designated by the NMFS in 2009. It is listed as a California Species of  
35 Special Concern and is regarded as Vulnerable by the American Fisheries Society

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<sup>17</sup> 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.

1 (CDFW 2014a). It has been assigned a global and state ranking of G3/S1S2; species  
2 assigned a ranking of S1 are considered critically imperiled in the state because of their  
3 extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW  
4 2014a).

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

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

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

31 The steelhead is a native, pelagic, anadromous fish that spawns in freshwater and  
32 migrates to the open ocean. The Central California Coast DPS includes all naturally  
33 spawned populations of steelhead (and their progeny) in California streams from the  
34 Russian River (inclusive) to Aptos Creek (inclusive), and the drainages of San  
35 Francisco, San Pablo and Suisun Bays eastward to Chipps Island at the confluence of  
36 the Sacramento and San Joaquin Rivers; and tributary streams to Suisun Marsh  
37 including Suisun Creek, Green Valley Creek, and an unnamed tributary to Cordelia  
38 Slough (commonly referred to as Red Top Creek), exclusive of the Sacramento-San  
39 Joaquin River Basin.

1 Critical habitat has been designated for the Central California Coast DPS of steelhead  
2 by the NMFS, the nearest of which is the San Pablo Hydrologic Unit 2206; the Project  
3 site is not located in or near designated critical habitat. However the Project site is  
4 located within suitable habitat for the Central California Coast DPS of steelhead. No  
5 occurrences for the Central California Coast DPS of steelhead have been recorded from  
6 within an 8 km (5 mile) radius of the Project site (CNDDDB 2014). Nonetheless, due to  
7 the presence of suitable aquatic habitat on site, the presence of Central California Coast  
8 DPS steelhead is assumed.

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

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

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

35 Chinook are anadromous, with adults migrating from the ocean into the freshwater  
36 streams and rivers of their birth in order to mate. There are different seasonal “runs”  
37 (e.g., spring, summer, fall, or winter) in the migration of Chinook from the ocean to  
38 freshwater, even within a single river system. These runs have been identified on the  
39 basis of the season in which the adult Chinook enter freshwater to begin their spawning

1 migration. However, distinct runs also differ in the degree of maturation at the time of  
2 river entry, the temperature and flow characteristics of their spawning site, and their  
3 actual time of spawning.

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

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

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

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

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

1 Counties. Historically, they occurred from Suisun Bay to Sacramento on the  
2 Sacramento River and to Mossdale on the San Joaquin River.

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

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

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

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

29 **White-Tailed Kite** (Federal: Migratory Bird Treaty Act (MBTA); State: Fully Protected  
30 Species). The white-tailed kite (*Elanus leucurus*) is designated as fully protected under  
31 the California Fish and Game Code. This species receives additional protection under  
32 the MBTA (USFWS 2013). It has been assigned a global and state ranking of G5/S3;  
33 species assigned a ranking of S3 are considered vulnerable in the state due to their  
34 restricted range, relatively few populations, or other factors making them very  
35 vulnerable to extirpation (CDFW 2014a).

1 White-tailed kites inhabit open grasslands and savannas. They breed in a variety of  
2 habitats including grasslands, cultivated fields, oak woodlands and suburban areas  
3 where prey is abundant.

4 The white-tailed kite is not listed under FESA; as such, no critical habitat has been  
5 designated. White-tailed kites are confirmed nesters in Contra Costa County (CNDDDB  
6 2014). Marginally suitable nesting habitat is present among the trees on site and in the  
7 immediate Project vicinity and there are abundant foraging opportunities in the  
8 surrounding undeveloped lands. A nesting occurrence was reported in 2005 from near  
9 Pittsburg (CNDDDB 2014). Due to the presence of marginally suitable nesting sites,  
10 white-tailed kites could occur on or near the site.

#### 11 Other Sensitive and Locally Rare Wildlife Species

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

17 It is the only fresh-water turtle native to greater California. Pacific pond turtles are  
18 habitat generalists, and have been observed in slow-moving rivers and streams (e.g., in  
19 oxbows), lakes, reservoirs, permanent and ephemeral wetlands, stock ponds, and  
20 sewage treatment plants. It prefers aquatic habitat with refugia such as undercut banks  
21 and submerged vegetation, and require emergent basking sites such as mud banks,  
22 rocks, logs, and root wads to thermoregulate their body temperature. Pacific pond  
23 turtles regularly use upland terrestrial habitats, most often during the summer and  
24 winter, especially for oviposition (females), overwintering, seasonal terrestrial habitat  
25 use, and overland dispersal. Females have been reported ranging as far as 500 meters  
26 (1,640 feet) from a watercourse to find suitable nesting habitat.

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

33 **Suisun Song Sparrow** (Federal: MBTA; State: Species of Special Concern). The  
34 Suisun song sparrow (*Melospiza melodia maxillaris*) is a California Species of Special  
35 Concern (CDFW 2014a) and is protected under the MBTA. The species has been  
36 assigned a global and state ranking of G5T2/S2 (CNDDDB 2014); species assigned a  
37 ranking of S2 are considered imperiled in the state due to their very restricted range,

1 very few populations, or other factors making them very vulnerable to extirpation  
2 (CDFW 2014a).

3 The Suisun song sparrow is restricted to Suisun Marsh from the Carquinez Strait east to  
4 the confluence of the Sacramento and San Joaquin Rivers. Suisun song sparrow is not  
5 listed under FESA; as such, no critical habitat has been designated for the species. The  
6 Project area is considered to provide marginally suitable nesting habitat for Suisun song  
7 sparrow consisting of blackberry tangles and dense vegetation. Suisun song sparrow is  
8 known from four records within an 8 km (5 mile) radius of the Project area. The nearest  
9 record is a 1998 sighting from the Dow Chemical wetland mitigation site, approximately  
10 4.5 km (2.8 miles) west of the Project site. It is also known from south Sherman Island  
11 on the opposite side of the River from the Project site. Due to the presence of  
12 marginally suitable habitat on site, its presence cannot be ruled out.

13 **Song Sparrow “Modesto Population”** (Federal: MBTA; State: Species of Special  
14 Concern). The Modesto population of the song sparrow (*Melospiza melodia*<sup>18</sup>) is a  
15 California Species of Special Concern (CDFW 2014a) and is protected under the  
16 MBTA. The species has been assigned a global and state ranking of G5/S3 (CNDDDB  
17 2014); species assigned a ranking of S3 are considered vulnerable in the state due to  
18 their restricted range, relatively few populations, or other factors making them very  
19 vulnerable to extirpation (CDFW 2014a).

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

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

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

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<sup>18</sup> The Modesto population is considered by some to belong to the subspecies *M. m. mailliardi*.

1 nesting on the underside of the dock. Based on the amount of vegetative cover on site,  
2 there is a high potential for the use of this habitat for breeding.

3 **Sacramento Splittail** (Federal: Candidate; State: Species of Special Concern). The  
4 Sacramento splittail (*Pogonichthys macrolepidotus*) is Species of Special Concern in  
5 California and is regarded as Vulnerable by the American Fisheries Society (CDFW  
6 2014a). Although it was determined that the species did not warrant federal listing by  
7 the USFWS in 2010, it remains a candidate for listing under FESA. It has been assigned  
8 a global and state ranking of G2/S2; species assigned a ranking of S2 are considered  
9 imperiled in the state due to their very restricted range, very few populations, or other  
10 factors making them very vulnerable to extirpation (CDFW 2014a).

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

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

22 **Sacramento Perch** (Federal: none; State: Species of Special Concern). The  
23 Sacramento perch (*Archoplites interruptus*) is listed as a California Species of Special  
24 Concern and is regarded as Threatened by the American Fisheries Society (CDFW  
25 2014a). It has been assigned a global and state ranking of G2G3/S1; species assigned  
26 a ranking of S1 are considered imperiled in the state due to its very restricted range,  
27 very few populations, or other factors making it very vulnerable to extirpation (CDFW  
28 2014a).

29 The Sacramento perch is endemic California, known from 28 localities in the Central  
30 Valley, including tributaries to the San Francisco Estuary. Sacramento perch is not  
31 listed under FESA; as such, no critical habitat has been designated for the species. The  
32 Project site is located within suitable habitat for the Sacramento perch. It has been  
33 reported from a single record within an 8 km (5 mile) radius of the Project site. That  
34 record is an undated collection of a juvenile fish taken at the intake screens of the  
35 Contra Costa Power Plant on the south shore of the San Joaquin River 2.2 km (1.4  
36 miles) east of the Project site. Due to the presence of suitable habitat on site, the  
37 presence of Sacramento perch is assumed.

1 **Hardhead** (Federal: none; State: Species of Special Concern). The hardhead  
2 (*Mylopharodon conocephalus*) is listed as a California Species of Special Concern and  
3 is regarded as Sensitive by the U.S. Forest Service (CDFW 2014a); it is not listed under  
4 FESA. It has been assigned a global and state ranking of G2/S3; species assigned a  
5 ranking of S3 are considered vulnerable in the state due to their restricted range,  
6 relatively few populations, or other factors making them very vulnerable to extirpation  
7 (CDFW 2014a).

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

14 **California Sea Lion** (Federal: MMPA; State: none). The California sea lion (*Zalophus*  
15 *californianus*) is not listed under either FESA or CESA; however, it is protected under  
16 the MMPA.

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

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

30 The California sea lion is not listed under FESA; as such, no critical habitat has been  
31 designated for the species. The Project area is located in aquatic habitat in which  
32 California sea lion could occur. Occurrence data are not maintained by the CNDDDB  
33 (2014), and there are no known California sea lion haul out locations within several  
34 miles of the Project area. The species may, however, move through or opportunistically  
35 forage within the lower San Joaquin River. Due to the periodic presence of California  
36 sea lions in the San Joaquin River, their presence in or near the work area is assumed.

1 **Harbor Seal** (Federal: MMPA; State: not listed). The harbor seal (*Phoca vitulina*) is not  
2 listed under either FESA or CESA; however, it is protected under the MMPA.

3 Harbor seals are fairly common, non-migratory pinnipeds inhabiting coastal and  
4 estuarine waters from Alaska to Baja California, Mexico. They are a year-round resident  
5 in the San Francisco Bay Area (Codde et al. 2012). They haul out on rocks, reefs, and  
6 beaches, and feed in marine, estuarine, and occasionally fresh waters (Zeiner et al.  
7 1990). Harbor seals are present in estuaries and coastal regions where there is a viable  
8 food supply from Central Mexico to Alaska (The Marine Mammal Center [TMMC] 2015).  
9 Seal pups are born between February and April on sandy beaches or rocky outcrops  
10 (TMMC 2015).

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

#### 18 3.4.1.3 Invasive Species

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

32 Several invasive aquatic species have rapidly spread in California’s waterways and  
33 have become a great concern to the State’s aquatic resources. Three freshwater  
34 mollusks are of great concern in California. These include the Quagga mussel  
35 (*Dreissena rostriformis bugensis*) and Zebra mussel (*Dreissena polymorpha*), which  
36 belong to the Drissenidae family, and the New Zealand mudsnail (*Potamopyrgus*  
37 *antipodarum*), a member of the Hydrobiidae family.

1 In addition to moving downstream with the flow of water, these mollusks are transported  
 2 by humans moving equipment and objects from one waterbody to another. Adults attach  
 3 to hulls of watercraft, persist in mud caked on tires, tractor treads, and equipment, and  
 4 the microscopic larvae can be transported on waders and boots, nets and other fishing  
 5 gear, bilges, ballasts, live wells, or any equipment that holds water. They can survive  
 6 out of water for a week or longer.

7 **3.4.2 Regulatory Setting**

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

**Table 3.4-1. Laws, Regulations, and Policies (Biological Resources)**

<b>U.S.</b>	Endangered Species Act (FESA) (7 USC 136, 16 USC 1531 et seq.)	<p>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.</p> <ul style="list-style-type: none"> <li>• 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.”</li> <li>• 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.”</li> <li>• 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.”</li> </ul> <p>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.</p>
<b>U.S.</b>	Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801 et seq.)	<p>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.</p>
<b>U.S.</b>	Marine Mammal	<p>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</p>

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	Protection Act (MMPA) (16 USC 1361 et seq.)	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.
<b>U.S.</b>	Migratory Bird Treaty Act (MBTA) (16 USC 703-712)	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.
<b>U.S.</b>	Rivers and Harbors Act (RHA) (33 USC 403)	<ul style="list-style-type: none"> <li>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.</li> </ul>
<b>U.S.</b>	Federal Water Pollution Control Act (AKA Clean Water Act - CWA) (33 USC 1251-1376)	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
<b>U.S.</b>	Other	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> </ul>
<b>CA</b>	California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.)	The CESA provides for the protection of rare, threatened, and endangered plants and animals, as recognized by the California Department of Fish and Wildlife (CDFW), and prohibits the taking of such species without its authorization. Furthermore, the CESA provides protection for those species that are designated as candidates for threatened or endangered listings. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened species and endangered species (Fish & G. Code, § 2070). The CDFW also maintains a list of candidate species, which are species that the CDFW has formally noticed as under review for addition to the threatened or endangered species lists. The CDFW also maintains lists of Species of Special Concern that

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		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)).
<b>CA</b>	Lake and Streambed Alteration Program (LSAP; Fish & G. Code, §§ 1600-1616)	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.
<b>CA</b>	Other relevant California Fish and Game Code sections	<ul style="list-style-type: none"> <li>• The California Native Plant Protection Act (Fish &amp; 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 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.</li> <li>• Fish and Game Code sections 3503 &amp; 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.</li> <li>• 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.</li> <li>• 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.</li> </ul>
<b>CA</b>	Other	<ul style="list-style-type: none"> <li>• Porter-Cologne Water Quality Control Act (Porter-Cologne; Cal. Water Code, § 13000 et seq.)</li> </ul>

- 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
- 3 policies of the Antioch General Plan, the Plant, located on uplands, is. An overview of
- 4 the General Plan policies relevant to biological resources is presented below. As stated
- 5 in the General Plan (City of Antioch 2003), it is the objective of the City of Antioch to
- 6 preserve natural streams and habitats supporting rare and endangered species of
- 7 plants and animals. The city of Antioch has established certain policies to support this
- 8 objective.

General Plan Policies	Project Consistency
<p><b>10.42 Biological Resources Policies</b></p> <p>a. <i>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.</i></p>	<p>The proposed Project would not impact wetlands.</p>
<p>b. <i>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.</i></p>	<p>Existing wetlands and riparian habitat within the study area would not be affected by Project implementation.</p>
<p>c. <i>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.</i></p>	<p>Not applicable: no new development is proposed in the vicinity of wetlands or riparian habitat.</p>
<p>d. <i>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.</i></p>	<p>No new development is proposed; existing wetlands, riparian habitat and woodland habitat on site would not be affected by Project implementation.</p>
<p>e. <i>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).</i></p>	<p>The proposed Project would not affect any preserves or wilderness areas.</p>
<p>f. <i>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.</i></p>	<p>The proposed Project would not affect any native oak trees.</p>
<p>g. <i>Preserve heritage trees throughout the Planning Area.</i></p>	<p>The proposed Project would not affect any heritage trees.</p>
<p>h. <i>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.</i></p>	<p>The proposed Project is adjacent to the Antioch Dunes National Wildlife Refuge. No landscaping is proposed as part of the Project.</p>
<p>i. <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.</i></p>	<p>The proposed Project would not increase impervious surfaces and would not contribute to dry-season runoff into any intermittent streams.</p>
<p>j. <i>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.</i></p>	<p>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.</p>

1 **3.4.3 Impact Analysis**

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

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

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

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

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

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

34 The Project would use both vibratory and impact hammers to drive the piles. Each pile  
35 would require approximately 15 minutes of vibratory driving and 100 to 700 blows with  
36 an impact hammer to drive the piles to their final elevation (Illingworth & Rodkin 2014). It

1 is anticipated that an APE 400 vibratory hammer and a Delmag D160 diesel impact  
2 hammer would be required to drive the 42-inch, 48-inch, and the 72-inch piles; while the  
3 24-inch and the 30-inch walkway piles would be installed using an ICE 44 vibratory  
4 hammer and a Delmag D62 diesel impact hammer (Illingworth & Rodkin 2014). For the  
5 vibratory hammer, each pile is estimated to be driven 30 feet in approximately 15  
6 minutes. Impact hammer driving would then be used until the pile reaches its required  
7 depth, and is anticipated to result in 20 blows per foot. The Project is anticipated to  
8 install one pile per day for the 72-inch piles and up to two piles per day for all other  
9 piles. An estimated 24 days of in-water construction is planned.

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

26 The NMFS has identified acoustic threshold (received sound level) criteria which marine  
27 mammals are predicted to experience changes in their hearing sensitivity, either  
28 permanent or temporary hearing threshold shifts. Physiological responses such as  
29 auditory or non-auditory tissue injuries are known as Level A Harassment in the MMPA  
30 and harm in the FESA. Level A Harassment becomes a concern when the sound levels  
31 from man-made sounds reach or exceed the acoustic threshold associated with auditory  
32 injury in marine species. A permanent threshold shift (PTS) is a permanent, irreversible  
33 increase in an animal's auditory threshold within a given frequency band or range of the  
34 animal's normal hearing. A temporary threshold shift (TTS) is a temporary, reversible  
35 increase in the threshold of audibility at a specific range of frequencies. While TTS is  
36 not an injury, it is considered Level B Harassment by the MMPA and harassment by the  
37 FESA. Along with TTS, Level B Harassment also includes behavioral impacts. For  
38 pinnipeds, NMFS has specified Level A SPL thresholds as 190 dB referenced to (re) 1

1 micropascal ( $\mu\text{Pa}$ )<sup>19</sup> (root mean squared [rms]<sup>20</sup>). The Level B SPL threshold for all  
2 marine mammals is 160 dB re 1  $\mu\text{Pa}$  (rms).

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

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

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

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<sup>19</sup> 1  $\mu\text{Pa}$  is the reference sound pressure for sound in water.

<sup>20</sup> Root-mean-square (rms) is the average of the squared sound pressure over some duration.

- 1 mammals and fish were modeled by Illingsworth and Rodkin (2014), which is included  
 2 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**

Modeling Scenario	Distance to Marine Mammal Acoustic Criteria in Meters			Distance to Fish Acoustic Criteria in Meters			Distance to Behavioral Zone
	RMS (dB re: 1uPa)			Peak (dB re: 1uPa)	Cumulative SEL <sup>1</sup> (dB re:1uPa-sec <sup>2</sup> )	RMS (db re:1uPa)	
	Level B Harassment	Level A Injury					
	160	180	190	206	187	183	150
<b>72-inch Piles (Pile ID: BD 1-4) Estimated 700 Pile Strikes per Pile</b>							
Modeled Unattenuated	1,970 <sup>2</sup>	130	35	30	620 <sup>2</sup>	1,065 <sup>2</sup>	7,630 <sup>1</sup>
Assuming a 10 dB Reduction with Attenuation	510	35	<10	<10	160	275	1,970 <sup>2</sup>
<b>48-inch Pile (Pile ID: MD 3) Estimated 520 Pile Strikes</b>							
Modeled Unattenuated	765 <sup>2</sup>	50	15	15	155	265	2,955 <sup>2</sup>
Assuming a 10 dB Reduction with Attenuation	200	15	<10	<10	40	70	765 <sup>2</sup>
<b>42-inch Piles (Pile ID: MD 1&amp;2) Estimated 420 Pile Strikes per Pile</b>							
Modeled Unattenuated	765 <sup>2</sup>	50	15	15	135	235	2,955 <sup>2</sup>
Assuming a 10 dB Reduction with Attenuation	200	15	<10	<10	35	60	765 <sup>2</sup>
<b>30-inch Piles (Pile ID: WB 3-5) Estimated 100 Pile Strikes per Pile</b>							
Modeled Unattenuated	580	40	<10	15	40	70	2,255 <sup>2</sup>
Assuming a 10 dB Reduction with Attenuation	150	<10	<10	<10	10	20	580
<b>24-inch Piles (Pile ID: WB 2&amp;6) Estimated 360 Pile Strikes per Pile</b>							
Modeled Unattenuated	510	35	<10	<10	95	160	1,970 <sup>2</sup>
Assuming a 10 dB Reduction with Attenuation	130	<10	<10	<10	25	40	510
<b>24-inch Pile (Pile ID: WB 1) Estimated 160 Pile Strikes</b>							
Modeled Unattenuated	510	35	<10	<10	60	100	1,970 <sup>2</sup>
Assuming a 10 dB Reduction with Attenuation	130	<10	<10	<10	15	25	510
Notes:							
<sup>1</sup> Based on driving of one pile. SEL criteria apply to impact pile driving events that occur during 1 day.							
<sup>2</sup> Distance to underwater noise thresholds is constrained by river topography.							

**Table 3.4-3. Modeled Cumulative SEL Under Various Pile Driving Scenarios**

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

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

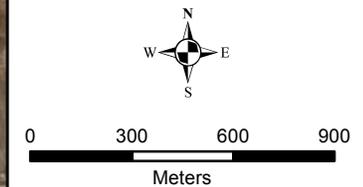
5 **Special-Status Marine Mammals: Less than Significant with Mitigation.** As  
 6 indicated in Table 3.4-2 above, harbor seals and California sea lions that may be  
 7 transiting near the wharf during pile extraction and installation activities could be  
 8 exposed to SPLs exceeding the NMFS Level A (e.g., within a 35 meter radius for the  
 9 72-inch piles) and Level B (e.g., within a 1,970 meter radius for the 72-inch piles) take  
 10 thresholds. Both the sound level and duration of exposure to pile driving would affect  
 11 the magnitude of effect on these pinnipeds. As a result, the Project could result in a  
 12 potentially significant impact to harbor seals and California sea lions absent measures  
 13 to avoid and minimize this potential impact. Informal consultation between the Applicant  
 14 and NMFS has been ongoing since approximately October 2014. In addition to  
 15 consultation under FESA, the federal action agency, USACE, recommended the  
 16 Applicant submit an application for a Minor Impact Letter of Permission (LOP) under  
 17 Section 10 of the Rivers and Harbors Act. As a requirement of the LOP, the Project  
 18 must have an overall minimal impact, both individually and cumulatively, on aquatic  
 19 resources.

Georgia-Pacific  
Antioch Wharf  
Breasting Dolphins  
Replacement Project

Contra Costa County,  
CA

Supplemental Figure 1.

NMFS Hydroacoustic  
Action Area



Map Date: February 2014  
Map By: Chris Zumwalt  
Base Source: ESRI Streaming 11/02/2010

**Figure 3.4-3** NMFS Hydroacoustic Action Area

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

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

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

22 Pile Driving Impacts to Fish: The SPLs generated during unattenuated impact driving of  
23 all piles except the 24-inch piles would exceed the adopted 206 dB peak acoustic  
24 criteria for injury to fish at a distance of 10 meters. With implementation of the sound  
25 attenuation measures described in **MM BIO-7**, however, the distance to the 206 dB  
26 level would be reduced to less than 10 meters for all pile sizes. Even with  
27 implementation of sound attenuation, fish that may be present in the Project vicinity  
28 could experience cumulative sound exposure levels (SEL) if they were within 275  
29 meters (to the 183 dB threshold) from the sound source, which would be considered a  
30 significant impact. Implementation of a work window restriction and soft-start procedure,  
31 however, would reduce this potential impact. Specifically, limiting the construction  
32 period to between August 1 and November 30 would ensure that non-mobile life stages  
33 (eggs and larvae) of special-status fish species would not be present, and  
34 implementation of the soft start (slowly increasing the dB from the impact strikes) would  
35 allow the mobile phase (juvenile or adult) of any of the special-status species to move  
36 out of the area before they would encounter the potentially injurious exposure levels.  
37 Finally, hydroacoustic and biological monitoring would be conducted during pile driving  
38 to document acoustic field distances and any observable biological effects to fish.  
39 Consequently, the impact would be less than significant with implementation of **MM**  
40 **BIO-1** and **MM BIO-7**, which are described in detail below.

1 Impacts to fish spawning and rearing habitats: The Project would not result in any  
2 impacts to spawning or rearing habitat, would not impair migration or reproduction, and  
3 is unlikely to cause injury or mortality to special-status fish because it would take place  
4 during recommended in-water work windows. Therefore, this impact is considered to be  
5 less than significant with implementation of **MM BIO-1**.

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

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

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

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

28 **Special-Status Reptiles: Less than Significant with Mitigation.** Due to the presence  
29 of marginally suitable aquatic habitat in the Project area and the occurrence of the  
30 species in the vicinity, the potential exists for the occurrence of resident or transient  
31 Pacific pond turtles on site. If present during construction, direct mortality, injury and/or  
32 harassment of individuals could result. Significant impacts on special-status reptiles  
33 may result from acoustic shock waves generated from pile driving, increased noise and  
34 human activity, contact with construction equipment, as discussed above for special  
35 status fish. The nature and significance of these impacts would be similar to those for  
36 fish. These impacts would be mitigated to a less than significant level with the  
37 implementation of **MMs BIO-2, BIO-3, BIO-5, BIO-6, BIO-7, and BIO-8**.

1 **Special-Status Birds: Less than Significant with Mitigation.** As currently proposed,  
2 the Project would not require the removal or significant pruning of any trees and  
3 therefore would not result in direct impacts on white-tailed kite, Modesto song sparrow,  
4 Suisun song sparrow, or other special status bird species. However, Project  
5 implementation could have adverse effects on white-tailed kite, if present, by causing  
6 nest abandonment, harassment of individual special-status birds, or disruption of  
7 breeding activities during project construction. Such impacts are not expected to occur,  
8 however, due to the proposed work schedule of August 1 through November 30, which  
9 is outside the breeding, nesting, and rearing season. Implementation of **MMs BIO-1,**  
10 **BIO-3, BIO-4, BIO-5,** and **BIO-9** would ensure impacts to birds remain less than  
11 significant.

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

18 **Mitigation Measures:**

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

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

25 **MM BIO-3: Designation of an Agency-Approved Project Biologist.** At least  
26 30 days before initiating Project activities, the Project proponent shall obtain the  
27 California Department of Fish and Wildlife's written approval for a designated  
28 Project Biologist. The Project Biologist shall be on site during initial Project  
29 activities and as necessary to oversee activities described for pile-driving  
30 acoustic monitoring (MM BIO-7) and monitoring of sensitive migratory birds (MM  
31 BIO-9).

32 **MM BIO-4: Worker Environmental Awareness Program (WEAP).** A WEAP  
33 shall be developed and presented by the Project Biologist. The WEAP shall  
34 cover the ecology, identification, legal protections afforded all potentially  
35 occurring special-status plant and animal species as well as the identified  
36 protective measures and implications of non-compliance. All persons employed

1 or otherwise working on the Project sites shall attend a WEAP presentation prior  
2 to performing any work on site.

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

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

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

- 24 a) Use of an impact hammer cushion block;  
25 b) Use of impact hammers only during daylight hours;  
26 c) Implementation of “soft start” procedures, in which impact strikes gradually  
27 increase in energy and frequency of impacts to permit wildlife to vacate  
28 the surroundings; and  
29 d) Use of a bubble curtain surrounding piles during pile driving operations.

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

- 32 a) all engine-powered equipment shall be well-maintained and free of leaks of  
33 fuel, oil, hydraulic fluid or any other potential contaminant;  
34 b) all engine-powered equipment used and operated from the decks of barges,  
35 boats or the wharf shall be positioned over drip-pans;

- 1 c) a spill prevention and response plan shall be prepared in advance of the  
2 commencement of work; a spill kit with appropriate clean-up supplies shall  
3 be kept on hand during operations. The kit shall include a floating oil-  
4 absorbent sock that could be immediately deployed and maintained around  
5 the work barges in the event of a spill or any accidental leakage of fuel or  
6 hydraulic fluids;
- 7 d) refueling and maintenance of mobile equipment shall not be performed  
8 directly over the waters of the River. Only approved and certified fuel cans  
9 with “no-spill” spring-loaded nozzles shall be used; and
- 10 e) All spill cleanup materials or other liquid or solid wastes shall be securely  
11 containerized and labeled in the field during transport by barge to the  
12 contractor’s yard.

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

- 16 a) If construction activities are scheduled to occur outside of the breeding  
17 season (i.e., September 1 through January 31), no preconstruction  
18 surveys or other mitigation measures are necessary.
- 19 b) If construction activities are scheduled to occur during the breeding  
20 season (i.e., February 1 through August 31), a preconstruction nesting  
21 bird survey shall be conducted of the wharf structures, the identified work  
22 area and a buffer zone (see below). The survey should be performed by a  
23 qualified biologist no more than two weeks prior to the initiation of work. If  
24 no active nest is observed, work may proceed without restrictions. An  
25 active nest is one that contains eggs, chicks, or young birds that have not  
26 fledged from the nest.
- 27 c) For any active nests found near the construction limits (76 meters [250  
28 feet] for raptors and 33 meters [100 feet] for passerines), the Project  
29 biologist shall map their location and make a determination as to whether  
30 or not construction activities are likely to disrupt the nest or cause nest  
31 failure. If it is determined that construction is unlikely to disrupt incubation,  
32 rearing, or fledging, construction may proceed. If it is determined that  
33 construction may disrupt these behaviors, the no-construction buffer zone  
34 shall be implemented. In general, the buffer zone shall be a minimum of  
35 300 feet from the drip line of the nest tree or nest for raptors and 50 feet  
36 for passerines. The ultimate size of the no-construction buffer zone may  
37 be adjusted by the Project biologist based on the species involved,  
38 topography, lines of sight between the work area and the nest, physical  
39 barriers, and the ambient level of human activity. The buffer zone may be  
40 reduced after consultation and with concurrence from the California

1 Department of Fish and Wildlife and/or the U.S. Fish and Wildlife Service  
2 Division of Migratory Bird Management. If it is determined that  
3 construction activities are likely to disrupt an active nest, construction  
4 activities within the no-construction buffer zone shall not proceed until the  
5 Project biologist determines that the young have left the nest and are  
6 foraging independently or the nest is no longer active.

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

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

- 18 • 510 meters for 72-inch piles
- 19 • 200 meters for 48 and 42-inch piles
- 20 • 150 meters for 30 and 24-inch piles

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

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

28 **Less than Significant Impact.** No riparian habitat or sensitive natural communities  
29 occur within the proposed work area. The proposed Project would require the use of  
30 barges, tugboats, and other equipment and clothing that could potentially transfer  
31 invasive aquatic organisms and diseases between unrelated water bodies. To ensure  
32 that impacts to riparian or other sensitive natural communities, including aquatic  
33 communities, are minimized, the Applicant would ensure that all barges, tugboats and  
34 other equipment would originate from, ports or facilities in the San Francisco Bay  
35 Estuary. Currently, the barges anticipated for use on the Project have a home port at  
36 the contractor’s yard, 200 Cutting Boulevard, Richmond, CA; the tug boats anticipated  
37 for use on the Project are expected to come from Pier 50 in the Port of San Francisco.

1 **c) Have a substantial adverse effect on federally protected wetlands as defined by**  
2 **section 404 of the Clean Water Act (including, but not limited to, marsh, vernal**  
3 **pool, coastal, etc.) through direct removal, filling, hydrological interruption, or**  
4 **other means?**

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

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

18 **Less than Significant with Mitigation.** Project implementation is not expected to  
19 interfere substantially with the local or regional movement of any native resident or  
20 migratory fish or wildlife species or with established native resident or migratory wildlife  
21 corridors, or impede the use of native wildlife nursery sites; therefore, impacts would not  
22 be considered significant. However, during construction activities, the non-migratory  
23 movements of special-status fish and marine mammal species, as well as Pacific  
24 salmon freshwater EFH could be temporarily affected by the movement of barges,  
25 tugboats and equipment as well as by underwater sound during pile driving, water  
26 turbidity, and accidental release of contaminants, as described in detail in the impact  
27 analysis for item **a)**, above.

28 Impacts on the movement of any native resident or migratory fish or wildlife species  
29 would be less-than significant with the implementation of **MMs BIO-1, BIO-2, BIO-3,**  
30 **BIO-4, BIO-5, BIO-6, BIO-7, BIO-8,** and **BIO-9.**

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

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

35 **f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural**  
36 **Community Conservation Plan, or other approved local, regional, or State habitat**  
37 **conservation plan?**

1 **No Impact.** The only approved habitat conservation plan in the vicinity of the proposed  
2 Project is the East Contra Costa County Habitat Conservation Plan/Natural Community  
3 Conservation Plan (Plan). The Project site is located on sovereign land within the limits  
4 of the city of Antioch; neither the city of Antioch nor the CSLC is a participant in that  
5 Plan. In addition, none of the activities associated with the proposed Project would  
6 conflict with the provisions of the Plan, and therefore there would be no impact. No  
7 other habitat conservation plans apply to the Project area.

#### 8 **3.4.4 Mitigation Summary**

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

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