3.5 Biological Resources

This section of the Draft Environmental Impact Statement/Report (EIS/R) characterizes the existing biological resources and natural environment in the Phase 2 project area and analyzes whether implementation of the project would cause a substantial adverse effect on biological resources. The information presented is based on review of existing conditions within the area and other pertinent federal, state and local regulations, which are presented in Section 3.5.2, Regulatory Setting. Using this information as context, an analysis of the biological environmental impacts of the project is presented for each alternative in Section 3.5.3, Environmental Impacts and Mitigation Measures. Program-level mitigation measures described in Chapter 2, Alternatives, would be implemented as part of the project. Therefore, this section only includes additional, project-level mitigation measures, as needed.

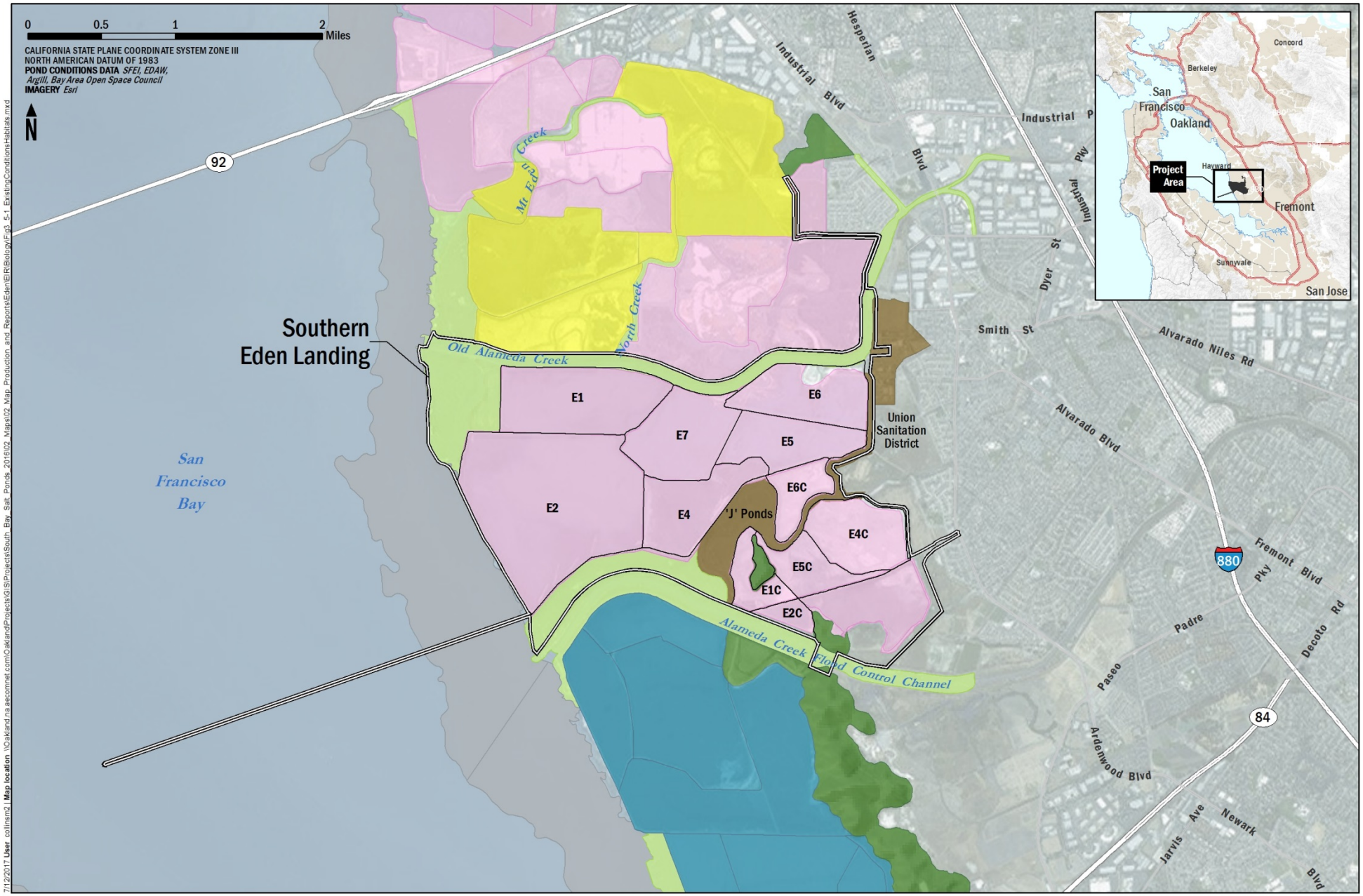
3.5.1 Physical Setting

Methodology

Following the methodology in the 2007 South Bay Salt Pond (SBSP) Restoration Project Final EIS/R (2007 Final EIS/R), this section characterizes the existing biological conditions related to Phase 2 of the SBSP Restoration Project. The principal biological components of concern are the vegetation and habitats, the wildlife, and the area of habitat subject to United States Army Corps of Engineers (USACE) jurisdiction. Phase 2 of the SBSP Restoration Project focuses on the southern half of the Eden Landing Ecological Reserve (ELER, or Reserve) which includes 11 ponds that are described in three groups: the Bay Ponds (E1, E2, E4 and E7); the Inland Ponds (E5, E6, and E6C); and the Southern Ponds or C-Ponds (E1C, E2C, E4C, and E5C) (Figure 2-2). Existing conditions in the Eden Landing pond area are provided here to provide a regional context for the proposed project. The ELER, and the southern Eden Landing ponds within it, are owned and operated by the California Department of Fish and Wildlife (CDFW). Existing conditions within each of the three pond groups are also provided (see Figure 3.5-1 for general habitat conditions). Much of the data on wildlife use of the Eden Landing Ponds has been collected by its owner and operator, CDFW. Additional information has been provided by the United States Fish and Wildlife Service (USFWS), the United States Geological Survey (USGS); non-profit organizations and research groups such as Point Blue Conservation Science (Point Blue), formerly the Point Reyes Bird Observatory Conservation Science and the San Francisco Bay Bird Observatory (SFBBO); local government entities; consultants; researchers; and private individuals.

Regional Setting

As discussed in the 2007 Final EIS/R, the San Francisco Bay Estuary is the largest estuary on the west coast of North America and is an extremely productive and diverse ecosystem (Trulio et al. 2004). The South San Francisco Bay (South Bay) includes some of the most important habitat remaining in the Bay Area for a number of wildlife species (Goals Project 1999). The term “South Bay” refers to the portion of San Francisco Bay (or Bay) south of Coyote Point on the western shore and San Leandro Marina on the eastern shore (Goals Project 1999). This region differs in several physical and ecological aspects from the other portions of San Francisco Bay Estuary. The habitats included in the South Bay are open waters and subtidal and intertidal habitats (largely mudflats) that extend to the upper reaches of tidal action, tidal and nontidal wetlands, and former salt evaporation ponds adjacent to the Bay, and the upland areas immediately adjacent to these features.



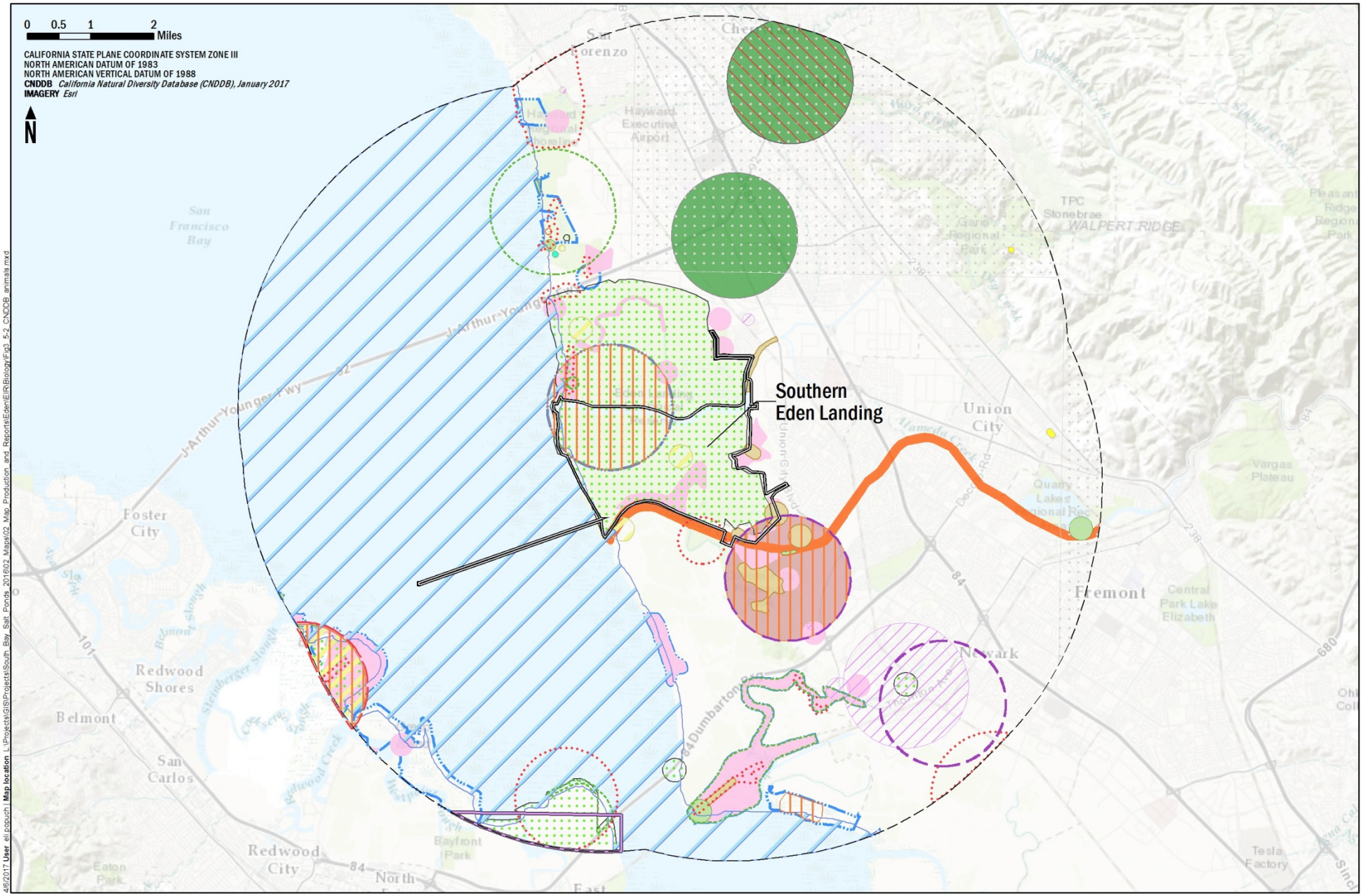
7/12/2017 User collinsm2 | Map location \\Oakland.na.aecomnet.com\Oakland\Projects\GIS\Projects\South_Bay_Salt_Ponds_2016\02_Maps\02_Map_Production_and_Reports\Eden\EIR\Biology\Fig3_5-1_ExistingConditionsHabitats.mxd

AECOM
South Bay Salt Pond Restoration Project

Figure 3.5-1
Existing Condition Study Area Habitats

The diversity of habitat types, particularly within the South Bay, is largely responsible for the diversity of wildlife species that occur. Although the high productivity of these habitats allows those species that are not habitat-limited to achieve substantial numbers, the tidal salt marshes and open waters that sustain aquatic plants and phytoplankton and the salt ponds that sustain high biomass of invertebrates are the basis of the estuary's complex and productive food web. The San Francisco Estuary supports more than 250 species of birds, 120 species of fish, 81 species of mammals, 30 species of reptiles, and 14 species of amphibians (Siegel and Bachand 2002). Equally important, the San Francisco Estuary supports populations of species that are of regional, hemispheric, or even global importance. A number of special-status wildlife species—including endemic, endangered, threatened, and rare wildlife species or subspecies—reside in the San Francisco Bay Area. Figure 3.5-2 illustrates occurrences of these special-status species with data from the California Natural Diversity Database (CNDDB). These rare San Francisco Bay area include the California Ridgway's rail (*Rallus obsoletus obsoletus*; formerly California clapper rail), salt marsh harvest mouse (*Reithrodontomys raviventris raviventris*), salt marsh wandering shrew (*Sorex vagrans halicoetes*), and Alameda song sparrow (*Melospize melodia pusillula*) in remnant tidal marsh habitat and other species such as California least terns (*Sterna antillarum browni*), western snowy plovers (*Charadrius nivosus* ssp. *nivosus*), longfin smelt (*Spirinchus thaleichthys*) and steelhead (*Oncorhynchus mykiss*; Central California Coast Distinct Population Segment).

The southern San Francisco Bay Area, including the former salt-production ponds and managed ponds, provides habitat for more than one million waterbirds each year, including large percentages of the Pacific Flyway populations of some shorebird, duck, and tern species (Page et al. 1999; Stenzel and Page 1988; Takekawa et al. 2001; Trivedi and Gross 2005). With its extensive mudflats, remnant salt marshes, and salt ponds, the South Bay in particular supports very high diversity and abundance of waterbirds (Harvey et al. 1992; Takekawa et al. 2001; Warnock 2004). Some species, such as the Wilson's phalarope (*Phalaropus tricolor*), red-necked phalarope (*Phalaropus lobatus*), eared grebe (*Podiceps nigricollis*), and the federally threatened western snowy plover, forage in the South Bay most abundantly in shallow ponds; western snowy plover also nest in the dry salt pannes or salt flats in some ponds. In contrast, a number of bird species use other habitats extensively as well, and most shorebirds occur in ponds primarily during high tide, when their preferred intertidal foraging habitats are inundated (Warnock 2004). Use of individual ponds by foraging birds is influenced primarily by water depth and salinity, which mediate food availability. Salinity mediates the availability or abundance of prey in these ponds—fish for piscivorous species occur in low-salinity ponds, while species that forage on brine flies (especially *Ephydra millbrae* and *Lipochaeta slossonae*), reticulated water boatmen (*Trichocorixa reticulata*), and brine shrimp (*Artemia franciscana*) in the higher-salinity ponds can benefit from the considerable biomass of these invertebrates in areas where water depths are suitable for foraging. At any given time, only a relatively small portion of the pond complexes provide suitable conditions (e.g., moist soil or shallow water) for foraging by shorebirds. Numerous waterbirds use the ponds and their associated islands and levees primarily for roosting, either at night or during high tide, when their preferred foraging habitats are submerged. Large mixed species flocks of shorebirds, gulls, terns, cormorants, pelicans, herons, and other birds are often seen roosting or loafing on levees, in shallow water, or on exposed mud in the ponds, and several species are known to use isolated or undisturbed pieces of upland habitat for nesting, including levees and islands.



LEGEND

- Eden Landing Phase 2 Project Area
- 5 Mile Buffer
- Alameda song sparrow
- Alameda whipsnake
- Bank swallow
- black skimmer
- Burrowing owl
- California black rail
- California clapper rail
- California least tern
- California red-legged frog
- Longfin smelt
- Northern harrier
- Pallid bat
- Salt-marsh harvest mouse
- Salt-marsh wandering shrew
- Saltmarsh common yellowthroat
- San Francisco gartersnake
- Short-eared owl
- Steelhead - central California coast DPS
- Tricolored blackbird
- western mastiff bat
- western snowy plover

AECOM

South Bay Salt Pond Restoration Project

Figure 3.5-2

CNDDB Special-Status Wildlife Species

There are two commercial airports in the South Bay (San Francisco International Airport and Norman Y. Mineta San Jose International Airport), and Oakland International Airport is just north of San Leandro Marina, which is the dividing line between the South Bay and the Central Bay. There are smaller private airstrips in San Carlos and Hayward, and the Moffett Federal Airfield, which is also used by the California Air National Guard, is in Sunnyvale. These airfields do present some potential for bird strikes by planes flying into or out of them. Such bird strikes are rare enough as to present very little potential for affecting the various populations of special-status birds. The 2007 Final EIS/R did not include bird strikes as a potential impact on biological resources. In fact, the potential impact of concern is more about the possibility of reductions in aviation safety from aircraft hitting birds in the air. An analysis of these impacts was conducted for the Bair Island EIS/R (USFWS and CDFG 2006), which identified the greatest risks to aviation safety from bird strikes as being from larger and higher-flying waterfowl that are attracted more to open-water ponds than they are to tidal marshes. Tidal marsh tends to attract smaller and lower-flying or ground-based shorebirds. This point was mirrored in the Federal Aviation Administration's 2007 Circular on hazardous wildlife attractants on or near airports, which found that cormorants, cranes, pelicans, and ducks presented much greater hazards to aviation than do small shorebirds (Federal Aviation Administration 2007).

The Eden Landing ponds included in the Phase 2 alternatives are all further away than the recommended 10,000-foot distance a project should be from an airport. For this reason, bird strikes are not exhaustively assessed in this Draft EIS/R.

The details of the habitats in and adjacent to the former salt ponds proposed for restoration under Phase 2 and the species that utilize these habitats are discussed in greater detail in the following section.

Eden Landing Phase 2 Project Setting

The Phase 2 activities assessed in this document are in the southern Eden Landing Ponds. The following subsections present a summary of the major habitat categories that were mapped in the SBSP Restoration Project Biology and Habitats Existing Condition Report (H.T. Harvey and Associates 2005). In addition, information presented in the *Eden Landing Ecological Reserve System E2 and E2C Operation Plan* (Operations Plan, CDFW 2016a) was used to update the baseline conditions of the Eden Landing Phase 2.

The following discussion first generally describes the habitat types within the southern Eden Landing Ponds. The subsequent section then describes more specifically which of these habitats occur within each pond group.

Habitats Identified within the Eden Landing Ponds

Tidal Salt Marsh

Tidal salt marsh vegetation consists of halophytic (salt-tolerant) species adapted to occasional to regular (tidal) saltwater inundation. Tidal salt marsh occurs on the outboard (San Francisco Bay) portions of salt pond levees, where salinities are higher.

In tidal salt marsh, cordgrass (*Spartina* sp. – OBL[1]) dominates low marsh areas. Pacific cordgrass (*Spartina foliosa*) has hybridized extensively with smooth cordgrass (*Spartina alterniflora*), a non-native species from the east and gulf coasts of North America. One or both of these species and/or their hybrids may be present at any one location.

The pickleweed and cordgrass salt marsh habitats are generally separated by elevation; cordgrass typically occurs below the Mean High Water mark and pickleweed occurs above this mark and often extends into higher elevations. However, the hybridized cordgrass can extend into the pickleweed elevation in some marshes. Pickleweed (*Sarcocornia depressa* and *S. pacifica* – OBL) dominates middle marsh areas, and high marsh areas feature a mixture of pickleweed and other moderately halophytic species, including alkali heath (*Frankenia salina* – FACW), saltgrass (*Distichlis spicata* – FAC), saltmarsh dodder (*Cuscuta salina* – NL), small flowered iceplant (*Mesembryanthemum nodiflorum* – FAC), fleshy jaumea (*Jaumea carnosa* – OBL), spearscale (*Atriplex prostrate* – FACW), perennial pepperweed (*Lepidium latifolium* – FAC), New Zealand spinach (*Tetragonia tetragonioides* – NL), and marsh gumplant (*Grindelia stricta* var. *angustifolia* – NL). High marsh is considered an ecotone, also known as an upland transitional zone, because the high marsh species frequently occur above the high tide line, which is indicated by wrack material (water-transported organic and synthetic detritus). The outboard sides of pond levees and channels associated with Old Alameda Creek (OAC) and Alameda Creek Flood Control Channel (ACFCC) and Whales Tail Marsh and Cargill Marsh typify tidal salt marsh in the project area. There are also small patches of salt marsh on portions of the internal sides of the pond levees, and these receive muted and controlled tidal flows thru water control structures.

In addition to the endangered salt marsh harvest mouse and the California Ridgway's rail, the Alameda song sparrow (*Melospiza melodia pusillula*), endemic to the Central and South San Francisco Bay, nests in dense herbaceous vegetation in salt and brackish marshes. The savannah sparrow (*Passerculus sandwichensis*) nests in pickleweed and peripheral halophytes in the upper marsh and upland transitional zones. The saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*) nests in tidal and nontidal brackish and freshwater marshes and possibly also in low densities in salt marsh habitat (Shuford and Gardali 2008) in the South Bay. A wide variety of birds nest in the tidal marshes of the South Bay, including several species of ducks, Virginia rails (*Rallus limicola*), soras (*Porzana carolina*), black-necked stilts (*Himantopus mexicanus*), northern harriers (*Circus cyaneus*), and in a few locations herons and egrets (Gill 1977). Also, California black rails (*Laterallus jamaicensis coturniculus*) winter and possibly breed in small numbers in these marshes (Liu et al. 2005). In addition, non-breeding birds, including larger shorebirds, swallows, blackbirds, and other species, roost, occasionally in large numbers,

[1] Plant indicator status categories include (Environmental Laboratory 1987):

- OBL - Plants that almost always occur in wetlands under natural conditions (estimated probability greater than 99 percent), but which rarely occur in non-wetlands
- FACW - Plants that occur usually (estimated probability 67 to 99 percent) in wetlands, but also occur in non-wetlands
- FAC - Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands
- FACU - Plants that occur sometimes (estimated probability 1 to 33 percent) in wetlands, but occur more often in non-wetlands
- UPL - Plants that occur rarely (estimated probability less than 1 percent) in wetlands, but occur almost always in non-wetlands
- NL – Not listed or evaluated for this region

in the tidal marsh. Tidal marshes (and mudflats) in several South Bay locations are also used as haul-out and pupping sites by harbor seals (*Phoca vitulina richardsi*), though none of these are close to southern Eden Landing.

Brackish Marsh

Brackish marsh occurs along the intertidal reaches of the creeks and sloughs that drain to the Bay, where salinities are lower due to freshwater input. Brackish marsh is found where intermediate interstitial soil salinities occur along creeks and sloughs; where freshwater channels experience periodic tidal inundation, and where groundwater emerges into tidal marshlands. Vegetative diversity and richness increase with greater freshwater influence. Where sediment deposits form terraced floodplains along low-flow channels, short bulrushes such as seacoast bulrush (*Bolboschoenus robustus* – OBL) and saltmarsh bulrush (*Bolboschoenus maritimus* ssp. *paludosus* – OBL) dominate the brackish habitat. These terraced areas may also support dense populations of the invasive perennial pepperweed, which can quickly develop into monotypic stands with increasing levels of disturbance. Other moderately halophytic plants such as brass buttons (*Cotula coronopifolia* – OBL) and taller bulrushes, including California bulrush (*Schoenoplectus californicus* – OBL) and hard stemmed tule (*Schoenoplectus acutus* var. *occidentalis* – OBL), occur in areas of lower soil salinity (e.g., toward the upland edges of brackish marsh). Tidal salt marsh species, including pickleweed, alkali heath, saltgrass, and spearscale, may also colonize brackish habitat. The two major streams outside of southern Eden Landing (OAC and the ACFCC) have brackish marsh along their banks in the uppermost areas of tidal influence. There are also areas of brackish marsh along the Alameda County Flood Control and Water Conservation District's (ACFCWCD) channels and in the channels between the CDFW-owned levees and the County-owned levees outside the eastern edge of Eden Landing.

Brackish marshes support many of the wildlife species that use salt marsh and freshwater marsh habitats. Species composition and the relative abundance of different species may vary spatially within brackish marshes depending on water salinity, vegetation type, and habitat structure. Variability in salinity within brackish marshes is likely most important for aquatic species, which are directly subject to variation in salinity. Brackish marshes are particularly important for anadromous fish (migrating from saline to fresh water to spawn), catadromous fish (migrating from fresh to saline water to spawn), and invertebrates such as shrimp, which use brackish marshes while physiologically acclimating to changing salinity on their migrations between saline and freshwater habitats.

The often taller and denser vegetation in brackish marshes supports large densities of breeding song sparrows, saltmarsh common yellowthroats, and marsh wrens (*Cistothorus palustris*) and large numbers of Virginia rails and soras during migration and winter.

Freshwater Marsh

Freshwater marsh vegetation in and around the project area exists along the upper reaches of sloughs and creeks and primarily consists of emergent vegetation adapted to freshwater wetland conditions. Though some freshwater marshes may experience tidal influence and periodic saltwater inundation, soil salinity remains relatively low due to freshwater flowing through these areas on a regular basis. The upper reaches of OAC (along the northern boundary of the Bay and Inland Ponds) demonstrate the vegetation transition that occurs as freshwater influence increases. Dense stands of California bulrush and hard-stemmed tule interspersed with perennial pepperweed (*Lepidium latifolium*) or curly dock (*Rumex crispus*) compose the majority of emergent vegetation in freshwater marsh habitat. Areas less frequently

exposed to freshwater flow but still exposed to occasional saltwater inundation may also host halophytic species such as marsh gumplant and pickleweed. Upstream in the OAC and ACFCC drainages, there are areas of freshwater marsh, and there are also narrower strips of freshwater marsh along the ACFCWCD's channels within the stormwater management areas east of the Ponds E5 and E6.

Because of the relatively limited areas of freshwater marsh occur in the South Bay, the wildlife communities of these marshes (versus those of brackish and salt marshes) in the South Bay have been little studied. Where freshwater occurs along the inland margins of the project area, the Pacific treefrog (*Pseudacris regilla*), bullfrog (*Rana catesbeiana*), and western toad (*Bufo boreas*) are present. California tiger salamanders (*Ambystoma californiense*) occur in vernal pool habitats in the Warm Springs Unit area, primarily on lands of the Don Edwards San Francisco Bay National Wildlife Refuge (or Refuge), adjacent to the SBSP Restoration Project area and the Newark salt ponds managed by Cargill Inc. (Cargill).

Most wetland-associated birds respond more to food availability and habitat structure than to salinity and therefore may occur in abundance in freshwater, brackish, or salt marsh habitats with suitable habitat structure. Some birds that are typically associated with fresh (versus more saline) marshes during the breeding season, such as bitterns, Virginia rails, and soras, breed sparingly in the South Bay, likely due to the limited extent of freshwater marshes. In contrast, red-winged blackbirds (*Agelaius phoeniceus*), American coots (*Fulica americana*), common moorhens (*Gallinula chloropus*), pied-billed grebes (*Podilymbus podiceps*), song sparrows, saltmarsh common yellowthroats, and marsh wrens breed commonly in freshwater marsh habitats in the South Bay. A variety of mammals occur in these freshwater habitats as well, although with the exception of the muskrat (*Ondatra zibethica*), none are associated primarily with this habitat type. Rather, mammals associated more with adjacent upland habitats use freshwater marsh for cover or foraging habitat.

Upland/Levees

The primary upland habitat existing in the Phase 2 project area at Eden Landing exists along the tops of levees and along the landward sides of the project area. There are also two natural hills in southern Eden Landing: Turk Island and Cal Hill (shown on Figure 2-2 and others). Across the ACFCC, the Coyote Hills form must of the land in the Coyote Hills Regional Park.

The salt pond levees were constructed from native tidal salt marsh soils (silty clay) in the immediate vicinity and may occasionally be reinforced with rock or concrete debris. Due to the high-salinity of these soils and their inherent disturbed nature, many levees feature areas of bare soil or are otherwise populated by non-native halophytic species, including small flowered iceplant, New Zealand spinach, sea fig (*Carpobrotus chilensis* – FACU), Russian thistle (*Salsola soda* – FACW), and Australian saltbush (*Atriplex semibaccata* – FAC).

On levees and portions of levees where freshwater (groundwater or rain) has reduced soil salinity over time, other common ruderal species (non-native species that thrive in areas of disturbance) of forbs and grasses dominate; including black mustard (*Brassica nigra* – NL), Italian thistle (*Carduus pycnocephalus* – NL), yellow star thistle (*Centaurea solstitialis* – NL), sweet fennel (*Foeniculum vulgare* – NL), perennial pepperweed, common mallow (*Malva neglecta* – NL), bird's foot trefoil (*Lotus corniculatus* – FAC), wild oats (*Avena fatua* – NL), ripgut brome (*Bromus diandrus* – NL), crabgrass (*Digitaria sanguinalis* – FACU), Italian rye grass (*Lolium multiflorum* – NL), tall wheat grass (*Elymus ponticus* – NL), and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum* – FAC). Native shrubs may colonize more substantial levees.

Due to the intense disturbance of much of uplands areas adjacent to the ponds, with most areas lacking an obvious transitional zone between the aquatic bayland habitats and adjacent habitats, most of the wildlife species found in these peripheral areas are common species adapted to urban or ruderal habitats. Reptiles such as the western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), and southern alligator lizard (*Elgaria multicaranata*) and mammals such as the house mouse (*Mus musculus*), California vole (*Microtus californicus*), western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel (*Spermophilus beecheyi*), black-tailed jack rabbit (*Lepus californicus*), cottontail (*Sylvilagus audubonii*), brush rabbit *(S. bachmani*), valley pocket gopher (*Thomomys bottae*), and striped skunk (*Mephitis mephitis*) all occur in the upland transitional areas along the edge of the Bay.

In most areas, the bird species that occur in the peripheral upland habitats are also common, widespread species. These include permanent residents such as the Anna's hummingbird (*Calypte anna*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), northern mockingbird (*Mimus polyglottos*), bushtit (*Psaltriparus minimus*), California towhee (*Pipilo crissalis*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), lesser goldfinch (*Carduelis psaltria*); summer residents such as the barn swallow (*Hirundo rustica*) and cliff swallow (*Petrochelidon pyrrhonota*); transients (some of which breed at higher elevations in the Bay Area), including the Swainson's thrush (*Catharus ustulatus*); and winter residents such as the hermit thrush (*Catharus guttatus*), white-crowned sparrow (*Zonotrichia leucophrys*), golden-crowned sparrow (*Zonotrichia atricapilla*), yellow-rumped warbler (*Dendroica coronata*), and American pipit (*Anthus rubescens*).

In remote areas (e.g., levees between salt ponds far from the upland edge such as those along the Bay Ponds), South Bay levees are heavily used for roosting and some nesting by birds such as double-crested cormorants (*Phalacrocorax auritus*), California gulls (*Larus californicus*), American white pelicans (*Pelecanus erythrorhynchos*), Forster's terns (*Sterna forsteri*), black-necked stilts, and American avocets (*Recurvirostra Americana*). Western snowy plovers have been identified nesting in relatively large numbers on some South Bay levees relatively recently, in the years since their construction. Before the development of the levees, western snowy plover primarily nested in natural dunes, many of which have been lost to development. Large numbers of shorebirds use salt pond levees for roosting, particularly when intertidal foraging habitats are inundated during high tide (Warnock 2004). Some species, including western snowy plovers, black-necked stilts, and least sandpipers (*Calidris minutilla*), also forage frequently along the margins of levees. Gulls, Forster's terns, Caspian terns (*Hydroprogne caspia*), cormorants, pelicans, and other waterbirds also frequently roost on levees. The California least tern uses levees in the South Bay as post-breeding roosting sites. After breeding (primarily at Central Bay sites), adult California least terns bring their juvenile offspring to the South Bay to forage before migration. Mammals use levees for dispersal and to obtain access to foraging areas. Red foxes (*Vulpes vulpes*) and California ground squirrels often excavate dens within levees (usually near the upland edge). Levees with riprap or concrete debris provide some cover for other small mammals, including predators or nuisance species such as the Norway rat (*Rattus norvegicus*), roof rat (*Rattus rattus*), and feral cat (*Felis catus*), and peripheral halophytes along the lower edges of the levee provide high-tide refugia for species such as the salt marsh harvest mouse, California Ridgway's rail, and California black rail. These high-tide refugia may be quite important to the survival of individual rails and mice during extreme high-tide events. However, levees also provide corridors for mammalian predators to access marsh areas, which can lead to high levels of predation on marsh wildlife.

Mudflats

Naturally occurring mudflats on the outboard sides of many ponds begin at low tidal salt marsh areas and extend into the Bay. They form the overwhelming majority of intertidal habitat in the South Bay, with exceptions being only a narrow and deep channel near the center of the Bay and the fringing marshes and former salt ponds around the edges. Covered by shallow water during high tide, these mudflats are exposed during low tide. These intertidal habitats are inhospitable to most vascular emergent vegetation; typically supporting 0 to 10 percent cover of cordgrass or pickleweed. Narrow stretches of mudflat occur within slough and creek channels and at the mouths of major sloughs. Mudflats occur during low tides in OAC, and ACFCC. Eventually, as sediment accretes in former salt ponds restored to full tidal action, tidal marsh habitat is expected to replace open water and mudflats.

These mudflats are a key reason for the importance of the San Francisco Bay Area to west coast shorebird populations, with an average of 67 percent of all the shorebirds on the west coast of the United States using San Francisco Bay wetlands (Page et al. 1999). Gulls and some dabbling ducks forage on the exposed mudflats as well. Because benthic invertebrates often recede deeper into the mud as the tidal elevation drops, especially large concentrations of foraging birds usually occur along the edge of the receding or rising tideline. Although the largest numbers of shorebirds forage on the broad flats along the edge of the Bay at low tide, some shorebirds, gulls, and large waders (e.g., herons and egrets) feed on the exposed flats along sloughs and channels, and the smaller channels in the brackish and salt marshes are the favored foraging areas for the state and federally endangered California Ridgway's rail.

Shorebirds, gulls, terns, American white pelicans, and ducks often use exposed mudflats as roosting or loafing areas when available, as do harbor seals. When the tides rise, most of these birds return to roosting areas in ponds or other alternate habitats, and the seals move to open waters.

Former Salt Production Ponds

Former salt ponds were previously managed for the purpose of commercial salt production. At southern Eden Landing, almost all of the interior of these ponds are now managed ponds that are either year-round open water or seasonally dry ponds. The total acreage of these ponds is approximately 2,250 acres. A formal delineation of jurisdictional wetlands and other waters within the Phase 2 ponds has not yet taken place. But based on the various program-level surveys and the similar surveys done for Phase 1 and for Phase 2 at the Don Edwards San Francisco Bay National Wildlife Refuge, the expectation is that all of these ponds will be considered jurisdictional and that most of that total area will be other waters.

The margins and basins of some former salt ponds are ponded during the fall, winter and spring seasons, but some are actively drained by CDFW or allowed to dry during the summer (e.g., Ponds E6C, E5C, E4C, and E1C). When dry, these ponds consist of bare ground and salt flat or salt panne (non-mudflat soils) areas. Historically, these basins were subject to regular tidal inundation, but following installation of levees and their use as salt ponds, they instead experience near-constant inundation and increased salinity. These conditions are beyond the tolerance of most halophytic vegetation, and only a few vascular plant species can survive in this environment. Vascular plant species that have adapted to these harsh environmental conditions include pickleweed, alkali heath, and the non-native small flowered iceplant (*Carpobrotus* spp.) which are typically only found along the margins of the basins and on top of the soil terrace of the salt flats. Due to the paucity of vegetation, these ponds provide little to no cover for small mammals or reptiles and provide nesting habitat only for species such as the western snowy plover that

ground-nest on the dry salt pannes, levees, and the occasional islands that have been created (by deposition of dredged material) within the ponds.

Many of the ponds provide valuable roosting and foraging habitat for shorebirds, waterfowl. Higher-salinity ponds support high densities of brine shrimp and brine flies (especially *Ephydra millbrae*), which in turn serve as prey for waterfowl and shorebirds.

The larger ponds in the project area are, collectively, productive systems supporting large quantities of vertebrate and invertebrate biomass. However, much of the biomass produced by these ponds is unavailable to some types of birds or fish due to water depths (for shorebirds) and salinities (for fish) that preclude these vertebrates' use of much of the invertebrates as food in the deeper, higher-salinity ponds.

Open Water and Subtidal Habitats

The open water category includes a variety of habitat types, including subtidal Bay waters, tidal sloughs and channels, and areas of standing or flowing waters within the salt ponds and tidal marshes. Deep water does not support emergent vegetation. Deep bays and channels are important for aquatic invertebrates, fishes, waterbirds, and harbor seals. The open waters of South Bay support a high diversity of benthic and pelagic macroinvertebrates. Though most of the dominant invertebrates are non-native species, they nonetheless support native oyster populations, large fish populations representing several different trophic levels, including Pacific herring (*Clupea pallasi*), northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax caeruleus*), staghorn sculpin (*Leptocottus armatus*), several species of perch (Embiotocidae family), English sole (*Parophrys vetulus*), and California halibut (*Paralichthys californicus*). Many of these fish species in turn support harbor seals and piscivorous (fish-eating) birds such as the Forster's tern, California least tern, American white pelican, brown pelican (*Pelecanus occidentalis*), and double-crested cormorant. Waterfowl such as greater scaup (*Aythya marila*), lesser scaup (*Aythya affinis*), canvasbacks (*Aythya valisineria*), and surf scoters (*Melanitta perspicillata*) dive for bivalves, crustaceans, and other invertebrates in shallower subtidal areas. Bird diversity in the open Bay waters is fairly low, as the species of birds that can exploit the subtidal areas are limited to those that can forage from the air (e.g., terns) or under water (e.g., scoters) and those that can swim. However, large densities (i.e., rafts) of diving ducks (e.g., ruddy ducks [*Oxyura jamaicensis]*, bufflehead [*Bucephala albeola*], greater scaup) occur in some areas where appropriate depths and concentrations of benthic invertebrates, particularly bivalves, provide a rich food source. Some species, such as gulls, also roost on the open waters of the Bay, especially at night.

The tidal sloughs and channels that circulate water around and between salt ponds and marsh remnants and through the marshes provide important habitat for large numbers of benthic and pelagic invertebrates and fish. These detritus-rich channels serve as important nurseries and feeding areas for estuarine fish, including leopard sharks (*Triakis semisasciata*). California bay shrimp (*Crangon franciscorum*) spawn in the open ocean but spend much of their lives feeding in the brackish waters of South Bay sloughs (Baxter et al. 1999). Diving ducks generally avoid the smaller tidal channels but can be found in abundance, particularly during their nonbreeding season, near the mouths of the larger tidal sloughs, in open waters, and in deeper ponds. During the winter, thousands of diving ducks roost and forage in the artificial lagoons around San Francisco Bay (e.g., in Foster City and Redwood Shores on the Peninsula) and in the Sunnyvale water treatment plant in the far South Bay. At Eden Landing, the Bay Ponds are relatively deep open water ponds that provide large areas of habitat for diving and dabbling ducks. Dabbling ducks such as the gadwall (*Anas strepera*), green winged teal (*Anas crecca*), northern shoveler (*Anas clypeata*), and mallard (*Anas platyrhynchos*) reach high densities in the shallower ponds and in smaller and

shallower channels, where they feed on aquatic plants (including algae, submerged aquatic vegetation, and plankton) and invertebrates. Terns often forage in the larger and mid-sized channels and ponds, and several species of herons and egrets forage in the shallows for fish. Many shorebirds feed along the exposed flats along tidal channels at low tide, as do rails and other tidal marsh birds.

Eden Landing Phase 2 Restoration Project Ponds

All of the ponds in southern Eden Landing, including the Bay Ponds, Inland Ponds and Southern Ponds, are being considered for Phase 2 restoration actions and are included in this Draft EIS/R.

Aquatic Habitats. Large areas of mudflats and open water Bay habitats are found west of Eden Landing. Smaller and more channelized open water also exists along the OAC and ACFCC. Large expanses of mudflat and cordgrass habitats exist outside of Eden Landing, along the levee borders, and at the mouth of the OAC and ACFCC. There is a variety of Initial Stewardship Plan management regimes, including System Ponds (E1, E2, and E2C) and Seasonal Ponds (E5, E6, E4 E7, E1C, E4C, E5C, and E6C). System Ponds are managed to circulate water through a series of ponds linked by water control structures that are controlled to reduce or maintain ambient salinities. Seasonal Ponds have less bay-water inputs, particularly in summer; water levels will rise and recede depending on precipitation and limited bay/slough or pond-to-pond hydrology. Ponds are managed differently throughout the year, primarily either as part of “summer” or “winter” operations, with seasonal transitional periods to either draw down or begin flooding to provide habitat for spring and fall migration periods, respectively.

Vegetation. The Phase 2 Eden Landing Ponds are predominately-open water ponds that are either permanently (e.g., Bay Ponds) or seasonally inundated (e.g., some Inland and Southern Ponds) and therefore have little vegetation within the ponds. The pond bottoms are a mix of mudflats or salt pannes depending on the extent to which they are exposed or become dry. The Phase 2 Eden Landing ponds include circulating, open water or “system ponds,” other ponds which are allowed to dry or “seasonal ponds,” and a few ponds (e.g., E6, E5 and E6C) which are provided “make up” water during the summer and result in high-salinity ponds called “batch” ponds. The concentration of salinity in these batch pond increases as the water evaporates. Vegetated areas in and around the Phase 2 Eden Landing area include pickleweed-dominated salt marsh, cordgrass-dominated marsh, smaller areas of brackish and freshwater marsh, upland vegetation, and small developed areas. Pickleweed salt marsh dominates the lower reach of the ACFCC along the southern boundary of the pond complex. Pickleweed-dominated tidal marsh is present in a strip of high marsh between the Bay Ponds and the ACFCC. Also, the J-Ponds primarily contain pickleweed and limited amounts of other salt marsh vegetation, even though they do not receive tidal flows. Brackish marsh exists upstream in OAC. Levees, in various states of function and condition, are found around the perimeter and in some instances internal to the Ponds. Upland vegetation is most often associated with the levees and adjacent areas.

There are tidal salt marshes with small marsh ponds or “pannes” at the Whale’s Tail marsh and Cargill Marsh, located at the mouths of the Old Alameda and Mt. Eden Creeks along the western edge of Eden Landing. The Whale’s Tail marsh is bordered by the restored and developing salt marsh in the Cargill Marsh (also known as New Marsh). In addition, small areas of coarse grain or oyster shell beach ridges are found along the bayfront edges of the Whale’s Tail marsh, and the strip marshes on the outboard levee of Pond E2.

Wildlife. Physical, biological and chemical characteristics of ponds such as extent of open water or exposed pond bottom, islands or other isolated berms or mounds, vegetation, salinity and depth influence

wildlife use. Changes in salinity and depth that may vary seasonally or between years may affect the abundance and species composition of invertebrates, fish, and feeding and roosting assemblages of birds, in ponds. Results of bird surveys at ponds managed for salt production by Cargill also suggests the response to physical characteristics varies between guilds. For example, small and medium shorebirds, gulls, and eared grebes showed an increase in abundance with increases in salinity while piscivorous birds, egrets and herons, and diving ducks showed marked decreases in abundance in areas of higher salinity. These different responses are likely related to the interactions between water depth, salinity, and dissolved oxygen and with their prey base. Some guilds, including dabbling ducks and terns showed little change in abundance with changes in salinity, potentially due to more varied foraging preferences with regard to water quality parameters. These differences support the assumption that a range of ponds with differing physical characteristics is necessary to support a diverse and robust avian community.

Monitoring conducted by USGS; SFBBO; University of California, Davis; and others indicated that the most prominent wildlife resources and patterns of wildlife distribution at Eden Landing and vicinity in recent years are as follows:

- Great blue herons nest on old wooden structures such as duck hunting blinds. Nesting great blue herons occur in the “Heron House” and occasionally some electrical transmission towers in the Eden Landing Ponds (Donehower and Tokatlian 2012).
- Breeding black-necked stilts and American avocets occur in and around many Eden Landing ponds in low densities.
- California Ridgway’s rails occur in low (less than 0.2 rails per hectare) to medium (0.2 to 0.5 rails per hectare) densities within the OAC, and the ACFCC and along the strip marshes north of the ACFCC and just outside of the E2 levee. Ridgway’s rails are known to occur in moderate density in Whale’s Tail Marsh, and the Cargill Marsh.
- California black rails are known to occur in low to medium densities in the upstream reaches with more brackish tidal marsh within OAC and ACFCC.
- Ponds E1 and E2 and the shallow bay outboard of the ponds are regularly used as foraging areas by California least terns during the post-breeding period in late summer.
- Forster’s terns nest primarily on islands or isolated levee segments within a number of ponds in the Eden Landing pond complex. Caspian terns have also nested on a small island in Pond E10.
- Large numbers of shorebirds forage on mudflats west of the Eden Landing pond complex at low tide.
- Large numbers of shorebirds roost, and forage to varying degrees, in most Eden Landing ponds, particularly at high tide.
- Ponds E1, E2, E4, and E7 support large numbers of piscivorous birds.
- Ponds in the Eden Landing complex supporting large numbers of dabblers include Ponds E4C, E5C, E6A, E6B, and E9,whereas Ponds E1, E2, E6A, E6C, and E10support the greatest abundance of diving ducks (Washburn et al. 2015).

- Red-tailed hawks, peregrine falcons, crows and common ravens nest on electrical transmission towers and old wooden structures in and among the pond levees and ponds.
- Salt marsh harvest mouse habitat in the Eden Landing pond complex is most extensive along Whale's Tail Marsh, OAC, and the ACFCC. Smaller habitat units are present within the restored tidal marsh that are developing in North Creek and Mt. Eden Creek marshes, diked marsh areas along the eastern perimeter and in several areas outside and on the landward side of this pond complex.
- Salmonids, such as steelhead (*Oncorhynchus mykiss*), occur in the ACFCC. The ability for salmonids to reach upstream spawning habitat is limited due to the presence of extensive barriers that restrict migration. Fish passage is the subject of other restoration efforts, which may, in the near-term future, restore a viable salmonid run.
- The largest concentration of breeding and wintering western snowy plovers in the San Francisco Bay Area is located in the salt ponds north of OAC in the northern (Phase 1) portion of the Eden Landing pond complex. Recent work by Tokatlian et al (2014) documented that the Eden Landing complex hosted 66 percent of all the nests found in Recovery Unit 3 (RU3). Pond E14 had the most nests (54 nests), followed by Pond E8 (32 nests) and Pond E13 (19 nests). Most nests were on dry pond bottoms, with some nests on internal graveled levees and berms. In 2014, a habitat enhancement project was completed in Pond E14, which spread oyster shells over two large (approximately 25-acre) plots.

Habitat Related Operations. The operational characteristics of the individual ponds that are being assessed in terms of their effect upon biological resource for the Eden Landing Phase 2 portion of the SBSP Restoration Project are discussed below.

Bay Ponds. The Bay Ponds are relatively large at a combined 1,394 acres in size. They include Ponds E1 (337 acres), E2 (673 acres), E4 (175 acres) and E7 (209 acres). The average bottom elevation of these ponds is 2.3-feet (NGVD). As part of the Initial Stewardship Plan, circulation of tidal water, particularly intake to and discharge from the pond systems, was established through use of existing as well as newly installed water control structures from the bay and sloughs, and between the existing levees (pond-to-pond). Intake occurs primarily at Pond E1, and discharge occurs primarily out of Pond E2. Pond depth is managed to be approximately 1 foot in Ponds E1 and E2 during the summer, at which time Ponds E4 and E7 are partially drawn down. Winter average depths of approximately 1 to 2 feet occur in all ponds.

The interior of these ponds are primarily open water with little to no vegetation. Suitable nesting bird habitat (for Forster's terns, American avocets, black-necked stilts, and the occasional black skimmer) exists on a few small, isolated islands or berms found within the interior of the ponds.

Inland Ponds. The Inland Ponds (413 acres) includes Ponds E6 (176 acres), E5 (159 acres), and E6C (78 acres). Ponds E6C, E6 and E5 are typically managed as "batch" ponds (salinity to approximately 120 parts per thousand [ppt]) with year-round water. The ponds have low salinity in the spring, and are allowed to concentrate and increase salinity during the summer with "make-up" water flow from Ponds E7 and E4 to maintain target water and salinity levels. The high-salinity water in Ponds E6C, E6 and E5 is diluted and circulated during the winter in the subsequent ponds with circulation through the system and discharge via Pond E2. The system-wide circulation normally reduces the salinity for the next

summer season. For 2016 operations, Pond E6C was drawn down to provide additional dry seasonal pond area for western snowy plover breeding habitat.

Southern Ponds (C-Ponds). The Southern Ponds totals 376 acres in size. It includes E4C (175 acres), E1C (66 acres), E5C (111 acres), and E2C (24 acres). Cargill Pond (CP) 3C (153 acres) was not acquired by CDFW in 2003 and is not included in the Phase 2 project plans; however, CP3C remains hydraulically linked to and is operated as part of ELER's Pond E2C system. CP3C may be acquired from Cargill and incorporated into ELER in the future. The Southern Ponds are located along the southeastern boundary of the ELER adjacent to the ACFCWCD lands and are comprised of diked marshes and a detention basin. Pond bottom elevations range from 2.4 to 3.6 NGVD.

The Southern Ponds are mostly seasonally dry, with periodic, managed intake and discharge via Pond E2C. Ponds E4C, E5C and E1C are essentially seasonal ponds with winter open water and shallow water conditions in the fall and spring and dry conditions during the summer. Pond E1C was a supplemental intake pond under pump driven salt making operations. Ponds E4C, E5C and E1C could also be shallow open water during the summer with pumped intake from ACFCC, but pump-driven intake operations are not anticipated. Constraints on pumping include high-energy costs, as well as elevated salinity resulting from high summer evaporation which may preclude adequate circulation and mixing prior to discharge. Ponds E1C, E5C and E4C are generally filled from E2C in late October with the onset of rainfall and open circulation with increased gravity inflow.

Other Notable Wildlife Resources outside the Project Area

The most prominent wildlife resources and patterns of wildlife distribution within the general South Bay area are as follows:

- Steelhead use estuarine habitats as rearing habitat for juveniles. They move through the South Bay on their migrations to and from upstream spawning areas in the designated critical habitat in Stevens Creek, Coyote Creek, and Guadalupe River.
- Green sturgeon have been found throughout San Francisco Bay (the designated critical habitat for this species), although its population and its freshwater spawning tend to be concentrated in the northern portions of the Bay and the Sacramento-San Joaquin River Delta.
- Large numbers of shorebirds forage on the intertidal mudflats ringing the South Bay during low tide. Shorebirds roost (and, variably, forage) in salt ponds and other habitats at high tide.
- Large numbers of waterfowl forage and roost on open Bay and pond waters and other available habitats.
- The largest harbor seal haul-out site in the South Bay occurs along lower Mowry Slough. Other areas frequently used as haul-out sites are near Calaveras Point, at Dumbarton Point, on Greco and Bair Islands, and along Corkscrew Slough.
- California Ridgway's rail and salt marsh harvest mouse habitat in many areas is limited in extent and connectivity. For example, many of the tidal marshes are very narrow and have little to no escape cover or transitional habitat. Relatively large marshes occur on Dumbarton Point, between Newark and Mowry Sloughs, at the Palo Alto Baylands Park and Nature Preserve, and on Greco and Bair Islands. The highest population densities for rails continue to be in the South Bay. The

largest populations occur in Arrowhead Marsh, Dumbarton Point, Mowry Slough, the Faber/Laumeister Marshes, Bair Island, and Greco Island (USFWS 2013).

Special-Status Plant Species

The special-status plant species that occur in the South Bay in the vicinity of the SBSP Restoration Project are discussed in this section. The most current and historic pertinent information was reviewed to compile a list of species considered for occurrence within the Phase 2 project area. The CNDDB was queried to determine the potential for occurrence in the area based on known populations and habitat requirements. This database represents the most current data available regarding special-status plant distribution within California. A map of the results is presented as Figure 3.5-3.

The SBSP Restoration Project pond complexes themselves are not expected to support many special-status plants: vascular plants are almost entirely absent from artificial, hypersaline ponds, and levees and remnant marshes provide peripheral halophytic habitat bearing little resemblance to the broad, relatively heterogeneous habitat of an intact upper marsh. However, pickleweed and native cordgrass, while not themselves listed under the Federal Endangered Species Act (ESA), are key components of marsh vegetation. Also, special-status plants may once have occurred in the natural salt pannes, sandy deposits, and slough channels of the former marsh, and habitat still exists in Eden Landing and its surroundings. The legal status and likelihood of occurrence of these species are listed in Table 3.5-1.

No ESA-listed plant species have been documented within the boundaries of the Eden Landing pond complex (CDFW 2016b). In fact, there is only one known ESA-listed plant occurrence within 5 miles of the project areas (Figure 3.5-3). This record is a historical occurrence (from 1959), of Contra Costa goldfields (*Lasthenia conjugens*) and is believed to be extant. This species usually occurs within saline/alkaline and freshwater wetlands such as vernal pools or wetland-riparian areas within valley grassland habitats. The habitat types are not present in the project area, and the species is not expected to occur. Although not found in southern Eden Landing, several species-status plant species (i.e., California Native Plant Society (CNPS)-ranked and track species) have been documented near southern Eden Landing that have potential to occur in the Phase 2 project area; including Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*), and saline clover (*Trifolium hydrophilum*).

Special-Status Wildlife Species

Special-status animal species that occur in or near the Eden Landing Phase 2 project area are shown on Figure 3.5-2. The legal status and likelihood of occurrence of these species are listed in Table 3.5-2. There are three threatened or endangered species that are a focus of particular management efforts by the CDFW at ELER, including: salt marsh harvest mouse, California Ridgway's rail, and western snowy plover.

Other special-status wildlife species are known to use or may use the Phase 2 project area for breeding and rearing of young. These include Alameda song sparrow (*Melospiza melodia pusillula*), double-crested cormorant (*Phalacrocorax auritus*), fox sparrow (*Passerella iliaca*), northern harrier (*Circus cyaneus*), salt marsh wandering shrew (*Sorex vagrans halicoetes*), saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), and short-eared owl (*Asio flammeus*). California black rails (*Laterallus jamaicensis coturniculus*) breed in the brackish marshes of the OAC that are upstream of the Phase 2 project area and below the 20-tide gate structure.

A number of other special-status species occur in the Phase 2 project area as visitors, migrants, or foragers but are not known or expected to breed in the immediate project area. Animals that occasionally occur within the project area and breed in adjacent habitats or in the greater South Bay area, but occur only in the Phase 2 project area as uncommon to rare foragers, include the California black rail (*Laterallus jamaicensis coturniculus*), California least tern, California brown pelican (*Pelecanus occidentalis californicus*), California Central Coast steelhead DPS, green sturgeon Southern DPS (*Acipenser medirostris*), longfin smelt (*Spirinchus thaleichthys*), fall-run chinook salmon (*Oncorhynchus tshawytscha*), golden eagle (*Aquila chrysaetos*), tricolored blackbird (*Agelaius tricolor*), Vaux's swift (*Chaetura vauxi*), and white-tailed kite (*Elanus caeruleus*).

Species that occur in the project area regularly as foragers but have "special status" only at nesting sites elsewhere in California include the American peregrine falcon (*Falco peregrinus anatum*), American white pelican (*Pelecanus erythrorhnchos*), black oystercatcher (*Haematopus bachmani*), common loon (*Gavia immer*), Cooper's hawk (*Accipiter cooperii*), lesser yellowlegs (*Tringa flavipes*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), merlin (*Falco columbarius*), osprey (*Pandion haliaetus*), red knot (*Calidris canutus* ssp. *roselaari*), sharp-shinned hawk (*Accipiter striatus*), short-billed dowitcher (*Limnodromus griseus*), Western grebe (*Aechmophorus occidentalis*), and whimbrel (*Numenius phaeopus*).

Table 3.5-1 Special-Status Plant Species and Their Potential to Occur in the Phase 2 Eden Landing Ponds

NAME	STATUS *	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Threatened or Endangered Species			
California seablite (*Suaeda californica*)	FE, CRPR 1B.1	Sandy, high-energy shorelines within salt marsh. Relict populations in South Bay had been considered extirpated; known from the San Francisco Bay and Morro Bay, San Luis Obispo county. Elev. 0 – 525 ft.	**Low potential to occur.** Suitable habitat occurs within Eden Landing and Ravenswood pond complexes and the species has been documented in salt marsh habitat at multiple locations in central San Francisco Bay.
Contra Costa goldfields (*Lasthenia conjugens)*	FE, CRPR 1B.1	Saline/alkaline vernal pools, mesic areas within grassland. Known from Alameda, Solano, Monterey, Contra Costa, and Napa Counties. Annual; blooms March through June. Elev. 13 – 590 ft.	**No potential to occur.** Historically known from edges of salt ponds at the Bay shore near Mt. Eden and Newark. No suitable habitat is present in the southern Eden Landing Phase 2 project area. Otherwise occurs in disjunct populations in Monterey and North Bay areas.
Fountain thistle (*Cirsium fontinale* var. *fontinale*)	FE, SE, CRPR 1B.1	Valley and foothill grassland, chaparral, growing in serpentine seeps and grassland. Elev. 295 – 590 ft.	**No potential to occur.** No serpentine seeps are present in the Phase 2 Eden Landing project area.
Marin western flax (*Hesperolinon congestum*)	FT, ST, CRPR 1B.1	Chaparral, valley and foothill grassland, growing in serpentine barrens and in serpentine grassland and chaparral. Elev. 100 – 1.200 ft.	**No potential to occur.** No serpentine habitats are present in the Phase 2 Eden Landing project area.
Robust spineflower (*Chorizanthe robusta* var. *robusta*)	FE, CRPR 1B.1	Cismontane woodland, coastal dunes, coastal scrub, growing on sandy terraces and bluffs or in loose sand. Elev. 10 – 390 ft.	**No potential to occur.** No CNDDB occurrences within 5 miles of the Phase 2 Eden Landing project area. Eden Landing does not include appropriate coastal habitat with sandy substrate.
San Mateo thorn-mint (*Acanthomintha duttonii*)	FE, SE, CRPR 1B.1	Chaparral, valley and foothill grassland, coastal scrub in relatively open areas. Only known to occur on very uncommon serpentinite vertisol clays. Elev. 165 – 655 ft.	**No potential to occur.** No CNDDB occurrences within 5 miles of the Phase 2 Eden Landing project area. No appropriate habitat or suitable serpentinite substrate is present at Eden Landing.
Santa Cruz tarplant (*Holocarpha macradenia*)	FT, SE, SRPR 1B.1	Coastal prairie, coastal scrub, and valley and foothill grassland. Often found in clay, sandy areas. Elev. 30 – 720 ft.	**No potential to occur.** Appropriate habitat, substrate and the elevation range are absent from the project area. One historic (from 1915) CNDDB occurrence within 5 miles of the Phase 2 Eden Landing project area.

NAME	STATUS*	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Species of Concern and CRPR Species			
Alkali milk-vetch (*Astragalus tener* var. *tener*)	CRPR 1B.2	Alkaline soils in playas, vernal pools, and adobe clay areas within grassland. Alameda, Merced, Solano, and Yolo Counties. Annual; blooms March to June. Elev. 0 – 200 ft.	**Low potential to occur.** A recently rediscovered population in seasonal wetlands at Warm Springs in Fremont. Considered extirpated from Hayward, Newark and San Leandro Quads. Currently no high-quality habitat in Phase 2 Eden Landing project area.
Arcuate bush-mallow (*Malacothamnus arcuatus*)	CRPR 1B.2	Chaparral on gravelly alluvium substrates. Elev. 260 – 1,166 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Brittlescale (*Atriplex depressa*)	CRPR 1B.2	Chenopod scrub, meadows, playas, valley and foothill grassland, vernal pools. Usually occurs in alkali scalds or clay in meadows or annual grassland. Elev. 3 – 1,050 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
California androsace (*Androsace elongate* ssp. *acuta*)	CRPR 4.2	Annual herb in chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland and valley and foothill grasslands. Elev. 345 – 4,280 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Chaparral ragwort (*Senecio aphanactis*)	CRPR 2B.2	Chaparral, cismontane woodland, coastal scrub. drying alkaline flats. Elev. 505 – 2,625 ft.	**No potential to occur.** There is one historic (from 1892) CNDDB occurrence within 5 miles of the Phase 2 Eden Landing project area. However, there is no suitable habitat present at Eden Landing.
Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)	CRPR 1B.2	Moist, alkaline soils within grassland. Tolerates disturbance. Annual; blooms June through November. Known from Alameda, Monterey, San Luis Obispo, and Santa Clara Counties. Elev. 0 – 850 ft.	**Low potential to occur.** Known from several locations in Newark, Fremont, Alviso, and Sunnyvale, including three CNDDB occurrences within 5 miles of Eden Landing. Slight potential for occurrence in peripheral halophyte or disturbed upland zones in Phase 2 Eden Landing project area, but not currently associated with salt marsh.
Davidson's bush-mallow (*Malacothamnus davidsonii*)	CRPR 1B.2	Coastal scrub, riparian woodland, chaparral, cismontane woodland, in sandy washes. Elev. 605 – 2,805 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.

NAME	STATUS*	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Diablo helianthella (*Helianthella castanea*)	CRPR 1B.2	Usually rocky, axonal soils. Often in partial shade. Broadleaf upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland. Elev. 200 – 4,260 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing, and the known elevation range is well above the elevations found within the project area. There is one CNDDB occurrence within 5 miles of Eden Landing.
Fragrant fritillary (*Fritillaria liliacea*)	CRPR 1B.2	Coastal scrub, valley and foothill grassland, coastal prairie. Often on serpentine; various soils reported, though usually clay, in grassland. Elev. 10 – 1,340 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	CRPR 1B.2	Cismontane woodland, valley and foothill grassland, growing on clay soils or serpentine on dry hillsides. Elev. 325 – 985 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Hairless popcorn-flower (*Plagiobothrys glaber*)	CRPR 1A	Formerly known from alkali meadows and coastal salt marshes and swamps. Extirpated throughout its range; last documented occurrence in 1954, though possibly relocated near Antioch. Elev. 50 – 590 ft.	**No potential to occur.** Presumed extinct. There are two historic occurrences within 5 miles of the Phase 2 Eden Landing project area (1890, and 1896)
Hall's bush-mallow (*Malacothamnus hallii*)	CRPR 1B.2	Chaparral. Populations may occur on serpentine. Elev. 30 – 1,800 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*)	CRPR 1B.1	Vernal pools, alkaline depressions, roadside ditches, and other wet places near the coast. Elev. 15 – 150 ft.	**Low potential to occur.** One CNDDB occurrences is located within 5 miles of Eden Landing. Suitable habitat may be present in Phase 2 Eden Landing project area.
Johnny-nip (*Castilleia ambigua* var. *ambigua*)	CRPR 4.2	Annual herb of coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grasslands, and vernal pool margins. Elev. 0 – 1,425 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Kings Mountain manzanita (*Arctostaphylos regismontana*)	CRPR 1B.2	Broadleaved upland forest, chaparral, north coast coniferous forest, growing on granitic or sandstone outcrops. Elev. 1,060 – 2,400 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.
Lesser saltscale (*Atriplex minuscula*)	CRPR 1B.1	Chenopod scrub, playas, valley and foothill grassland, in alkali sink and grassland in sandy, alkaline soils. Elev. 65 – 330 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.

NAME	STATUS*	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Lost thistle (*Cirsium praeteriens*)	CRPR 1A	Little information is available about the habitat preferences of the species. Bloom period is June through July. Elev. 0 – 330 ft.	**No potential to occur.** The species is known from only two collections made near Palo Alto (last in 1901) and is presumed extirpated in California.
Most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*)	CRPR 1B.2	Chaparral, valley and foothill grassland, cismontane woodland, growing on serpentine outcrops, on ridges and slopes. Elev. 390 – 2,400 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area. Serpentine substrates are absent. However, there are two CNDDB documented occurrences within 5 miles of the Eden Landing.
Patterson's navarretia (*Navarretia paradoxiclara*)	CRPR 1B.3	Serpentinite, openings, vernally mesic, often drainage of meadows and seeps. Elev. 490 – 1,410 ft.	**No potential to occur.** There are no CNDDB occurrences within 5 miles of Eden Landing. No suitable habitat present in Phase 2 Eden Landing project area.
Pincushion navarretia (*Navarretia myersii* ssp. m*yersii*)	CRPR 1B.1	Acidic vernal pools. Elev. 65 – 985 ft.	**No potential to occur.** There are no CNDDB documented occurrences within Alameda County or CNDDB occurrences within 5 miles of the Phase 2 project area at Eden Landing. No suitable habitat present in Phase 2 Eden Landing project area.
Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)	CRPR 1B.2	Coastal salt marsh habitats, growing with pickleweed and saltgrass, etc. Elev. 0 – 50 ft.	**Potential to occur.** Found in LaRiviere Marsh, Don Edward's Refuge, Fremont in 2010 and 2015. Currently, appropriate habitat is present in the fully tidal marshes adjacent to and outside of the Phase 2 Eden Landing project areas. There is one documented occurrence within 5 miles of the Phase 2 Eden Landing project area; near the mouth of Redwood Creek on the west side of the Bay.
Prostrate navarretia (*Navarretia prostrata*)	CRPR 1B.1	Seasonal wetlands and vernal pools within grassland and coastal scrub. Ranges from Monterey County south to San Diego. Annual; blooms April through July. Elev. 10 – 3,970 ft.	**No potential to occur.** There are no CNDDB occurrences within 5 miles of the Phase 2 project area at Eden Landing. In South Bay area, known only from Warm Springs in Fremont. No suitable habitat present in Phase 2 Eden Landing project area.
Saline clover (*Trifolium hydrophilum*)	CRPR 1B.2	Edges of salt marshes, alkali meadows, and vernal pools along the coast from Sonoma County south to San Luis Obispo as well as in the inland counties of Solano and Colusa. Annual; blooms April through June. Elev. 0 – 985 ft.	**Low potential to occur.** There is one CNDDB occurrence within 5 miles of the Phase 2 project area at Eden Landing. Historic collection (type locality) from Belmont and documented in Fremont salt flats in 2004. Currently, no high-quality habitat present in the immediate Phase 2 Eden Landing project area.

NAME	STATUS*	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
San Francisco collinsia (*Collinsia multicolor*)	CRPR 1B.2	Closed-cone coniferous forest and coastal scrub, growing on decomposed shale (mudstone) mixed with humus. Elev. 100 – 820 ft.	**No potential to occur.** No suitable forest or scrub habitats present in Phase 2 Eden Landing project area.
San Joaquin spearscale (*Extriplex* [=*Atriplex] joaquiniana*)	CRPR 1B.1	Alkaline soils within chenopod scrub, meadows, playas, and grasslands in 14 Central California counties. Annual; blooms April through October. Elev. 0 – 2,460 ft.	**No potential to occur.** There is one documented occurrences within 5 miles of the Phase 2 project area at Eden Landing. Currently, no suitable habitat present in Phase 2 Eden Landing project area.
Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*)	CRPR 4.3	Annual herb of chaparral and cismontane woodlands. Elev. 295 – 4,920 ft.	**No potential to occur.** There are no CNDDB occurrences within 5 miles of the Phase 2 project area at Eden Landing. Suitable habitats are not present in the Phase 2 Eden Landing project area.
Slender-leaved pondweed (*Stuckenia filiformis* ssp. *alpina*)	CRPR 2B.2	Marshes and swamps (assorted shallow freshwater habitats). Elev. 985 – 7,050 ft.	**Potential to occur.** There is one historic (from 1977) CNDDB occurrence within 5 miles of the Phase 2 project area at Eden Landing. Suitable freshwater habitat is absent from the Phase 2 Eden Landing project areas, and area well outside the known elevation range of the species.
Small spikerush (dwarf spikerush) (*Eleocharis parvula*)	CRPR 4.3	Coastal and riparian marshes, swamps, and wetlands; blooms July and August. Elev. 3 – 9,840 ft.	**Low potential to occur.** There are no known occurrences within 5 miles of the Phase 2 project area at Eden Landing. However, a population of has been documented on the levee shoreline of one of the Island Ponds. Suitable habitat for this species is found within the Phase 2 Eden Landing project area.
Western leatherwood (*Dirca occidentalis*)	CRPR 1B.2	Broad-leafed upland and riparian forest and woodlands, and chaparral, growing on brushy slopes, in mesic areas; mostly in mixed evergreen & foothill woodland communities. Elev. 100 – 1,800 ft.	**No potential to occur.** No suitable habitat present in Phase 2 Eden Landing project area.

* Definitions:

CRPR – California Rare Plant Rank

CRPR 1A – Plants considered extinct.

CRPR 1B – Plants rare, threatened, or endangered in California and elsewhere.

CRPR 2B – Plants rare, threatened, or endangered in California, but more common elsewhere.

CRPR 3 – Plants about which more information is needed; a review list.

CRPR 4 – Plants of limited distribution; a watch list.

0.1-Seriously threatened in California (over 80 percent of occurrences threatened / high degree and immediacy of threat)

0.2-Moderately threatened in California (20 to 80 percent occurrences threatened / moderate degree and immediacy of threat)

FE – Federally Endangered

FT – Federally Threatened

SE – State Endangered (California)

ST – State Threatened (California)

Sources:

CDFW 2016b. California Natural Diversity Database, Biogeographic Data Branch, Sacramento, CA. August. Available online at https://www.wildlife.ca.gov/Data/CNDDB

Nomenclature from CNPS 2016 and CDFW 2016b.

Table 3.5-2 Special-Status Animal Species and Their Potential to Occur in the Phase 2 Eden Landing Ponds

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Threatened or Endangered Species			
Alameda whipsnake (*Masticophis lateralis euryxanthus*)	FT, ST	Chaparral foothills, shrublands with scattered grassy patches, rocky canyons and watercourses, and adjacent habitat. Underground or under cover when inactive.	**No potential to occur.** Suitable habitats are not present in the Phase 2 project area at Eden Landing.
American peregrine falcon (*Falco peregrinus anatum*)	SFP, BCC	Forages in many habitats; nests on cliffs and similar human-made structures.	**Known to occur.** Regular forager (on other birds) in the vicinity of project area, primarily during migration and winter. In the Phase 2 project area, individuals have successfully nested in former duck hunting blinds.
Bald eagle (*Haliaeetus leucocephalus*)	SE, SFP, BCC	Occurs mainly along seacoasts, rivers, and lakes; nests in tall trees or in cliffs. Feeds mostly on fish.	**Low potential to occur.** Rare visitor, primarily during winter, to the Phase 2 project area. May occasionally forage, but does not nest, in the project area at Eden Landing.
Bank swallow (*Riparia riparia*)	ST	Colonial nester on vertical banks or cliffs with fine-textured soils near water.	**Low potential to occur.** There is one CNDDB occurrence within 5 miles of the Phase 2 project area, but it is from 1983. Species has not been observed in the project area, but may be a rare transient. No suitable breeding habitat in the project area.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
California black rail (*Laterallus jamaicensis coturniculus*)	ST, SFP, BCC	Breeds in fresh, brackish, and tidal salt marsh.	**Known to occur.** Non-breeding individuals winter in small numbers in ACFCC and freshwater marsh upstream from the Phase 2 project area. Have been observed in small numbers during breeding seasons in Old Alameda Creek (OAC) and breed in small numbers. Suitable habitat is largely absent from the Phase 2 Eden Landing project area, aside from OAC.
California brown pelican (*Pelecanus occidentalis californicus*)	SFP (*Delisted from Federal ESA*)	Occurs in near-shore marine habitats and coastal bays. Nests on islands in Mexico and Southern California.	**Known to occur.** Regular in project area during nonbreeding season (summer and fall). Roosts on levees in the interiors of pond complexes; forage in ponds and Bay.
California least tern (*Sterna antillarum browni*)	FE, SE, SFP	Nests along the coast on bare or sparsely vegetated flat substrates.	**Known to occur.** The South Bay is an important post-breeding staging area for California least terns. Current Bay Area nesting sites include Alameda Point and Hayward Regional Shoreline. Has attempted to nest in small numbers at northern Eden Landing Pond E8A prior to full tidal restoration (completed in 2011), but all nests were depredated. A small colony is established north of Eden Landing, at Hayward Regional Shoreline.
California red-legged frog (*Rana draytonii*)	FT, CSSC	Permanent waters of streams, marshes, lakes and other quiet bodies of water. Estivate in the summer underground. Disperse along riparian corridors.	**No potential to occur.** Suitable habitat does not occur within the Phase 2 project area at Eden Landing. Species does not occur in saline habitats.
California Ridgway's rail (*Rallus obsoletus obsoletus*)	FE, SE, SFP	Salt and brackish marsh habitat usually dominated by pickleweed and cordgrass.	**Known to occur.** Resident in tidal marshes and sloughs within and immediately adjacent to the Phase 2 project area at Eden Landing, including Whale's Tail and Cargill Marsh, the OAC and ACFCC tidal marshes. Suitable habitat within the Bay, Inland and Southern Ponds is largely absent.
California tiger salamander (*Ambystoma californiense*)	FT, ST, WL	Vernal or temporary pools in annual grasslands, or open stages of woodlands.	**No potential to occur.** Suitable habitat for this species is not present in the Phase 2 project area at Eden Landing. A population is present on Refuge lands in the Fremont/Warm Springs area, though not in the immediate SBSP pond complexes.
Delta smelt (*Hypomesus transpacificus*)	FT, FE	Inhabits open waters of bays, tidal rivers, channels, and sloughs; when not spawning, it tends to concentrate where salt water and freshwater mix and zooplankton populations are dense. Populations occur in the lower Delta and upper Suisun Bay after breeding.	**No potential to occur.** Phase 2 project area is outside the geographic range of the species.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Green sturgeon, Southern Distinct Population Segment (DPS) (*Acipenser medirostris*)	FT, CSSC	Spends majority of life in near-shore oceanic waters, bays, and estuaries; spawns in freshwater rivers.	**Known to occur.** Spawns in Sacramento River, but not known to spawn in South Bay. Juveniles and adults forage in San Francisco Bay. Present in the South Bay; may be in adjacent channels; unlikely to be inside ponds.
Longfin smelt (*Spirinchus thaleichthys)*	FC, ST, CSSC	Spends the majority of life in San Francisco Bay, moving upstream to spawn in low-salinity waters in winter/spring.	**Known to occur**. Occurs year-round in San Francisco Bay and known to occur in the South Bay.
Salt marsh harvest mouse (*Reithrodontomys raviventris raviventris*)	FE, SE, SFP	Salt marsh habitat dominated by pickleweed.	**Known to occur.** Limited habitat within the southern Eden Landing Ponds; however, species is known to occur in pickleweed marshes within and immediately adjacent to the Phase 2 project area at Eden Landing (Mt. Eden Creek, Baumberg Tract marshes, Whale's Tail Marsh, OAC, and the ACFCC, and in several areas on the landward side of this pond complex).
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	FE, SE, SFP	Near freshwater marshes, ponds, and slow-moving streams; upland areas near pond/marsh habitat are important in fall and winter. Occur along the San Francisco peninsula.	**No potential to occur.** The Phase 2 project area is outside the known geographic range of the species.
Steelhead – California Central Coast DPS (*Oncorhynchus mykiss irideus*)	FT	Cool streams with suitable spawning habitat and conditions allowing migration and marine habitats.	**Known to occur.** Known to be present in several South Bay creeks (including ACFCC). Suitable spawning habitat is not present in the project area, but this species moves through the area to spawn upstream, though several barriers to upstream migration occur and are the subject of separate restoration efforts.
Tricolored blackbird (*Agelaius tricolor*)	SE, BCC	Cattail or tule marshes; forages in fields, farms. Breeds in large freshwater marshes, in dense stands of cattails or bulrushes. Breeds in	**Potential to occur.** Suitable nesting habitats are not present in the Phase 2 project area, but may occur in nearby freshwater habitats (upstream) in the OAC and ACFCC. Species has not been documented within southern Eden Landing, but has been documented in Coyote Hills Regional Park. May occur in the Phase 2 project area at Eden Landing as a nonbreeding forager.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Freshwater, vernal pool and similar ephemeral wetlands with grass or mud bottoms in grasslands	**No potential to occur.** Suitable habitats for the species are not present in the Phase 2 project area. Species does not occur in estuarine habitats.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE	Freshwater. Natural or artificial, seasonally ponded habitat types, including vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches and tire ruts.	**No potential to occur.** Suitable habitats for the species are not present in the Phase 2 project area. Species does not occur in estuarine habitats.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Western snowy plover (*Charadrius nivosus nivosus*)	FT, CSSC, BCC	Nests on sandy beaches and salt panne habitats, including dry ponds.	**Known to occur.** Occurs in the Phase 2 project area, and successful breeding occurred in Pond E6C in 2016. High numbers of breeding birds occur in northern Eden Landing. Additional birds occur in the project area during winter.
State Species of Concern and Fully Protected Species			
Alameda song sparrow (*Melospiza melodia pusillula*)	CSSC, BCC	Breeds in salt marsh, primarily in marsh gumplant and cordgrass along channels.	**Known to occur.** Common resident, breeding and foraging in tidal salt marsh. Suitable habitat is available within and adjacent to the Phase 2 project area (along the OAC, ACFCC, Whale's Tail, Cargill marsh, and Alameda County Wetlands).
Allen's Hummingbird (*Selasphorus sasin*)	BCC	Habitat includes chaparral, thickets, forested areas, riparian woodland, ravines and canyons, planted stands of eucalyptus or cypress, residential areas; in migration and winter, also in montane woodland and in open situations with flowering shrubs.	**No potential to occur.** There are no documented occurrences within 5 miles of the Phase 2 project area. Suitable habitat is not present within southern Eden Landing.
American white pelican (*Pelecanus erythrorhnchos*)	CSSC (nesting)	Forages in freshwater lakes and rivers; nests on islands in lakes.	**Known to occur.** Common non-breeder, foraging primarily on ponds in the project area. Regular visitor from late summer to spring. Not known to breed on-site.
Barrow's goldeneye (*Bucephala islandica*)	CSSC (nesting)	Nests in freshwater marshes; winters in coastal marine habitats.	**Low potential to occur.** Uncommon winter visitor; does not breed in the project area.
Bell's sparrow (*Amphispiza belli*)	BCC	Desert, shrublands, and chaparral, most commonly associated with sagebrush for breeding. Also found in chaparral.	**No potential to occur.** Suitable habitat is not present in the Phase 2 project area at Eden Landing.
Black oystercatcher (*Haematopus bachmani*)	BCC	Breeds in high tide margin of intertidal zone, and includes mixed sand and gravel beaches.	**Known to occur.** Species has been observed within southern Eden Landing. Suitable intertidal habitats are limited within the southern Eden Landing ponds, but present in marshes associated with the OAC, ACFCC, Whale's Tail and Cargill marshes.
Black skimmer (*Rynchops niger*)	CSSC, BCC (nesting)	Nests on abandoned levees and islands in salt ponds and marshes on Refuge lands.	**Low potential to occur.** There is only one sighting in eBird in the Eden Landing project area, and it was in 1978; the only CNDDB occurrence was north of Eden Landing in 1994. Known to nest on the Refuge in small numbers south of Eden Landing. There are few islands present in the in the Phase 2 project area. May forage in low numbers in some years. Breeding has not been confirmed within the Phase 2 project area.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Black-vented shearwater (*Puffinus opisthomelas*)	BCC	Pelagic, but coastal; most frequently observed in close proximity to the shore. Nests on sparsely-vegetated islands in areas of permanent upwelling	**No potential to occur.** Suitable pelagic and coastal habitats are not present in the Phase 2 project area. There are no documented occurrences or sightings in the vicinity of the project area.
California gull (*Larus californicus*)	WL (nesting)	Nests on inland lakes and around San Francisco Bay, in ponds.	**Known to occur.** Nesting colonies are on the watch list; individuals are not. Common resident, breeding on several Bay Ponds and associated small islands in the Phase 2 project area at Eden Landing. Forages throughout project area. Nuisance concern for this species addressed through Adaptive Management Plan and other Reserve practices.
California horned lark (*Eremophila alpestris actia*)	WL	Short-grass prairie, annual grasslands, coastal plains, and open fields.	**Low potential to occur.** Given the few records in eBird, this species is probably not common in the project area at Eden Landing during nonbreeding season. Not known to nest on salt pond levees, salt flats, or ruderal habitats within Phase 2 project area, but have been present during spring forging on levees.
California yellow warbler (*Dendroica petechia brewsteri*)	CSSC, BCC (nesting)	Breeds in riparian woodlands, particularly those dominated by willows and cottonwoods.	**Low potential to occur.** May occur on-site as a migrant. No nesting habitat within or adjacent to southern Eden Landing, but nests in riparian habitat upstream from the Bay, including areas within the South Bay.
Common loon (*Gavia immer*)	CSSC (nesting)	Nests in freshwater marshes; winters in coastal marine habitats.	**Potential to occur.** Occasional winter visitor; does not breed in the Phase 2 Eden Landing project area.
Cooper's hawk (*Accipiter cooperii*)	WL (nesting)	Nests in woodlands; forages in many habitats in winter and migration.	**Potential to occur.** Observed on-site as a migrant and winter resident. Breeds in limited numbers in upland habitats adjacent to the project area in the South Bay, but not within the immediate Phase 2 project area.
Costa's hummingbird (*Calypte costae*)	BCC	Desert and semi-desert, and arid brushy foothills and chaparral.	**Low potential to occur.** Suitable breeding habitat is not present in the Phase 2 project area. Species has limited potential to occur in winter as a migrant, but there is only one eBird occurrence nearby (at Coyote Hills Regional Park).

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Double-crested cormorant (*Phalacrocorax auritus*)	WL (nesting)	Colonial nester on coastal cliffs, offshore islands, electrical transmission towers, and along interior lake margins. Feeds on fish.	**Known to occur.** Breeds on electrical transmission towers and nearby bridges and structures within the Phase 2 project area and forages in ponds and other open water habitats in the Phase 2 project area.
Fall-run chinook salmon Central Valley Evolutionarily Significant Unit (ESU) (*Oncorhynchus tshawytscha*)	CSSC	Cool rivers and large streams that reach the ocean and that have shallow, partly shaded pools, riffles, and runs.	**Known to occur.** Known to be present in several South Bay creeks (including ACFCC,) and associated slough channels within the project area. Suitable spawning habitat is not present in the project area, but this species moves through the area to spawn upstream along some of these creeks.
Fox sparrow (*Passerella iliaca*)	BCC	Dense thickets in coniferous or mixed woodlands, chaparral, p arks, and gardens, wooded bottomlands along rivers and creeks.	**Known to occur.** Suitable breeding habitat for this species is not present in the Phase 2 project area. Species has been observed in southern Eden Landing during the non-breeding season (winter).
Golden eagle (*Aquila chrysaetos*)	SFP, WL, BCC	Breeds on cliffs or in large trees or electrical towers; forages in open areas.	**Potential to occur.** Occasional forager, primarily during the nonbreeding season. Known to nest in the Fremont/Milpitas area. No nesting records within the Phase 2 project area at Eden Landing.
Lawrence's goldfinch (*Carduelis lawrencei*)	~~BCC~~	Oak-pine woods, chaparral. Breeds in variety of habitats including streamside trees, oak woodlands, open pine woods, pinyon-juniper woods, chaparral. Often found close to water.	**Low potential to occur.** Suitable breeding habitat does not occur in the Phase 2 project area at Eden Landing. However, the species may forage or migrate through the project area.
Least bittern (*Ixobrychus exilis*)	BCC	Marshes, reedy ponds. Mostly freshwater marsh but also in brackish marsh, in areas with tall, dense vegetation standing in water.	**Low potential to occur.** Suitable freshwater habitat does not occur in the Phase 2 project area. Suitable brackish marsh and associated vegetation occurs upstream along the OAC and ACFCC and outside of the Phase 2 project area at Eden Landing; however, this species has not been observed or recorded there.
Lesser yellowlegs (*Tringa flavipes*)	BCC	Marshes, mudflats, shores, ponds; in summer, open boreal woods. Occurs widely in migration, including coastal estuaries, salt and fresh marshes	**Known to occur**. Species has been observed foraging and migrating within southern Eden Landing ponds. Breeding habitat is not present in the project area.
Loggerhead shrike (*Lanius ludovicianus*)	CSSC (nesting)	Nests in dense shrubs and trees; forages in grasslands, marshes, and ruderal habitats.	**Potential to occur.** Resident in low numbers within the Phase 2 project area at Eden Landing.
Long-billed curlew (*Numenius americanus*)	WL, BCC (nesting)	Nests on prairies and short-grass fields; forages on mudflats, marshes, pastures, and agricultural fields.	**Potential to occur.** Forages on mudflats and marshes and roosts on levees, diked marshes, and ponds in the project area as a migrant and winter resident. Does not nest in the Phase 2 project area at Eden Landing.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Marbled godwit (*Limosa fedoa*)	BCC	Prairies, pools, shores, tideflats. Breeds mostly on northern Great Plains, in areas of native prairie with marshes or ponds nearby. In migration and winter around tidal mudflats, marshes, ponds, mainly in coastal regions.	**Known to occur.** Forages in the South Bay, including southern Eden Landing in ponds, marshes and mudflats as a migrant and winter resident. Does not nest in the Phase 2 project area.
Merlin (*Falco columbarius*)	WL	Uses many habitats in winter and migration.	**Potential to occur.** Regular in low numbers during migration and winter. Does not nest in California.
Northern harrier (*Circus cyaneus*)	CSSC (nesting)	Nests and forages in marshes, grasslands, and ruderal habitats.	**Known to occur.** Common year-round in and in the vicinity of the southern Eden Landing ponds. Breeds in small numbers in marsh in the vicinity of the Phase 2 project area; forages in a variety of habitats.
Osprey (*Pandion haliaetus*)	WL (nesting)	Nests in tall trees or cliffs on freshwater lakes and rivers and along seacoast; feeds on fish.	**Potential to occur.** Occasional forager, primarily during the nonbreeding season. Has nested in power line towers in the Fremont area, adjacent to the project area; could make similar use of remaining towers in southern Eden Landing.
Pallid bat (*Antrozous pallidus*)	CSSC	Grasslands, shrublands, woodlands, and forest from sea level up through mixed conifer forest. Most common in open, dry habitat, with rocky areas.	**Low potential to occur.** Habitat in Phase 2 project area is limited for the species. Species may forage in the project area. However, nesting habitat is absent. There are no known occurrences in the Phase 2 project area at Eden Landing.
Pink-footed shearwater (*Puffinus creatopus*)	BCC	Open ocean. Mainly found well offshore over relatively shallow waters of continental shelf. Rarely seen from shore, and rarely over deep mid-ocean waters. Nests on islands with soil suitable for nesting burrows.	**No potential to occur.** Suitable habitats for this species are not present in the Phase 2 project area and the species has been reported in the South Bay.
Red knot (*Calidris canutus* ssp. *roselaari*)	BCC	Tidal flats, shores; tundra (summer). In migration and winter on coastal mudflats and tidal zones, sometimes on open sandy beaches of the sort favored by Sanderlings. Nests on Arctic tundra, usually on rather high and barren areas inland from coast, but typically near a pond or stream.	**Known to occur.** Forages in the South Bay, including southern Eden Landing in ponds, marshes and mudflats as a migrant and winter resident. Does not nest in the Phase 2 project area at Eden Landing.
Rufous-crowned sparrow (*Aimophila ruficeps*)	BCC	Grassy or rocky slopes with sparse low bushes; open pine-oak woods. In Southwest, usually in rocky areas of foothills and lower canyons, in understory of pine-oak woods, or in chaparral or coastal scrub.	**Low potential to occur.** Uncommon in South Bay pond habitats.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Salt marsh wandering shrew (*Sorex vagrans halicoetes*)	CSSC	Occurs in middle and high marsh zones with abundant driftwood and pickleweed.	**Potential to occur.** Known from northern Eden Landing. May occur in the salt marshes located around and adjacent to the Phase 2 project area at Eden Landing, though numbers have declined and current status is unknown.
Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)	CSSC, BCC	Breeds primarily in fresh and brackish marshes in tall grass, tules, willows; low-density resident in salt marshes, which are used more in winter.	**Known to occur.** Common resident, breeding in freshwater and brackish marshes and, to a lesser extent, in salt marshes; forages in all three marsh types during the nonbreeding season.
Sharp-shinned hawk (*Accipiter striatus*)	WL (nesting)	Nests in woodlands; forages in many habitats in winter and migration.	**Known to occur.** Uncommon but has been observed on-site as a migrant and winter resident. No breeding habitat in the Phase 2 project area at Eden Landing.
Short-billed dowitcher (*Limnodromus griseus*)	BCC	Mudflats, tidal marshes, pond edges. Migrants and wintering birds favor coastal habitats, especially tidal flats on protected estuaries and bays, also lagoons, salt marshes, sometimes sandy beaches.	**Known to occur.** Common within southern Eden Landing and adjacent areas during wintering and migration period. Does not nest within the South Bay.
Short-eared owl (*Asio flammeus*)	CSSC (nesting)	Nests on ground in tall emergent vegetation or grasses; forages over a variety of open habitats.	**Known to occur.** Uncommon. Has bred in small numbers within the Phase 2 project area at Eden Landing, although current breeding status unknown. Most numerous in project area in migration and winter.
Vaux's swift (*Chaetura vauxi*)	CSSC (nesting)	Nests in snags in coastal coniferous forests or, occasionally, in chimneys; forages aerially.	**Potential to occur.** May forage over project area during spring. No nesting habitat within area. The closest known occurrences are from Coyote Hills Regional Park.
Western burrowing owl (*Athene cunicularia hypogea*)	CSSC, BCC	Flat grasslands and ruderal habitats.	**Low potential to occur.** Nests have been found at several upland sites immediately adjacent to the Phase 2 project area pond complexes (notably in Coyote Hills Regional Park). Observations have been reported, primarily of wintering birds, though the species may forage within moist grasslands along the northeastern perimeter of northern Eden Landing to some extent.
Western grebe (*Aechmophorus occidentalis*)	BCC	Rushy lakes, sloughs; in winter, bays, ocean. Summers mainly on fresh water lakes with large areas of both open water and marsh vegetation; rarely on tidal marshes.	**Known to occur.** Common winter resident. Species winters and forages within and adjacent to the Phase 2 project area at Eden Landing. No nesting habitat occurs in the project area.
Western mastiff bat (*Eumops perotis californicus*)	CSSC	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban.	**Low potential to occur.** Habitat in Phase 2 project area is limited for the species. Species may forage in the project area. However, nesting habitat is absent. There are no known occurrences in the Phase 2 project area at Eden Landing.

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
Western pond turtle (*Actinemys marmorata*)	CSSC	Permanent or nearly permanent fresh or brackish water in a variety of habitats.	**Low potential to occur.** Uncommon and unlikely to occur within southern Eden Landing. May occasionally found in freshwater and brackish creeks and sloughs in and adjacent to the Phase 2 project area at Eden Landing.
Whimbrel (*Numenius phaeopus*)	BCC	Shores, mudflats, marshes, tundra. Found on a wide variety of habitats on migration.	**Known to occur.** Common winter resident. Species has been observed foraging in southern Eden Landing. Does not nest in the Phase 2 project area at Eden Landing.
White-faced ibis (*Plegadis chihi*)	WL (nesting)	Forages in freshwater marshes and, to a lesser extent, brackish areas.	**Low potential to occur.** Rare visitor in fall and winter. Has bred in heron rookery on Mallard Slough, but no current nesting within southern Eden Landing Ponds is known.
White-tailed kite (*Elanus caeruleus*)	SFP (nesting)	Nests in tall shrubs and trees; forages in grasslands, marshes, and ruderal habitats.	**Known to occur.** Common resident; breeds at inland margins of the estuarine areas. Little breeding habitat occurs within the Phase 2 project area in upland vegetation along OAC and ACFCC. Some foraging habitat present.

Definitions:

FE – Federally Endangered

FT – Federally Threatened

FC – Candidate for Federal Listing

BCC – USFWS Bird of Conservation Concern

SE – State Endangered

ST – State Threatened

SFP – Fully Protected (California)

CSSC – California Species of Special Concern

WL – CDFW Watch List

Sources:

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Audubon and Cornell Lab of Ornithology. 2016. eBird. Online Observations and Species Maps. Available at: http://ebird.org/

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USFWS 2016a. List of Threatened and Endangered Species that May Occur in Your Proposed Project Location, and/or May be Affected by Your Proposed Project. Consultation Code: 08FBDT00-2016-SLI-0239. September 21. San Francisco Bay-Delta Fish and Wildlife. http://ecos.fws.gove/ipac

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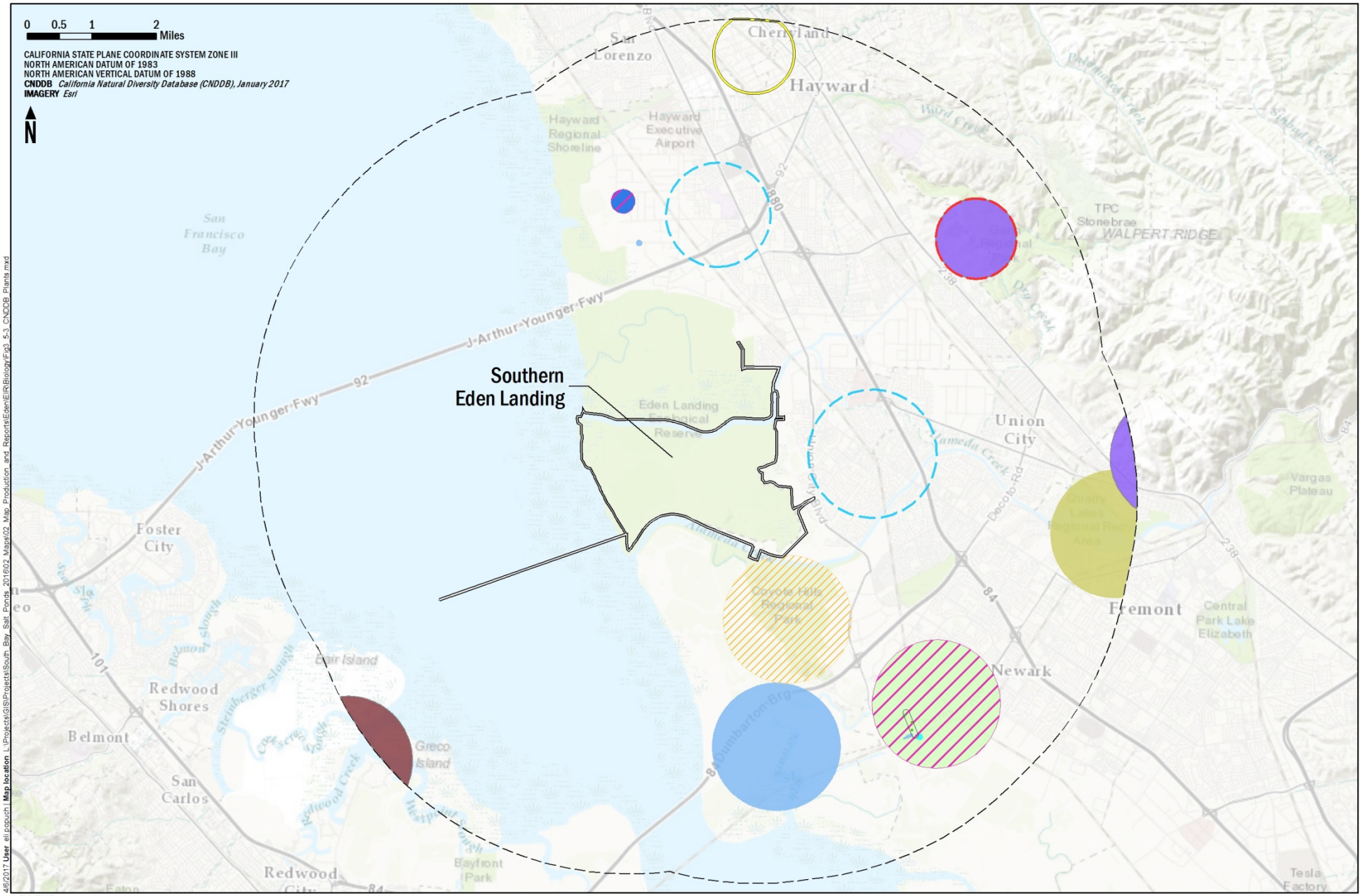

LEGEND

- Eden Landing Phase 2 Project Area
- Eden Landing Phase 2 Project Area 5 Mile Buffer
- Alkali milk-vetch
- Chaparral ragwort
- Congdon's tarplant
- Contra Costa goldfields
- Diablo helianthella
- Hairless popcornflower
- Hoover's button-celery
- Most beautiful jewelflower
- Point Reyes salty bird's-beak
- Saline clover
- San Joaquin spearscale
- Santa Cruz tarplant
- Slender-leaved pondweed

AECOM

South Bay Salt Pond Restoration Project

Figure 3.5-3

CNDDB Special-Status Plant Species

3.5.2 Regulatory Setting

This section discusses the regulations that are relevant to the biological resources of the southern Eden Landing Phase 2 project area.

Federal Regulations

Waters of the United States Regulations Overview

Jurisdictional wetlands and other waters meet the regulatory definition of "Waters of the U.S." are subject to the jurisdiction of the USACE under provisions of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Jurisdictional wetlands and other waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as Waters of the U.S., tributaries of waters otherwise defined as Waters of the U.S., the territorial seas, and wetlands (termed Special Aquatic Sites) adjacent to Waters of the U.S. (33 Code of Federal Regulations [CFR] Section 328.3[2]). Wetlands on non-agricultural lands are identified using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

Federal Endangered Species Act

The Federal Endangered Species Act (FESA) protects listed fish and wildlife species from harm or "take," which is broadly defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Take can also include habitat modification or degradation that directly results in death or injury to a listed wildlife species. An activity can be defined as take even if it is unintentional or accidental. Listed plant species are provided less protection than listed wildlife species. Listed plant species are legally protected from take under FESA if they occur on federal lands or if the project requires a federal action, such as a Section 404 fill permit.

USFWS has jurisdiction over federally listed threatened and endangered wildlife species under the FESA, and the National Marine Fisheries Service (NMFS; also referred to as National Oceanic and Atmospheric Administration [NOAA] Fisheries) has jurisdiction over federally listed, threatened, and endangered marine and anadromous fish. Coordination with NOAA Fisheries and USFWS is required for maintenance dredging and disposal projects, particularly if dredging activities would be conducted outside of environmental work windows. These agencies also maintain lists of species proposed for listing. Species on these lists are not legally protected under the Federal ESA, but may become listed in the near future, and these agencies often include them in their review of a project.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act governs all fishery management activities that occur in federal waters within the United States 200-nautical-mile limit. The act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans to achieve the optimum yield from United States fisheries in their regions. These councils, with

[2] 33 CFR 328.3, "Definition of Waters of the United States." 51 Federal Register 41250 (13 November 1986), as amended at 58 Federal Register 45036 (25 August 1993).

assistance from NOAA Fisheries, establish Essential Fish Habitat (EFH) in fishery management plans for all managed species. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with NOAA Fisheries regarding potential adverse effects of their actions on EFH, and respond in writing to the recommendations of the NOAA Fisheries.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (16 United States Code [USC] § 703) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

Marine Mammal Protection Act

The 1972 Marine Mammal Protection Act (16 USC §§ 1361–1407) was enacted to conserve marine mammals, including cetaceans, pinnipeds, and other marine mammal species. With certain exceptions, the act prohibits the taking and importation of marine mammals and products taken from them. Relevant to the Phase 2 project, this act prohibits harassment of marine mammals, including the harbor seal.

Coastal Zone Management Act

The 1972 Coastal Zone Management Act (16 USC §§ 1451–1464, Chapter 33) was passed to encourage coastal states to develop and implement coastal zone management plans. This act was established as a United States national policy to preserve, protect, develop, and where possible, restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations. See “San Francisco Bay Conservation and Development Commission” below for a discussion of how the act is implemented within San Francisco Bay.

Long-Term Management Strategy

The San Francisco Bay Long-Term Management Strategy (LTMS) is a multi-agency effort to establish a long-term plan for the beneficial reuse of dredge material for habitat restoration, levee maintenance, and construction fill. Its members are the San Francisco Bay Conservation and Development Commission (BCDC), USACE, the United States Environmental Protection Agency (EPA), and the San Francisco Bay Regional Water Quality Control Board (RWQCB). The major goals of the LTMS are to (1) maintain in an economically and environmentally sound manner those channels necessary for navigation in San Francisco Bay and Estuary and eliminate unnecessary dredging activities in the Bay and Estuary; (2) conduct dredged material disposal in the most environmentally sound manner; (3) maximize the use of dredged material as a resource; and to (4) establish a cooperative permitting framework for dredging and dredged material disposal applications. .

State Regulations/Agencies

California Department of Fish and Wildlife

The mission of CDFW is to manage California’s diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities.

California Endangered Species Act

The California Endangered Species Act (CESA) prohibits the take of any plant or animal listed or proposed for listing as rare (plants only), threatened, or endangered. In accordance with the CESA, CDFW has jurisdiction over state-listed species (California Fish and Game Code § 2070). CDFW also maintains lists of "species of special concern" that are defined as species that appear to be vulnerable to extinction because of declining populations, limited ranges, and/or continuing threats.

Fish and Game Code, Section 1600 et. Seq.

Habitats potentially under the regulatory jurisdiction of CDFW are described under Division 2, Chapter 6, Sections 1600–1616 of the Fish and Game Code of California. Under Sections 1600–1607 of the Fish and Game Code of California, CDFW does not claim jurisdiction over saltwater habitats, including diked, muted, and tidal salt marsh similar to that found within the Eden Landing Phase 2 project area. Other sections of the Fish and Game Code of California protect various groups of wildlife species, including fish, crustaceans, mollusks, birds, mammals, reptiles, and amphibians.

Fully Protected Species

CDFW also regulates "Fully Protected Animals", a classification which was the State's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Under Fish and Game Code 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish), fully protected species may not be taken or possessed at any time and no permits may be issued for their take except for collection of these species for scientific research and relocation of bird species for the protection of livestock. Most (but not all) Fully Protected Animals have also been listed as threatened or endangered species under the more recent state and federal endangered species laws and regulations.

San Francisco Bay Conservation and Development Commission

BCDC is a California state agency. BCDC jurisdiction in the project area extends over the Bay, up to mean high tide and to 5 feet above mean sea level in marshes, and over a 100-foot shoreline band inland from the line of mean high tide or the line 5 feet above mean sea level adjacent to marshes. BCDC also has certain waterway jurisdiction in the project area, along the ACFCC and OAC. BCDC does not have 100-foot shoreline band jurisdiction adjacent to its certain waterway jurisdiction. BCDC also has salt pond jurisdiction, consisting of all areas that have been diked off from the Bay and have been used during the 3 years from August 1966 to August 1969 for the solar evaporation of Bay water in the course of salt production. The SBSP Restoration Project would require a BCDC permit or consistency determination for dredging and filling, shoreline improvements, or substantial changes in use. BCDC is responsible for enforcing the McAteer-Petris Act, which requires that "maximum feasible public access, consistent with a project be included as part of each project to be approved by the BCDC." BCDC is also responsible for determining consistency with the federal Coastal Zone Management Act.

The federal Coastal Zone Management Act and the California Coastal Act require the BCDC to review federal projects, projects that require federal approval or projects that are supported by federal funds. BCDC's San Francisco Bay Plan (Bay Plan) promotes Bay conservation along with shoreline development and public access. BCDC has adopted policies that specifically address public access and wildlife compatibility, where in some "cases public access would be clearly inconsistent with the project because of public safety considerations or significant use conflicts, including unavoidable, significant adverse effects on Bay natural resources."

The SBSP Restoration Project would require a BCDC permit for dredging and filling and shoreline improvements.

California State Lands Commission

The California State Lands Commission (CSLC) manages lands and resources under their jurisdiction to ensure public access to these lands and waters for current and future generations. Public lands under the jurisdiction of the CSLC include fee lands owned by the State and easement interests in lands which are held in public trust. The CSLC has jurisdiction and management authority over all ungranted tidelands (*e.g.*, tidal sloughs), submerged lands, and the beds of navigable lakes and waterways. On tidal waterways, the State's sovereign fee ownership extends landward to the high tide line, except where there has been fill or artificial accretions or the boundary has been fixed by agreement or court decision. Use of public trust lands is generally limited to water dependent or related uses, including commerce, fisheries, and navigation, environmental preservation, and recreation. Public trust lands may also be kept in their natural state for habitat, wildlife refuges, scientific study, or use as open space.

The SBSP Restoration Project would obtain a construction easement (a surface and submerged lands lease) for the dredge material infrastructure placed in the Bay and for pilot channel dredging through OAC.

San Francisco Bay Regional Water Quality Control Board

The RWQCB has been delegated authority to implement provisions of the federal Clean Water Act and California's Porter-Cologne Water Quality Control Act. These statutes establish the process for developing and implementing planning, permitting, and enforcement authority for waste discharges to land and water. The *San Francisco Bay Basin (Region 2), Water Quality Control Plan (Basin Plan)* establishes beneficial uses for surface and groundwater resources and sets regulatory water quality objectives that are designed to protect those beneficial uses (RWQCB 2017). Under the current Basin Plan, designated beneficial uses of the San Francisco Bay Area's surface waters include municipal and domestic supply; agricultural supply; industrial service supply; groundwater recharge; contact and noncontact recreation; warm freshwater fish habitat; cold freshwater fish habitat; wildlife habitat; preservation of rare and endangered species; migration of aquatic organisms; and spawning, reproduction, and/or early development of fish.

The Basin Plan provides a program of actions designed to preserve and enhance water quality and to protect beneficial uses. It meets EPA requirements and establishes conditions related to discharges that must be met at all times.

The implementation portion of the Basin Plan includes descriptions of specific actions to be taken by local public entities and industries to comply with the Basin Plan's policies and objectives. These actions include measures for urban runoff management and wetland protection.

The SBSP Restoration Project would be designed to comply with RWQCB permitting requirements. USFWS and CDFW would prepare and conform to a Storm Water Pollution Prevention Plan (SWPPP), as required under the State Water Resources Control Board–implemented National Pollutant Discharge Elimination System permit program for construction activities and conform to an SWPPP, as required by the State Water Resources Control Board. The SWPPP would identify specific measures for reducing construction impacts such as erosion and sediment control measures.

The SBSP Restoration Project would involve construction activities that could adversely affect water quality, and therefore the Action Alternatives would require acquisition of a Clean Water Act Section 401 water quality certification from the RWQCB.

The San Francisco Bay RWQCB also has established sediment screening criteria and testing requirements for the beneficial reuse of dredged material (e.g., wetlands creation, upland disposal). All sediment used for creation of upland habitat would be screened to meet wetland cover standards set by the RWQCB.

California Native Plant Society / California Rare Plant Rank

The California Native Plant Society (CNPS), a statewide, non-governmental conservation organization, working with CDFW and other organizations, has developed a ranking of plant species of concern in California. Vascular plants included on the California Rare Plant Rank (CRPR) are defined as follows:

CRPR 1A: Plants considered extinct.

CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere.

CRPR 2: Plants rare, threatened, or endangered in California but more common elsewhere.

CRPR 3: Plants about which more information is needed; these are on the CNPS "review list."

CRPR 4: Plants of limited distribution; these are on the CNPS "watch list."

Although the CNPS is not a regulatory agency, and plants on the ranking have no regulatory protection under the federal or state Endangered Species Acts, plants appearing as CRPR 1B or CRPR 2 are, in general, considered to meet the California Environmental Quality Act (CEQA) Section 15380 criteria and adverse effects to these species are considered significant. Although most CRPR 3 and CRPR 4 plants are not eligible for state listing, some CRPR 4 plants may be considered significant locally and could be considered to meet the CEQA Section 18380 criteria if the populations are at the periphery of the specie range, the taxon is uncommon, has sustained significant losses, exhibits unusual morphology, or occur on unusual substrates.

Regional/Local Regulations and Related Programs

Alameda County and Hayward General Plans

Section 3.8 (Land Use) contains the regional/local plans, regulations, and related programs associated with the CDFW Eden Landing Ecological Reserve, Alameda County, and the City of Hayward[3]. The Project is owned and operated by the State of California are part of CDFW's Eden Landing Ecological Reserve, managed for resident and migratory waterbirds and tidal marsh habitats and species.

The Alameda County General Plan designates the Eden Landing Phase 2 area as Shoreline and Bay Open Space. The principals for this designation identified in the General Plan are consistent with the Project including providing for an "orderly transition of phased out salt extraction area to uses compatible with

[3] The Eden Landing pond complex, while primarily located on State-owned lands, is still within the incorporated boundaries of the City of Hayward. Access to the ponds is through the City of Union City, but the border of that city is at the gated entrance to the State-owned pond complex.

the open space plan." Similarly, the Project is consistent with the natural resource goals identified in Chapter 3.5 of the Hayward General Plan including "enhancing natural baylands, wetlands, marshes, hillsides, and unique ecosystems…to protect their natural ecology, establish the physical setting in the city, provide recreation opportunities…." (City of Hayward 2014).

Eden Landing Land Management and Pond System Operations Plans

Section 1019 of the California Fish and Game Code requires the Department to draft and adopt Land Management Plans for any property wholly under its jurisdiction and that was purchased after January 1, 2002. Land Management Plans document management goals and objectives, and other necessary information for consistent and effective management of CDFW Wildlife Areas and Ecological Reserves. Land Management Plans describe future conditions and contain long-range guidance to accomplish the purposes for which a Refuge or Reserve was established. The CDFW manages the ELER according to the ELER (Baumberg Tract) Restoration and Management Plan (1999) and the Operations Plan (CDFW 2016a). Additionally, the CDFW, and implemented the Initial Stewardship Plan. Together these documents describe pond management activities that are carried out to meet the goals and objectives for managed ponds within the ELER, which includes the ponds in the Phase 2 project area.

The broad objectives of the Operations Plan include the following:

- Maintain year-round open water habitat of various depths in Ponds E1, E2, E7, E4 and E5 and E2C and deeper open water habitat in winter in all ponds. Muted tidal circulation via Ponds E2 and E2C.
- Maintain discharge salinity into San Francisco Bay (Pond E2) and ACFCC (Pond E2C) at less than 44 ppt via muted tidal circulation in Ponds E2 and E2C.
- Operate Cargill Pond 3C (CP3C) as part of E2C system as year-round open water, though it is not owned by CDFW.
- Manage for different waterbird guilds in summer vs. winter by varying depth and salinity of the ponds.
- Maintain prey base for overwintering ducks, migratory shorebirds and resident waterbirds.

The CDFW meets these overarching objectives through the control of tidal flow into and out of the ponds. Tidal flows into and out of the ponds are primarily influenced by (1) pond bottom elevations and (2) existing water control structures' access to tidal flux. These basic parameters are further influenced by seasonal changes in weather, and diurnal and annual fluctuations in the tides. As per the Operations Plan, the management of tidal flux and its effect on species and water quality ensures the CDFW meets management objectives described above at the pond system and at a pond specific level.

Finally, while it may not be a formal part of the Operations Plan, CDFW does operate portions of Eden Landing to include public access for recreational use of hiking trails, kayak launches, and in-season waterfowl hunting areas. Implementation of the Phase 2 actions may necessitate changes to the goals and management of each pond.

San Francisco Estuary Invasive Spartina Project

The Invasive Spartina Project is in the process of implementing a coordinated, region-wide eradication program, comprising a number of on-the-ground treatment techniques to stave off a San Francisco Bay invasion of non-native cordgrass (*Spartina alterniflora* and its hybrids as well as *S. densiflora, S. patens*, and *S. anglica*) (California State Coastal Conservancy [SCC] and USFWS 2003). The Invasive Spartina Project is focused on the nearly 40,000 acres of tidal marsh and 29,000 acres of tidal flats that constitute the shoreline areas of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, and Sacramento Counties. The purpose of the Invasive Spartina Project is to arrest and reverse the spread of invasive non-native cordgrass species in the estuary to preserve and restore the ecological integrity of the estuary's intertidal habitats and estuarine ecosystem.

Association of Bay Area Governments San Francisco Bay Trail Plan

The plan for the Bay Trail proposes development of a regional hiking and bicycling trail around the perimeter of San Francisco and San Pablo Bays. The Bay Trail Plan was prepared by the Association of Bay Area Governments pursuant to Senate Bill 100 (1989), which mandated that the Bay Trail provide connections to existing park and recreation facilities; create links to existing and proposed transportation facilities; and be planned in such a way as to avoid adverse effects on environmentally sensitive areas. The Bay Trail Plan proposes an alignment for what is planned to become a 500-mile recreational "ring around the Bay."

Alameda County Flood Control and Water Conservation District

The Alameda County Public Works Agency is responsible for maintaining the infrastructure of Alameda County—from its roads and bridges to flood channels and natural creeks. Within the Public Works Agency, the ACFCWCD works specifically to protect county citizens from flooding while preserving the natural environment. The Grading and Permits Division enforces a number of ordinances that may require a permit, such as the Watercourse Protection and Flood Plain Management ordinances. The SBSP Restoration Project would be designed to comply with local ordinances, and the project is working collaboratively with Alameda County and the ACFCWCD to determine if any permits will be required.

Permits Required

The following permits/approvals may be required from the agencies indicated:

- Section 404 Permit (USACE);
- Section 401 Water Quality Certification (RWQCB);
- BCDC Permit (BCDC);
- Biological Opinion (BO) (USFWS);
- BO, Essential Fish Habitat consultation and Marine Mammal Protection Act Incidental Harassment Authorization (NOAA Fisheries);
- Incidental Take Permit or Consistency Determination (CDFW);
- CSLC lease or letter of non-objection; and

- Access and construction easements and/or permits from external landowners (e.g., Cargill and the ACFCWCD) and possibly from Alameda County and/or the cities of Hayward and Union City.

3.5.3 Environmental Impacts and Mitigation Measures

Overview

This section includes an analysis of potential short-term (construction) and long-term (operation) impacts of the SBSP Restoration Project's Phase 2 actions at Eden Landing. Impact evaluations for the Action Alternatives are assessed based on the existing conditions described in Section 3.5.2, not the conditions that would occur under the No Action Alternative.[4] This approach follows the requirements of the National Environmental Policy Act (NEPA), CEQA, and what was done for the 2007 Final EIS/R. In this case, the No Action Alternative represents no change from current management direction or level of management intensity provided in the *Final Eden Landing Ecological Reserve (Baumberg Tract) Restoration and Management Plan* (CDFG 1999) or the Operations Plan (CDFW 2016a). Mitigation measures are recommended, as necessary, to reduce significant impacts.

Significance Criteria

Significance criteria were developed and approved as part of the programmatic portion of the 2007 Final EIS/R. Those are unchanged for Phase 2. Therefore, for the purposes of this Draft EIS/R, a significant biological impact would occur if the project would result in any of the following:

- 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 CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS;
- Have a substantial adverse effect on 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;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state HCP.

These bullet points are general descriptors of what types of changes would constitute a significant impact. Below, the first four points in this general list are developed into specific impacts to particular habitats,

[4] "No Action Alternative" is the NEPA term. It corresponds to the CEQA term "No Project Alternative." This Draft EIS/R generally uses No Action throughout.

taxa, guilds, or species that were identified and chosen for individual analysis as part of the 2007 Final EIS/R.

The last two points are not directly considered as itemized impacts. However, this Draft EIS/R considers those criteria implicitly as part of the overall impact assessment. Specifically, with regard to conflicting with local policies or ordinances, the SBSP Restoration Project has committed to comply with applicable local policies and regulations. Some of the Eden Landing Phase 2 project areas are subject to local policies and regulations, for example the project activities within the ACFCC (under the jurisdiction of the ACFCWCD), and activities that occurs on adjacent property (e.g., Alameda County-owned levees and lands). In these areas, the relevant jurisdictional agencies are project partners that have made their policies known and with whose input and participation the alternatives have been developed. These local agencies will also have permitting authority over those aspects of the project that would ensure that their policies and ordinances would be followed. There is no need for a numbered impact specifically assessing these regulations. Further, the Phase 2 project alternatives do not conflict with provisions of an adopted HCP; NCCP; or other relevant local, regional, or state regulations.

The CEQA Guidelines indicate that an action would be significant if it had a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in a local or regional plan, policy, or regulation or by the USFWS or CDFW (AEP 2016). For species that use a single habitat type (e.g., only deep salt-pond habitat or cordgrass-dominated tidal salt marsh), determining whether Phase 2 would result in a substantial reduction in habitat is fairly straightforward. However, many species use a variety of habitats, including salt ponds, bay waters, intertidal areas, water treatment plants, and other habitats. Also, Phase 2 activities would not just result in a loss or gain of general habitat types such as “former salt pond,” but also a change in the conditions of those habitat types through species-targeted management (in the case of managed ponds) or carefully planned breaches and other measures to restore more extensive and more complex tidal marsh than currently exists in the South Bay. Although the extent of what is currently managed pond habitat would be reduced as a result of conversion to tidal habitats, the remaining managed ponds would be enhanced as part of various project phases and then actively managed for wildlife. As a result, making significance determinations simply on the basis of acreages of habitat loss or gain is not generally straightforward. Instead, in addition to assessing potential effects on individuals, this analysis considers habitat type, loss, or conversion in combination with species life histories, habitat needs, and overall population size and abundance in the South Bay to determine significance of impacts.

The 2007 Final EIS/R modeled habitat evolution in the South Bay under the three programmatic alternatives, and Point Reyes Bird Observatory (now called Point Blue) (Stralberg et al. 2006) performed modeling to predict bird population responses to changing habitat conditions under the three programmatic alternatives. The 2007 Final EIS/R predicted the acreage of various habitats important to wildlife species in the South Bay, including shallow and deep subtidal, intertidal, and low and high tidal marsh as well as the extent and size of tidal channels and marsh pannes within restored tidal marshes. The extent of these habitats was predicted at Year 0 (2008) and Year 50 (2058) for each of the alternatives. Using data gathered for the 2007 Final EIS/R tidal habitat predictions, predictions of the conditions within managed ponds provided by H.T. Harvey & Associates, and bird-habitat relationship data from 6 years (1999 to 2004) of Point Blue’s avian surveys in tidal marsh and salt pond habitats, Stralberg et al. (2006) developed models to predict numbers of key bird species in the SBSP Restoration Project area, and in the South Bay as a whole at Year 50 under each of the three alternatives.

The baseline for determining the significance of potential impacts under NEPA and CEQA for the purposes of this Draft EIS/R is the existing condition of the project area. However, South Bay populations of many plants and animals may vary considerably from one year to the next, and thus a longer-term average (e.g., in numbers of individuals of a particular species) is used where appropriate to establish baseline conditions and determine whether deviations from that condition would result in a significant impact. Triggers for action that are addressed in the Adaptive Management Plan (AMP) are designed to ensure, to the greatest extent possible, that the project not have significant adverse impacts and will be effective in achieving the project objectives. The discussion of impacts herein focuses on whether impacts would reach a level of significance under NEPA and CEQA.

Establishing thresholds of significance, determining the significance of impacts, and establishing adaptive management triggers for biological resources for the SBSP Restoration Project are complicated by several factors, as described in the 2007 Final EIS/R. These factors are summarized below.

- The lack of a clear, quantifiable baseline (i.e., status/abundance originally in 2006 or during preparation of this document between 2013 and 2015) for many potential species impacts makes it difficult to identify a quantitative threshold of significance. For example, interannual variability in shorebird numbers requires many years of bird surveys to establish a baseline quantitatively, yet the available data on South Bay birds may not accurately describe existing conditions for NEPA/CEQA baseline purposes.

- The most intensive, standardized surveys were conducted either before Initial Stewardship Plan implementation (Point Blue) or while conditions in the ponds were changing due to Cargill's preparation for the sale of the ponds and due to Initial Stewardship Plan implementation (USGS).

- Most such surveys covered the ponds and did not include the associated bay habitats such as mudflats and subtidal areas, which may be affected by the project.

- The inherent variability in South Bay plant and wildlife communities makes it difficult to determine whether a quantitative threshold of significance has been exceeded. For example, if the threshold of significance for project impacts to small migratory shorebirds was set at 20 percent below baseline conditions, the interannual variability in shorebird numbers in the South Bay would result in numbers that, in some years, would drop below the threshold, even if the project was not involved.

- A number of factors external to the SBSP Restoration Project will affect the biological resources using the South Bay. For example, global climate change and sea-level rise may have much greater effects on numbers of migratory shorebirds present in the South Bay than would changes resulting directly from the project. As restoration proceeds and key biological parameters (e.g., shorebird numbers) are monitored, it will be challenging to distinguish trends (e.g., declines in abundance of small migratory shorebirds) that actually result from project activities from trends resulting from external factors, yet such a distinction will be important to avoid significant project impacts.

- Some biological resources are expected to decline even in the absence of the project, which may exaggerate impacts actually attributable to the SBSP Restoration Project. For example, the loss of outboard mudflats due to existing processes of sediment dynamics in the Bay and sea-level rise is expected to occur regardless of the alternative selected; this loss would cause a number of species to be affected (negatively and positively) even under the No Action Alternative. Separating the

changes that are not related to the SBSP Restoration Project from those changes caused by the various alternatives is a considerable challenge.

- The SBSP Restoration Project sets forth restoration targets and thresholds of significance that in some instances are related to each other but are not identical. For example, the restoration target for small migratory shorebirds is "Maintain small shorebird numbers at pre-Initial Stewardship Plan levels," yet these population levels differ from the NEPA/CEQA baseline used in the 2007 Final EIS/R (which is a percentage change in the small shorebird population relative to fall 2006 numbers). These similar but not identical targets lead to a complication wherein maintaining populations at 90 percent of pre-Initial Stewardship Plan levels could occur, which would be a failure to achieve a restoration target but not severe enough to trigger a significance determination. Although these differences do not necessarily affect the determination of the NEPA/CEQA threshold of significance for small migratory shorebirds, they complicate the link between the adaptive management triggers and the threshold of significance in the monitoring and adaptive management process that would be used to avoid significant impacts.

In the summaries of thresholds of significance for specific biological resources impacts discussed below, the term "substantial" is frequently used to indicate the level of impact (e.g., a decline in numbers of a particular species or group) that would be considered significant under NEPA and CEQA. Neither NEPA nor CEQA guidelines provide a clear definition of the term "substantial" as it applies to the magnitude of an impact (e.g., to a species' populations, habitat, or range) that would be considered significant. Therefore, in determining the threshold of significance for a particular species or group of species for the SBSP Restoration Project, both the magnitude of impacts to South Bay populations and the contribution of South Bay populations to larger-scale (i.e., regional, flyway-level, continental, and range-wide) populations were considered. As a result, thresholds of significance may vary among different taxa (e.g., percent declines in numbers that would be considered significant may vary among some impacts discussed below). Except where a specific percent decline is noted in a particular significance threshold, a decline of 10 to 20 percent in South Bay numbers or 5 to 10 percent in flyway-level numbers (for birds) would generally be considered "substantial."

Thresholds of significance for potential project impacts to specific biological resources are discussed below. If at any point during the 50-year SBSP Restoration Project, a numerical threshold is exceeded or a qualitative threshold is reached for a given impact and that change has resulted from the SBSP Restoration Project, a significant impact would have occurred. However, monitoring and Adaptive Management are integral components of the SBSP Restoration Project and would be critical in preventing adverse effects from reaching a level of significance. The Adaptive Management triggers would be set to warn of potential impacts and allow Adaptive Management to be undertaken to reverse or forestall such impacts before such a point will have been reached. The rationale for each impact includes a description of how the threshold of significance was selected, indicates how the threshold of significance is related to the restoration target and the triggers, and illustrates how monitoring and Adaptive Management would be used to avoid a significant impact.

Although both the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA and the CEQA Guidelines were considered during the impact analysis, impacts identified in this Draft EIS/R are characterized using CEQA terminology. Please refer to Section 3.1.1, Chapter Organization, for a description of the terminology used to explain the severity of the impacts.

In Table 3.5-3, the threshold of significance is briefly described for each potential biological resources impact. Except where otherwise noted, the impacts and the thresholds of significance are the same as those presented in the 2007 Final EIS/R. Next, potential impacts and related adaptive management information are discussed.

Table 3.5-3 Biological Impact Significance Threshold

IMPACT	THRESHOLD OF SIGNIFICANCE
3.5-1: Potential construction-related loss of or disturbance to special-status, marsh-associated wildlife.	The SBSP Restoration Project would have a significant impact on marsh-associated species if it resulted in the mortality of, or the loss of active nests of, substantial numbers of state- or federally listed marsh-associated species or abandonment of a primary harbor seal haul-out or pupping area as a result of the SBSP Restoration Project.
3.5-2: Potential construction-related loss of or disturbance to nesting pond-associated birds.	Loss of any individuals or nests of the federally listed western snowy plover would be significant given the low west coast populations of this species. The loss of a substantial number of active nests and/or chicks of other pond-associated species, such as Forster's and Caspian terns, American avocets, and black-necked stilts, due to breaching of ponds and other construction-related activities during the nesting season would also be a significant impact.
3.5-3: Potential reduction in numbers of small shorebirds using San Francisco Bay, resulting in substantial declines in flyway-level populations.	The SBSP Restoration Project would have a significant impact on small shorebirds if it resulted in a substantial reduction in numbers (i.e., a decline of 20 percent below baseline levels as a result of the SBSP Restoration Project) of the most abundant species (i.e., semipalmated plover (*Charadrius semipalmatus*), western sandpiper (*Calidris mauri*), least sandpiper, dunlin (*Calidris alpina*), short-billed dowitcher [*Limnodromus griseus*], and long-billed dowitcher [*Limnodromus scolopaceus*]) in the South Bay, resulting in a substantial decline in flyway-level populations.
3.5-4: Loss of intertidal mudflats and reduction of habitat for mudflat-associated wildlife species.	The threshold of significance for this impact is defined as measurable, long-term loss of intertidal mudflat area not compensated for by equivalent increases in benthic invertebrate productivity, as a result of SBSP Restoration Project activities.
3.5-5: Potential habitat conversion impacts to western snowy plovers.	The SBSP Restoration Project would have a significant impact on western snowy plovers if it resulted in a decline in the adult breeding-season population within San Francisco Bay (relative to the NEPA/CEQA baseline).
3.5-6: Potential reduction in the population size of breeding, pond-associated waterbirds (avocets, stilts, and terns) using the South Bay due to reduction in habitat, concentration effects, displacement by nesting California gulls, and other project-related effects.	The SBSP Restoration Project would have a significant impact if it resulted in a decline of 10 percent or greater (relative to the NEPA/CEQA baseline) in the number of breeding black-necked stilts, American avocets, Caspian terns, or Forster's terns breeding in the San Francisco Bay Area.
3.5-7: Potential reduction in the population size of non-breeding, salt-pond-associated birds (e.g., phalaropes, eared grebes, and Bonaparte's gulls as a result of habitat loss.	The SBSP Restoration Project would have a significant impact on salt-pond-specialist waterbirds (i.e., eared grebes, Bonaparte's gulls [*Chroicocephalus philadelphia*]), Wilson's phalaropes, and red-necked phalaropes) if it resulted in the loss of a substantial number of individuals (i.e., a decline of 50 percent below baseline levels as a result of the SBSP Restoration Project) of these species from the South Bay, resulting in a substantial decline in flyway-level populations, due to a reduction in the extent of higher-salinity ponds and the conversion of managed ponds to tidal habitats.
3.5-8: Potential reduction in foraging habitat for diving ducks, resulting in a substantial decline in flyway-level populations.	The SBSP Restoration Project would have a significant impact on diving ducks foraging in the South Bay if it resulted in a substantial reduction in numbers (i.e., a decline of 20 percent below baseline levels as a result of the SBSP Restoration Project) of diving ducks using the South Bay, resulting in a substantial decline in flyway-level populations, due to the conversion of managed ponds to tidal habitats.

IMPACT	THRESHOLD OF SIGNIFICANCE
3.5-9: Potential reduction in foraging habitat for ruddy ducks, resulting in a substantial decline in flyway-level populations.	The SBSP Restoration Project would have a significant impact on ruddy ducks foraging in the South Bay if it resulted in a substantial reduction in numbers of individuals (i.e., a real decline of 15 percent below baseline levels as a result of the SBSP Restoration Project) using the South Bay, resulting in a substantial decline in flyway-level populations, due to the conversion of managed ponds to tidal habitats.
3.5-10: Potential habitat conversion impacts on California least terns.	The SBSP Restoration Project would have a significant impact on California least terns if it resulted in a decrease in foraging habitat or prey availability for post-breeding dispersants in the South Bay, leading to a decline in the Bay Area breeding population relative to baseline levels.
3.5-11: Potential loss of pickleweed-dominated tidal salt marsh habitat for the salt marsh harvest mouse and salt marsh wandering shrew and further isolation of these species' populations due to breaching activities and scour.	The threshold of significance for this impact is defined as measurable, sustained loss of pickleweed-dominated tidal salt marsh resulting in substantial isolation of salt marsh harvest mouse and salt marsh wandering shrew populations due to the SBSP Restoration Project, without development of a commensurate amount of new contiguous marsh once the appropriate elevations are achieved within the restored ponds.
3.5-12: Potential disturbance to or loss of sensitive wildlife species due to ongoing monitoring, maintenance, and management activities.	The SBSP Restoration Project would have a significant impact on biological resources as a result of ongoing monitoring, management, and maintenance activities if these activities resulted, directly or indirectly (e.g., by facilitating predation), in: ▪ The mortality of, or loss of active nests of, any western snowy plovers or California least terns; ▪ The mortality of, or the loss of active nests of, substantial numbers of state- or federally listed, marsh-associated species; ▪ Abandonment of a primary harbor seal haul-out or pupping area; ▪ The loss of substantial numbers of nests of non-listed pond-associated birds such as terns, avocets, and stilts; or ▪ Disturbance or harm to plant species of concern.
3.5-13: Potential effects of habitat conversion and pond management on steelhead.	The SBSP Restoration Project would have a significant impact on steelhead if it resulted in a decline in steelhead populations associated with South Bay spawning streams.
3.5-14: Potential impacts to estuarine fish.	The SBSP Restoration Project would result in a significant impact to estuarine fish if it resulted in a substantial decline in South Bay populations of estuarine fish.
3.5-15: Potential impacts to piscivorous birds.	The SBSP Restoration Project would result in a significant impact to piscivorous birds if it resulted in a substantial decline (relative to baseline levels) in South Bay populations of mergansers, pelicans, fish-eating grebes, herons, and egrets, resulting in a substantial decline in Pacific Flyway populations.
3.5-16: Potential impacts to dabbling ducks.	The SBSP Restoration Project would have a significant impact to dabbling ducks if it resulted in a substantial decline (relative to baseline levels) in South Bay populations of dabbling ducks, resulting in a substantial decline in Pacific Flyway populations.
3.5-17: Potential impacts to harbor seals.	The SBSP Restoration Project would result in a significant impact to harbor seals if it resulted in a substantial decline (relative to baseline levels) in South Bay populations.

IMPACT	THRESHOLD OF SIGNIFICANCE
3.5-18: Potential recreation-oriented impacts to sensitive species and their habitats.	Recreation associated with the SBSP Restoration Project would have a significant impact if it resulted, directly or indirectly (e.g., by facilitating predation), in: ▪ The abandonment of a primary harbor seal haul-out or pupping area; ▪ The mortality of, or loss of active nests of, western snowy plovers or California least terns; ▪ A reduction in California Ridgway's rail populations; ▪ The loss of substantial numbers of nests of non-listed pond-associated birds (specifically, terns, avocets, and stilts); ▪ Substantial, long-term declines in numbers of waterbirds in the South Bay due to recreational disturbance; or ▪ Losses of California Ridgway's rail or salt marsh harvest mouse individuals by impeding the use of high-tide refugia under or near public access features.
3.5-19: Potential impacts to special-status plants.	The threshold of significance for this impact is defined as the loss of individuals of a state- or federally listed plant species, or loss of a substantial portion of the population of other special-status plants (e.g., species considered rare under the CRPR), as a result of SBSP Restoration Project activities without commensurate increases in numbers as a result of restoration of tidal and transitional habitats.
3.5-20: Colonization of mudflats and marsh plain by non-native *Spartina* and its hybrids.	The threshold of significance is defined as colonization of restored tidal habitats by non-native *Spartina* at a level (measured by percentage of the vegetated marsh dominated by non-native *Spartina*) that exceeds recently colonized marshes elsewhere in the South Bay.
3.5-21: Colonization by non-native *Lepidium.*	The threshold of significance is defined as colonization of restored brackish marsh habitats by *Lepidium latifolium* at a level (measured by percentage of the vegetated marsh dominated by *Lepidium latifolium*) that exceeds recently colonized reference brackish marshes elsewhere in the South Bay.
3.5-22: Increase in exposure of wildlife to avian botulism and other diseases.	The threshold of significance is defined as a substantial increase in the incidence of avian botulism or other wildlife diseases in the South Bay, or an increase in the number of individuals exposed to such diseases, relative to baseline conditions as a result of the SBSP Restoration Project.
3.5-23: Potential impacts to bay shrimp populations.	The threshold of significance is defined as a substantial decrease in numbers of California bay shrimp within the South Bay as a result of the SBSP Restoration Project.
3.5-24: Potential impacts to jurisdictional wetlands or waters.	The threshold of significance for this impact is defined as measurable, long-term loss of jurisdictional wetlands or waters not compensated for by equivalent increases in jurisdictional wetlands or waters as a result of SBSP Restoration Project activities.
3.5-25: Potential construction-related loss of, or disturbance to, nesting raptors (including burrowing owls [*Athene cunicularia*]).	The SBSP Restoration Project would have a significant impact on raptors if it resulted in the mortality of, or the loss of active nests of, substantial numbers of raptors (including burrowing owls), as a result of the SBSP Restoration Project.

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Program-Level Evaluation Summary

In the 2007 Final EIS/R, the analysis determined that Programmatic Alternative C was beneficial or would have less-than-significant impacts to almost all species and habitats when evaluated at the full program scale. The only potentially significant adverse biological impacts identified for Programmatic Alternative C was to ruddy ducks. Construction-related impacts (that would generally be temporary and localized) would also occur under Programmatic Alternatives B and C; no construction-related impacts would occur under Programmatic Alternative A.

Programmatic Alternative C was chosen, and implementation of Phase 1 actions began. The actions proposed under completed Phase 1 actions in combination with Phase 2 actions will continue to move the overall mix of habitats toward 50 percent restored tidal marsh, after which future phases can continue progressing toward the mix of habitats described for Programmatic Alternative C.

Project-Level Evaluation

Project-level evaluation is described below for each of the 25 identified potential biological resource impacts. Of these 25 impacts, 23 are the same ones used in the 2007 Final EIS/R. However, two new impacts were added for consideration here. Impact 3.5-24 covers the potential impacts to jurisdictional wetlands or waters. This impact was added to more specifically call out and assess the changes to jurisdictional wetlands that would occur as part of connecting former salt ponds with tidal flows. Many of the ponds are surrounded by fringing marsh that would necessarily have channels excavated through them, and the Project Management Team (PMT) wanted to explicitly account for and analyze those channels. Impact 3.5-25 covers potential construction-related loss of, or disturbance to, nesting raptors (including burrowing owls). This impact was added at the request of project partners that own and manage public lands or infrastructure adjacent to the SBSP Restoration Project that are known to be raptor habitat. It was appropriate to make an explicit assessment of the construction-related impacts to those birds.

Phase 2 Impact 3.5-1: Potential construction-related loss of or disturbance to special-status, marsh-associated wildlife.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Construction related to the implementation of the SBSP Restoration Project could potentially disturb some special-status wildlife species, and in some cases could lead to the loss of individuals. Wildlife species that occur in tidal marsh habitats on the outboard side of the perimeter levees include special-status species such as the salt marsh harvest mouse, salt marsh wandering shrew, California Ridgway's rail, saltmarsh common yellowthroat, Alameda song sparrow, and northern harrier (2007 Final EIS/R).

avoided due to program-level mitigation measures, project-level design features, the AMP, and other Reserve management documents and practices designed to limit direct impacts, and no impacts on fully protected species would occur. Restoration activities associated with both tidal restoration and enhancement of managed ponds (e.g., placement of dredged material, operation of booster pumps, grading, island and berm construction, water-control structure installation and maintenance) would require use of heavy equipment, create loud noise, and increase human presence in and adjacent to existing marsh habitats. These activities may result in the disturbance of wildlife within those habitats, such as disrupting foraging or breeding behaviors, and possibly causing individuals to flee areas adjacent to construction activities or abandon their nests or territories in these areas. Such occurrences would be short-term adverse effects. It is anticipated that a number of measures to avoid direct impacts to federally listed species, such as seasonal work windows, vegetation clearing and biological monitoring as described below, would be required by the BO for this project (2007 Final EIS/R).

Seasonal work windows and biological monitoring may be used to avoid construction-related impacts to special-status, marsh-associated wildlife, and fully protected species. Work in areas that could cause disturbance or direct take of nesting birds (e.g., accidental crushing of individuals or nests) would be limited to the period September 1 through February 1, to the extent practicable. At any time of year, work within tidal salt marsh could impact California Ridgway's rails or salt marsh harvest mice, both of which are fully protected. The precautions outlined in the 2007 Final EIS/R for special-status, marsh associated wildlife would be taken during construction to avoid impacts on this species, and a number of measures to avoid and minimize impacts would be required by the BO from the USFWS for this project. If seasonal avoidance is not possible, using data from annual or periodic monitoring and/or pre-construction surveys conducted for California Ridgway's rails and salt marsh harvest mice, the project could be redesigned to avoid potential impacts, or habitats may be removed or modified by hand trimming prior to ground disturbance to avoid direct take of the species (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), there would be no new construction, and thus no construction-related impacts would occur.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B includes placement of dredge materials in the Bay and Inland Ponds to raise pond bottom elevations and construct habitat transition zones. An offloading facility would be located in the deep water channel of the Bay approximately 3 miles offshore of Pond E2. Dredge material would be offloaded at this facility, mixed with seawater, and the resulting slurry would be pumped from the offloader via pipelines to the Bay and Inland Ponds. The offloading facility would be comprised of a hydraulic offloader, landing barges, temporary mooring piles, delivery vessels, a feed water system, and slurry pipeline. The feed water system would be comprised of an intake pump and fish screen. The pipeline would be submerged from the offloading facility to shore. Up to two booster pumps would be located along the pipeline route, with potentially one in the Bay, depending on the hydraulic offloader's pumping capacity. Levees would be improved in the Bay and Inlands Ponds and existing water control structures would be used where possible to manage the slurry placed within the ponds; however, up to eight water control structures could be modified or added to maximize the residence time in the ponds and promote settling of solids. After the solids have settled in the ponds, excess water would be decanted and discharged into the Bay. Once complete, the infrastructure used for the import and placement of dredge material would be decommissioned/demolished prior to construction of other restoration, flood risk management, and recreational features.

Other restoration actions include improving some levees while breaching and lowering others, forming habitat islands, installing water control structures, excavating channels through pond interiors and existing fringing marsh, and constructing a recreational trail, footbridge, and viewing platform. Logs would be installed along the outboard levee for increasing local sedimentation to support strip marsh enhancement and to provide additional levee protection. Pilot channels would be excavated in the Bay, Inland, and Southern Ponds in areas that are largely devoid of vegetation. In addition, a connection from the Union Sanitation District (USD) treated wastewater pipeline and the Alameda County Water District's (ACWD) Aquifer Reclamation Program (ARP) wells would be provided to the Inland Ponds through the landward levee to deliver treated wastewater or brackish groundwater to the habitat transition zones and the adjacent marshes.

The construction impacts associated with many of these activities could include visual/noise disturbance associated with equipment operation and habitat loss. Areas of marsh habitat exist along intermittent strips of the perimeter levees of the southern Eden Landing Ponds including those adjacent to Ponds E1 and E2 (Whale's Tail Marsh, Cargill Marsh, the J-Ponds, the Alameda County-owned high marsh wetland south of E2, and narrow strips along the OAC and ACFCC), and in the Alameda County owned high marsh (between the ACFCC and the Bay Ponds) and the J-Ponds. In most places, potential impacts could occur to marsh habitat during construction, but impacts would be minor and limited to small areas. These impacts would be from noise, human presence, and the possibility of increased turbidity and other changes to water quality. The exception to that is where dredge material infrastructure (i.e., pumps and secondary pipelines, or substations) may temporary result in fill in marshes. In addition, channels would be excavated through existing marshes outside of the ponds to connect decant discharge structures, breaches or water control structures to the nearest channels. This temporary fill and permanent excavation of channels are a necessary component of implementing tidal marsh restoration and would result in loss of a small amount of marsh habitat.

These construction-related impacts to marsh-associated wildlife due to construction activities would be greatly offset by the creation of over 2,000 acres of vegetated tidal marsh in the Bay, Inland and Southern Ponds. Habitat transition zones and habitat islands would be included to increase marsh habitat diversity. Such habitat restoration would increase the extent of habitat for all special-status, marsh-associated wildlife species substantially.

Seasonal work windows and biological monitoring may be used to avoid construction-related impacts to special-status, marsh-associated wildlife. Work in areas that could cause disturbance or direct take of nesting birds (e.g., accidental crushing of individuals or nests) would be avoided by establishment of seasonal work windows, or by prior removal of vegetation prior to the nesting season for migratory birds. At any time of year, work within tidal salt marsh could impact California Ridgway's rails or salt marsh harvest mice, both of which are fully protected. The precautions outlined in the 2007 Final EIS/R for special-status, marsh associated wildlife would be taken during construction to avoid impacts on this species, and a number of measures to avoid and minimize impacts would be required by the BO from the USFWS for this project. If seasonal avoidance is not possible, using data from annual or periodic monitoring and/or pre-construction surveys conducted for California Ridgway's rails and salt marsh harvest mice, the project could be redesigned to avoid potential impacts, or habitats may be removed or modified by hand trimming prior to ground disturbance to avoid direct take of the species (2007 Final EIS/R).

With the implementation of the measures discussed above, the overall effect of Alternative Eden B would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C involves similar construction process as those outlined in Alternative Eden B with dredge material placement, levee breaches, improved and lowered levees, pilot channels, habitat islands, and habitat transition zones. Dredged material would only be placed within the Bay Ponds. There would also be many more water control structures required in the Southern Ponds and the Inland Ponds to enhance management of these ponds. In addition to the recreation facilities described in Alternative Eden B, Eden C provides two additional trail spurs with footbridges over the OAC and ACFCC and an additional viewing platform at the Alvarado Salt Works. Logs would not be placed on the outboard levee, as the levee would be otherwise improved. External pilot channels would be constructed at two locations: from OAC and from the ACFCC through the J-Ponds into the Bay Ponds.

The construction impacts would be similar to those listed for Alternative Eden B, except the footprint in and around marsh habitat would increase as a result of footbridges over the OAC and ACFCC, and excavation of a relatively long pilot channel through marsh habitat in the J-Ponds. The areas along the OAC, the ACFCC, in the County-owned high marsh south of the Bay Ponds, and in the J-Ponds contain suitable marsh habitat for special-status wildlife. The salt marsh harvest mouse has been observed in this area (CDFW 2016b), and the combined footprint of the pilot channel and the adjacent levee improvements would be substantially wider than the current footprint. The precautions outlined in the Programmatic BO for special-status, marsh-associated wildlife would be taken during construction to avoid impacts. The measures proposed for Alternative Eden B would be implemented to avoid impact as a result of construction activities. Over the long term, new marsh habitat creation in the Bay Ponds would offset any temporary construction impacts, and the overall effect would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be converted to tidal marsh, and the Inland and Southern Ponds would become enhanced managed ponds initially, and may later be converted to tidal marsh. Alternative Eden D would include similar construction features as described in Alternative Eden B and Eden C. Like Alternative B and C, dredged material would be placed in the Bay and Inland Ponds, and there would be two breaches on levees on the OAC. On the ACFCC, the same breach of Pond E2C would occur under all Action Alternatives (e.g., at an existing water control structure); however, a second breach would not be constructed under Alternative Eden D. When the Inland and Southern Ponds are converted to tidal marsh the water control structures would be removed, thereby connecting the pilot channels excavated in the first construction stage with the tidal flows in the OAC and ACFCC.

Construction impacts to habitat for marsh-associated wildlife for Alternative Eden D would be similar in type and extent to those listed for Alternatives Eden B and Eden C. Construction impacts would occur at the onset of the project, and again if and when the Inland and Southern Ponds are converted to tidal marsh, which would occur a decade or so later. Small fringe areas of marsh habitat exist along the perimeter levees in the OAC. Impacts would occur to marsh habitat during construction, but impacts would be minor and limited to small areas of marsh habitat. The impacts to marsh-associated wildlife due to construction activities would be greatly offset by the restoration of the Bay Ponds to tidal marsh habitat over the long term, and potentially later through the restoration of Inland and Southern Ponds to tidal marsh habitat (a decade or more later).

Construction-related impacts would be avoided through the implementation of the measures described in Alternative Eden B, and the overall effect of Alternative Eden D would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-2: Potential construction-related loss of or disturbance to nesting pond-associated birds.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Construction related to the implementation of the SBSP Restoration Project could potentially disturb some wildlife species and in some cases could lead to the loss of individuals. Birds that nest in managed pond habitats may be adversely affected by construction activities. Such species include the double-crested cormorant, Caspian tern, Forster's tern, California least tern, American avocet, black-necked stilt, and western snowy plover (2007 Final EIS/R).

Because these species occasionally nest on levees or their side-slopes or fringing marshes, tidal restoration activities such as levee breaching or lowering and pond enhancement activities such as berm construction, island construction, or installation of water-control structures could result in the direct alteration of levees and islands on which these birds nest. Levee breaching would also result in the flooding of some ponds that are seasonally dry, which could destroy nests placed on dried pond bottoms or islands or internal berms and levees. Construction activities would also involve the movement of heavy equipment, loud noise, and human presence in and adjacent to existing nesting habitat. These activities may result in the disturbance of birds nesting within ponds, such as disrupting foraging or breeding behaviors, and potentially resulting in the abandonment of nests, eggs, or young, or may facilitate predation on eggs or young by causing adults to flee (2007 Final EIS/R).

To minimize such impacts, several measures are incorporated into the project. Work in and adjacent to potential bird-nesting habitat would be conducted outside of the avian nesting season to the extent practicable. Work in these areas that could cause disturbance or direct take (e.g., accidental crushing of individuals or nests) would be limited to the period September 1 through January 31, to the extent practicable. This condition would minimize potential impacts to nesting birds. If seasonal avoidance is not possible, pre-construction surveys would be conducted for nesting birds. If any nesting pond-associated waterbirds are detected in areas that could be disturbed by construction activities, the implementation would be delayed, redesigned, a biological monitor would be present to minimize potential impacts to actively nesting birds, or other measures could be taken to avoid impacts in consultation with USFWS and CDFW (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), there would be no construction, and thus no construction-related impacts would occur.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B includes placement of dredge materials in the Bay and Inland Ponds to raise pond bottom elevations and construct habitat transition zones. An offloading facility would be located in the deep water channel of the Bay approximately 3 miles offshore of Pond E2. Dredge material would mixed with seawater, and the resulting slurry would be pumped via pipelines to the Bay and Inland Ponds. Up to two booster pumps would be located along the pipeline route, with potentially

one in the Bay, depending on the hydraulic offloader's pumping capacity. Levees would be improved in the Bay and Inlands Ponds and would support the secondary pipelines. Existing water control structures would be used where possible to manage the slurry placed within the ponds; however, up to eight water control structures could be modified or added to maximize the residence time in the ponds and promote settling of solids. After the solids have settled in the ponds, excess water would be decanted and discharged into the Bay. Once complete, the infrastructure used for the import and placement of dredge material would be decommissioned/demolished prior to construction of other restoration, flood risk management, and recreational features.

Other restoration actions include improving some levees while breaching and lowering others, enhancing habitat islands, and constructing a recreational trail, footbridge, and viewing platform. In doing so, Alternative Eden B would convert the Bay, Inland and Southern Ponds to tidal marsh. Logs would be installed along the outboard levee for marsh enhancement and to provide additional levee protection. Pilot channels would be excavated in the Bay, Inland, and Southern Ponds in areas that are largely devoid of vegetation.

The southern Eden Landing ponds currently contain suitable habitat for nesting pond-associated birds. Various gull Forster's tern, avocet, black-necked stilts, and cormorant colonies, are located here, as are other nesting birds. Construction activities could directly impact these nesting pond-associated birds (the effects on these types of birds from the actual habitat conversion is discussed in other impacts). Visual and noise impacts from construction equipment could temporarily disturb nesting birds, and placement of the pipeline on levees, operation of booster pumps, and construction and breaching could directly impact nesting birds through nest noise disturbance, flooding or crushing.

The deposition of slurry material in the ponds would also create adverse conditions for wildlife during the construction period. The slurry placed within the ponds would be managed to maximize residence time and promote settling of solids. Conditions in the Bay and Inland Ponds may include warm water temperature, low dissolved oxygen, and poor water circulation. These conditions would be limited to the Bay and Inlands Ponds until settlement and consolidation is complete, and would not be expected to affect the Bay or nearby managed ponds. Because the habitat value for the fish and other invertebrates would be eliminated in these areas, there would be minimal habitat value for wildlife, and avian use is expected to be minimal.

Once dredge material phase of the construction is complete, other restoration features would be constructed and levees would be breached to tidal flows. The long-term creation of nesting islands and improved invertebrate habitat and fisheries are expected to offset the short-term construction impacts and provide an overall benefit to nesting pond-associated birds. With implementation of the minimization measures (e.g., seasonal avoidance of nesting birds to the extent practicable, pre-construction surveys, and biological monitoring) described above, impacts to nesting birds as a result of construction-related disturbance would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C involves a similar construction process as that outlined in Alternative Eden B with dredge material placement, levee breaches, improved or lowered levees, habitat islands, channel excavation, and habitat transition zones and islands. However, Alternative Eden C would raise bottom elevations in the Bay Ponds, convert the Bay Ponds to tidal marsh, and the Inland and Southern Ponds would become enhanced managed ponds. In addition to the recreation facilities described

in Alternative Eden B, Eden C provides two additional trail spurs with footbridges over the OAC and ACFCC and an additional viewing platform at the Alvarado Salt Works. Pilot channels would be constructed at two locations to restore tidal flux to the Bay Ponds: from OAC and from the ACFCC through the J-Ponds.

Construction impacts would be similar to those listed for Alternative Eden B, except the wildlife in the Inland and Southern Ponds would not subject to dredged material or construction of associate infrastructure, breaches, or flooding. They could still be directly affected by the construction work itself, as these ponds would be have channels excavated and water control structures placed within them. Also, Alternative Eden C would result in additional recreation trail construction that may impact pond-dependent species that are roosting or nesting in these areas, especially as these added trails would pass near what are currently managed ponds (see Impact 3.5-18 for full discussion on recreation and public access impacts). Like Alternative Eden B, the removal, lowering and improvement of levees may result in construction disturbance and reduce the long-term benefit of levee habitat for nesting; this area contains levees and islands with suitable habitat for nesting pond-associated birds. Also, the long-term creation of nesting islands, enhanced management of the Inland and Southern Ponds, and improved fisheries are expected to offset the short-term construction impacts and provide an overall benefit to nesting birds.

With implementation of the minimization measures (e.g., seasonal avoidance of nesting birds, pre-construction surveys, and biological monitoring) described above, impacts to nesting birds as a result of construction-related disturbance would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be converted to tidal marsh, and the Inland and Southern Ponds would become enhanced managed ponds initially, and may later be converted to tidal marsh through the removal of water control structures. Alternative Eden D would include similar construction features as those described in Alternative Eden B and Eden C. The timing and location of these different components varies somewhat, but the overall effect on pond-dependent species would be similar.

Construction impacts to suitable habitat for nesting pond-associated birds for Alternative Eden D would be similar in extent to those listed for Alternatives Eden B in the long term and Eden C in the short and medium term. With implementation of the minimization measures (e.g., seasonal avoidance of nesting birds and pre-construction surveys) described above, impacts to nesting birds as a result of construction-related disturbance would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-3: Potential reduction in numbers of small shorebirds using San Francisco Bay, resulting in substantial declines in flyway-level populations.

Potential program-level impacts on small shorebirds are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Several species of small shorebirds (examples of common species include semipalmated plover, western sandpiper, least sandpiper, dunlin, short-billed dowitcher, and long-billed dowitcher) occur in the San Francisco Bay Area, primarily during migration and in winter (roughly July through April). Fall and winter populations of shorebirds have increased between 2008 and 2014, after sustaining decreases in population during implementation of the Initial Stewardship Plan. Spring populations of small shorebirds have remained relatively steady with some variability since 2002 (De La Cruz et al., in press). Populations of medium shorebirds (e.g., marbled godwit, willet) increased from 2002 to 2007 and have remained steady since then (De La Cruz et al., in press).

San Francisco Bay is one of the most important stopover and wintering areas on the west coast for these species. Within San Francisco Bay, the majority of these birds are typically found in the South Bay. In the South Bay, these small shorebirds forage primarily on intertidal mudflats at low tide and to a lesser extent along the margins of ponds or in shallow ponds. These birds roost and nest on sandy or gravel islands, salt flats, and levees.

Conversion of former salt ponds to tidal habitats is expected to increase the availability of intertidal mudflat foraging area at low tide in the short term, as some of the breached ponds would provide intertidal mudflat and shallow water habitats for some time before accreting enough sediment to become vegetated. However, in the long term, sedimentation patterns of the South Bay are expected to result in a loss of intertidal mudflat, both due to conversion to emerging fringe marsh and conversion to subtidal habitat due to scour as a result of increased tidal flux and eventually because of sea-level rise. The latter of these is expected to occur even in the absence of the SBSP Restoration Project, but mudflat loss is expected to be greater if ponds are breached and tidal habitats restored (2007 Final EIS/R) as part of the SBSP Restoration Project. However, intertidal mudflats are the dominant habitat of the South Bay, and only a small percentage of the total area of mudflats is within or adjacent to the Phase 2 areas and even a small portion of those are expected to be adversely affected by Phase 2 actions at southern Eden Landing.

In addition to causing changes in the extent of mudflats, tidal restoration of what are currently managed or seasonal ponds could reduce the availability of high-tide roosting habitat for small shorebirds. The extent of shallow-water habitat that may be used by foraging small shorebirds (estimated as the extent of managed ponds containing water less than 6 inches deep) would vary considerably among the alternatives. High-tide roosting habitat is unlikely to limit populations, as pond levees, islands, habitat transition zones, and other alternative habitats can support high densities of roosting birds. However, conversion of managed ponds to tidal habitats would reduce the numbers of sites where shorebirds can congregate at high tide, potentially resulting in increased predation, possibly increased susceptibility to disease, and increased disturbance (and associated increases in energy expenditure) by predators and humans.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The CDFW would continue to operate and maintain the ponds in accordance with ongoing management practices and operation plans that are in place and described in Chapter 2. All southern Eden Landing ponds would remain as managed ponds. OAC would remain a tidal creek channel with mudflat on its margins. Levees would be maintained, as needed, and the ponds would continue to provide the same habitat functions as they do now. Existing trails along the ACFCC would continue to be maintained and used for recreational access. Currently the ponds and levees in southern Eden Landing provide habitat for small shorebirds (around the edges of the deeper, open water ponds and within shallowly inundated ponds, particularly during spring and fall migratory periods). Northern Eden Landing would continue to provide a wide range of effective habitats as enhanced in Phase 1. The existing marsh

between the Bay Ponds and the ACFCC provides foraging habitat for them at low tides, as do parts of the OAC channel.

Because the habitat would not change relative to baseline and the ponds and surrounding levees and mudflats currently provide habitat, Alternative Eden A would have no impact on small shorebirds.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Under Alternative Eden B, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, levees would be breached and water control structures would be added to restore tidal flows to all Bay, Inland, and Southern Ponds, and pilot tidal channels would be constructed. This would result in a large extent of tidal marsh that would be restored. These conditions would be an improvement in shorebird habitat over the moderately deep water conditions that currently exist in the Bay Ponds in the short term as the ponds transition from mudflat to vegetated marsh. The easternmost levees would be raised and would continue to provide "de facto" flood protection and maintain flood risk management conditions and would also support a trail. Habitat transition zones would extend into the Inland and Southern Ponds. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

In the short term, the Southern Ponds would remain aquatic habitat, but would become tidal. With time, sedimentation would raise the pond bottom, providing some mudflat habitat for foraging at low tide. (This would also occur in the Bay and Inland Ponds if dredge materials were not used to raise the bottom elevations.) Once sediment accretion has reached a level that supports tidal marsh vegetation, small shorebird foraging habitat would be locally reduced; however, due to the abundance of mudflat habitat at low tide and managed ponds throughout the South Bay, this change would not be significant. Managed ponds in the South Bay are particularly important habitats for small shorebirds during high tides. Managed ponds would be removed from the Bay, Inland and Southern Ponds, and small shorebirds would have to rely on managed ponds located elsewhere in the South Bay to provide stable environmental conditions that allow longer foraging and roosting periods. To a smaller degree, narrow intertidal mudflats along marsh channels and sloughs of the Southern Ponds would continue to provide small amounts of foraging habitat for small shorebirds.

A footbridge would be added between the southern tip of E6C and E5C, and eastern edge of Pond E6C and E4C, would have a very small impact on existing mudflat habitat that could be used for foraging shorebirds. The trail systems improvements would be constructed on existing levees, some portions of which may be improved. These levees would also be located in or adjacent to areas subject to ongoing flood risk management studies, habitat transition zones, or habitat improvements. Small shorebirds that roost on the limited habitat on the existing easternmost levees may be disturbed by the construction and by the ongoing trail use. However, the placement of the trails and other recreation amenities would be grouped in the eastern portion of the pond complex, leaving the rest of it available for sensitive wildlife species.

Also, large areas of levees inside the pond complex are being retained and raised and improved as habitat islands for bird use, and the physical separation caused by the breaches would reduce access to mammalian predators and other disturbance. This roosting habitat for shorebirds would be created in the Bay, Inland and Southern Ponds. These islands would eventually transition to marsh mounds but in each

case would provide high-tide refuge for small shorebirds and better protection from mammalian predators compared to the levees. Habitat transition zones would also be constructed to increase habitat complexity. A habitat transition zone would provide a gradual slope that would increase the area available for intertidal habitat transition over time. This area would provide some foraging habitat for small shorebirds.

Outside of the immediate project area, intertidal mudflat areas within OAC, to lesser degree in ACFCC, and along the eastern edge of the San Francisco Bay adjacent to the project area are could be impacted by the changes in tidal flow volumes and velocities. These changes may include scour and erosion of the existing mudflats that provide habitat for small shorebirds. These changes are expected to result in localized changes in the extent and depth of the mudflat habitat; however, at a regional scale, the scoured or eroded material is expected to deposit elsewhere and could expand or reduce the depth of mudflat in those areas. These impacts are not expected to result in significant changes in small shorebird populations.

Overall, Alternative Eden B would have a net increase in foraging habitat quantity for shorebirds in the short and medium term, but a decrease in the longer term as marsh establishes in the Bay, Inland, and Southern Ponds. The lost habitat from levee breaching, scouring/erosion forces, and disturbance associated with recreational use would occur, but the additions and improvements of islands and transition zones for roosting or other habitat benefits would offset that. Though the long-term net effect of Alternative Eden B could lead to a net decrease in small shorebird use, these changes are not expected to produce substantial declines in flyway-level populations or reduce the populations 20 percent below baseline levels. Therefore, the impacts of Alternative Eden B are considered less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Under Alternative Eden C, pond bottom elevations would be raised through the import of dredge materials and tidal action would be restored to the Bay Ponds, and water control structures would be constructed in the Inland and Southern Ponds to create enhanced managed ponds. In addition, pilot channels, habitat islands, habitat transition zones, and trails would all be constructed as described in Chapter 2, Alternatives. Habitat transition zones would also be constructed along the mid-complex levee border of Ponds E7 and E6/E5 and E4 and the J-Ponds. Habitat islands would be created and the corresponding benefits would be as described in Alternative Eden B.

Because pond bottom elevations would be raised prior to breaching, the Bay Ponds and habitat transition zones would be at elevations higher than those that support mudflat habitat. Once tidal, the Bay Ponds are expected to recruit high salt marsh vegetation. Upland habitat areas on levees, islands, and habitat transition zones would provide additional roosting habitat. Bay Ponds E1, E2 and E7 do not currently provide foraging habitat for small shorebirds as they are moderately deep water ponds. However, Bay Pond E4 is drawn down sufficiently in summer and fall to provide areas suitable as small shorebird foraging habitat.

Scour and erosion impacts may occur adjacent to the levee breaches and in the San Francisco Bay mudflats, however, any mobile sediments would also be deposited, resulting in small changes in the location and extent of the mudflat. Because the amount of tidal marsh created under Alternative Eden B is greater than Alternative Eden C, the tidal flux and associated erosion and scour impacts are expected to be reduced in Alternative Eden C when compared with Alternative Eden B.

For the Inland and Southern Ponds, the existing ponds would be improved through enhanced management via additional water control structures to provide intake and discharge, as well as pond-to-pond flow,

which would improve circulation and management of inundation depth, and adequate water quality in these ponds. These enhancements would provide a diverse range of management and operations to support target habitats and conditions for a variety of wildlife species, including shorebirds. The management of these ponds would be determined based on previous operations plans, and informed through the AMP's ongoing monitoring results to determine optimum management and habitat conditions. The impacts associated with the enhanced managed ponds may include the reduction in amount of suitable habitat or an increase, depending on particular species prioritization and management needs. Habitat suitable for roosting and nesting are expected to continue in Inland and Southern Ponds that provide dry conditions during the breeding season. In addition, the Inland and Southern Ponds would continue to provide foraging habitat for shorebirds along levee margins and in those ponds managed to have shallow water. The changes to pond management are not expected to result in significant alteration in small shorebird population numbers and may increase them by increasing shallow water foraging and roosting habitat.

The same recreational infrastructure improvements and impacts described for Alternative Eden B would also occur under Alternative Eden C. In addition, though, Alternative Eden C includes a loop trail to the Alvarado Salt Works site and a pedestrian bridge over ACFCC. Comparatively, Alternative Eden C would result in more disturbances to existing levees associated with construction and recreation that has the potential to impact small shorebirds nesting or roosting on levees. The new trails proposed would be located on existing levees that are already used for CDFW access, but it is expected that the recreational access would increase potential for disturbance to roosting due to the increased use of the levee by bicyclists and people on foot. Again, however, the recreation would be clustered on the edge of the pond complex and leave large areas of ponds, islands, and other habitat areas free from human disturbance. The construction of nesting islands, which would be located away from levee-top trails to minimize disturbance from recreation, would provide roosting habitat and would mitigate for the roosting habitat lost where the new trail/infrastructure would potentially be located.

Overall, the enhanced managed ponds at the Inland Ponds and Southern Ponds would be improvements for these species. The other habitat features, including the temporary intertidal mudflat, as it transitions to marsh, and the ongoing upland habitat areas on levees, islands, and habitat transition zones would provide roosting and foraging habitat for small shorebirds. These features are expected to benefit small shorebirds, while suitable habitat for small shorebirds in other locations around the Bay is expected to remain and provide significant mudflats throughout the South Bay. Because the amount of fully tidal area is reduced when compared with Alternative B, the extent of impacts associated with scour and erosion is expected to be less than under Alternative B. The changes to small shorebird habitat are not expected to produce substantial declines in flyway-level populations or reduce the populations 20 percent below baseline levels and may help increase populations. For these reasons, the impacts of Alternative Eden C would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. Alternative Eden D has elements of both Alternatives Eden B and Eden C. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials and the Bay Ponds would be restored to tidal marsh. The restoration of the Inland and Southern Ponds, first as enhanced managed ponds and potentially later to fully tidal ponds at southern Eden Landing Ponds, would be staged over a long period of time (potentially a decade or more). The operation of enhanced managed ponds in the Inland and Southern Pond areas would, in the early years, be as described in Alternative Eden C. Later, the restoration of tidal action to the ponds would be similar to

those described in Alternative Eden B. Habitat enhancements, such as islands and habitat transition zones would be constructed. Similar long term habitat conversions and related losses relative to the existing conditions would occur. The habitat transition zones, and islands/mounds would provide high water shelter and foraging opportunities along the margins and nesting and roosting habitat (at least until they are vegetated). The short-term disturbances from construction would be similar. The long-term disturbances from recreational trail use would be similar to those in Alternative Eden B.

The main differences in the impacts associated with this alternative are with the locations of the habitat transition zone, which would be on the interior of the outer, western levees instead of on the eastern boundary. The mid-complex levee would provide temporary habitat for nesting and roosting, but it would be regraded to provide habitat transition zones, high tide refugia and/or lowered levees or islands in the long-term with restoration of the ponds behind it to tidal marsh. In addition, the increase in tidal flows may initially result in a small amount of erosion and scour of sloughs and outboard mudflats (similar to those described under Alternative Eden C), would stabilize, and then may be subject to addition erosion and scour impacts that in total would be most similar to those described under Alternative Eden B.

Overall, the staged and sequential transition of all of southern Eden Landing's ponds to tidal marsh over a decade or more, with opportunities under the AMP to retain some of those ponds as enhanced managed ponds to provide suitable habitat for small shorebirds would provide maximum flexibility in providing shorebird habitat (as well as habitat for other guilds of birds) while still moving toward full tidal restoration here. While some adverse effects on small shorebird population are expected, the implementation of Alternative Eden D is unlikely to reduce flyway-level populations 20 percent below baseline levels and would thus have a less-than-significant impact on small shorebirds.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-4: Loss of intertidal mudflats and reduction of habitat for mudflat-associated wildlife species.

Potential program-level impacts are addressed in Section 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Shorebirds are a primary user of intertidal mudflats, and the habitat- and population-related effects on small shorebirds from Phase 2 actions were covered extensively in Impact 3.5-3. This impact (Impact 3.5-4) focuses more generally on effects on other birds and other wildlife species. Resident and migratory (midsize and larger) shorebirds forage on invertebrates found in mudflats during low tide. Gulls and some dabbling ducks forage on exposed mudflats as well. During high tides, fish move over these mudflats to feed on invertebrates.

Restoration of former salt ponds to tidal habitats is expected to increase the availability of intertidal mudflat foraging area at low tide within the ponds in the short term in areas unaffected by the import and deposition of dredge materials. Some of the breached ponds would provide large areas of intertidal mudflat habitat for some time before accreting enough sediment for vegetation to colonize. Eventually, this mudflat habitat within the ponds would be converted to tidal marsh. In areas where pond bottom elevations are raised prior to breaching, these elevations are expected to be higher than those that readily support mudflat habitat. Once tidal, these ponds are expected to recruit high salt marsh vegetation.

Mudflats outside of the ponds could be directly affected by the construction and operation of dredge material infrastructure and indirectly affected by scour and changes in sediment transport. As the ponds are breached, increased tidal flux is expected to cause short-term scouring and loss of some of the mudflat area outside of the ponds alongside stream outflows, sloughs, and channels until an equilibrium has been reached. Mudflat loss is also expected as ponds are breached because sediments from existing mudflats could be transported into the breached subsided ponds and the ponds would then be colonized with vegetation (2007 Final EIS/R). However, intertidal mudflats are one of the most dominant habitats of the South Bay (the other being former salt-ponds), and only a minimal percentage of the total area of mudflats would be affected by the Eden Landing Phase 2 actions.

Numerous species of invertebrates, birds, and fish use intertidal mudflats. As a result, direct effects to mudflats outside of the ponds and a decline in mudflat availability due to scour and changes in sediment transport could result in declines in abundance of these species; however, because the Eden Landing Phase 2 project area represent a small fraction of the total South Bay mudflat area, these declines would be minimal. Also, productivity within the former salt ponds is expected to increase with tidal restoration, as tidal water brings nutrients and organisms into the former salt ponds. This would form marshes, which are likely to result in increased productivity in the benthic invertebrate food chain, potentially increasing the density of the invertebrate prey base available to the various bird and fish species that forage on intertidal mudflats. Such increases in productivity may offset, at least to some extent, the adverse effects of mudflat loss outside of the ponds on South Bay animals such as invertebrates, fish, and birds. In addition, minimal amounts of foraging habitat for some mudflat foragers would be created along the margins of the sloughs and channels that would form in restored marshes, as discussed in the 2007 Final EIS/R.

Alternative A (No Action). Under Alternative A (the No Action Alternative), no new action would be taken. The Bay, Inland and Southern Ponds would continue as managed ponds. Levees would be maintained, as needed, and the ponds would continue to provide the same habitat function. Currently, the only intertidal mudflat habitat within southern Eden Landing is within the OAC and the along the ACFCC. Mudflats may exist temporarily during the summer months within managed ponds that dry out. Intertidal mudflats also exist outside the Bay Ponds and at the mouth of the OAC and ACFCC on the bayward sides of southern Eden Landing. Northern Eden Landing would continue to provide the range of effective habitats that were provided and enhanced in Phase 1. None of these mudflats would be disturbed with the No Action Alternative; therefore, Alternative A would have no impact on intertidal mudflat habitat for wildlife species in the South Bay.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Under Alternative Eden B, an offloading facility and pipelines would be placed in the Bay during the construction period to transport dredge materials to Pond E2. Pond bottom elevations would be raised in the Bay and Inland Ponds and levees would be breached to restore tidal action to the Bay, Inland, and Southern Ponds. All of southern Eden Landing would transition to tidal marsh habitat. Internal levees would be breached and lowered, and habitat transition zones and islands/ marsh mounds would be created to provide high-tide refugia, nesting and foraging habitat. Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

An offloading facility would be located in the deep water channel of the Bay approximately 3 miles offshore of Pond E2. Dredge material would be offloaded at this facility, mixed with seawater, and the

resulting slurry would be pumped from the offloader via pipelines to the Bay and Inland Ponds. Up to two booster pumps would be located along the pipeline route, with potentially one in the Bay, depending on the hydraulic offloader's pumping capacity. The submerged pipeline would be anchored on the Bay bottom with precast concrete pipe weights to reduce vulnerability to wind and wave action.

The infrastructure placed in the Bay between the offloading facility and Pond E2 would have direct effects on benthic species on the mudflats along the pipeline route (those living at the sediment surface and in upper subsurface layer) and indirect effects on those species living at and just above the bottom sediments that cannot rise more than an few feet in the water column during high tide. To minimize potential effects to north-south movement across the mudflats, portions of the submerged pipeline could be floated above the shallow mudflats, where needed, to allow for species to pass below the pipe. Although effects to benthic species would occur during construction and operation of the dredge material placement infrastructure, as described above, intertidal mudflats are one of the most dominant habitats of the South Bay, and only a minimal percentage of the total area of mudflats would be affected by the Eden Landing Phase 2 actions. In addition, effects from pipelines and booster pumps would only occur during a portion of the construction period, as the dredge material infrastructure would be removed prior to construction of the other restoration, flood risk management, and recreational components.

Levee breaches and associated increases in tidal flux would increase erosion and scour and thus slightly reduce the total availability of mudflat habitat present along the edges of the OAC and the ACFCC as well as along the mudflat bayward of Eden Landing. However, this amount is also minimal relative to the amount of mudflat in the Bay. Sediment accretion in the Southern Ponds during the transition to tidal marsh would result in some temporary intertidal mudflat habitat. This mudflat habitat would in turn become vegetated as a tidal marsh in the long term. The existing mudflats along and outside of southern Eden Landing (OAC and ACFCC) would likely experience some scour and reduced area. The existing mudflats in San Francisco Bay may experience similar small amounts scour and localized reduction in the extent, but would likely be replaced by deposition in other areas. The impacts associated with scour and erosion are expected to stabilize and reach equilibrium quickly.

Overall, the planned full tidal restoration in Alternative Eden B would likely eventually result in more extensive channel networks, higher-order sloughs, and overall greater habitat diversity. Intertidal mudflat habitat is expected to develop along the channels and sloughs in the restored tidal marsh and along the shallow sloping features of the habitat transition zones and islands. There would also be some loss of mudflat due to scour from the increased tidal flux outside of the ponds and in adjacent sloughs. The net of these areas of change to existing mudflats is expected to be relatively small and would thus constitute a less-than-significant impact on mudflat habitats for wildlife species in the South Bay.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C would use an offloading facility, booster pumps, and pipelines to import dredge materials and raise pond bottom elevations, restore tidal action to the Bay Ponds as described for Alternative Eden B, and convert the Inland Ponds and Southern Ponds to enhanced managed ponds. In addition, the internal levees within the Bay Ponds would be breached, and the material would be used to create islands. A mid-complex levee and associated habitat transition zone would be created.

Due to the similarity of the activities proposed, the impacts on mudflats associated with the Bay Ponds are similar to those described under Alternative B. For the Inland Ponds and the Southern Ponds, the addition water control structures will provide ELER managers with a greater ability to manage and

operate the ponds for a wide variety of wildlife. However, these enhancements would provide only limited ability to provide intertidal mudflat habitat. The operation of water control structures is not expected to result in significant changes in existing mudflat conditions in the mudflats present in or along the OAC, ACFCC or in the San Francisco Bay outside of Eden Landing. Furthermore, due to the presence of large amounts of mudflat habitat throughout the South Bay these changes are not expected to be limiting for populations of mudflat-associate species.

Overall, with Alternative Eden C, the effects associated with the tidal flux would be less severe than those described from Alternative Eden B, because of the reduced area that will be exposed to full tidal action, and smaller tidal volumes and corresponding velocities. Like Alternative Eden B, there would be affects during construction from pipelines and booster pumps, and there may also be some loss of mudflat due to scour from the increased tidal flux outside of the ponds and in adjacent sloughs under Alternative Eden C.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Alternative Eden D is similar Alternative Eden B in the long term and similar to Alternative Eden C in the short term. In the short term, an offloading facility and pipelines would be used to import dredge materials and raise bottom elevations in the Bay and Inland Ponds, the Inland Ponds and Southern Ponds would become enhanced managed ponds, and the Bay Ponds (as with both Alternatives Eden B and Eden C) would become tidal marsh. Over time, the Inland Ponds and Southern Ponds enhanced managed ponds may also be converted to tidal marsh (similar to Alternative Eden B) through removal of the temporary mid-complex levee and the additions of more levee breaches. Like Alternative Eden C, Alternative Eden D would also provide water control structures in the Inland Ponds and Southern Ponds, but these could ultimately be removed to provide full tidal action. The staged transition of the Inland and Southern Ponds to tidal flows would occur when observations made elsewhere in South Bay and in the greater SBSP Restoration Project demonstrated pond-dependent wildlife species were not suffering adverse impacts as defined in the AMP and in the significance criteria established in the 2007 Final EIS/R such that managed ponds needed to be retained.

Overall, the potential impacts from pipelines and booster pumps on mudflats and from localized erosion and scour would, in the short term, be similar to those described under Alternative Eden C and more closely resemble those described under Alternative Eden B in the long term. Under Alternative Eden D, the impacts associated with localized erosion and scour will be spread out over time, giving biota more time to adjust to potential changes in mudflats.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-5: Potential habitat conversion impacts to western snowy plovers.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the SBSP Restoration Project's 2007 Final EIS/R. The project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed in this Draft EIS/R.

The Pacific coast population of western snowy plover is federally listed as threatened and substantial losses in the San Francisco Bay population could be significant in the context of the Pacific Coast population (2007 Final EIS/R). The majority of the San Francisco Bay population of western snowy plovers currently breeds in Eden Landing, where this species nests in and adjacent to a number of ponds. Recovery goals for the entire San Francisco Bay are to support 250 breeding pairs. Recovery goals for the

SBSP Restoration Project area are to support 125 breeding pairs. Western snowy plovers have found suitable breeding and nesting conditions in some former salt ponds that are now seasonally wet ponds. Plovers prefer open spaces with no vegetation, away from trails and predator perches. Although western snowy plovers in San Francisco Bay occasionally nest on levees and islands, the majority of nests are currently found on flats within dry or partially dry ponds (2007 Final EIS/R). Individuals also forage in adjacent shallow ponds or tidal sloughs. Some of these ponds would be converted to tidal marsh during pond restoration efforts, potentially impacting western snowy plover habitat. The enhancements and subsequent management of ponds that were included in Phase 1 at northern Eden Landing have seen net increases in numbers of nests, even as the total area of available habitats has decreased (De La Cruz et al., in press; Tokatlian et al. 2014).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Some of the Inland Ponds and Southern Ponds currently provide nesting and foraging habitat for western snowy plover, and that usage would continue. No changes would be made to the configuration or operation of these ponds that would either increase or decrease this habitat and the expected population numbers. Northern Eden Landing would continue to provide the range of effective habitats that were provided and enhanced in Phase 1. Alternative Eden A would have no impact on western snowy plover.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. The Bay Ponds are currently moderately deep pools, and the Inland Ponds and Southern Ponds are shallower and are frequently managed so as to be seasonally dry for use by this species. Under Alternative Eden B, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials and all of the ponds in southern Eden Landing would be converted to tidal marsh by being opened to tidal flows. There would also be habitat transition zones, islands, levee raising and lowering, and other habitat enhancements. The Bay Trail spine would be completed along the eastern side of the project area. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

Tidal marsh habitats are not well-suited for western snowy plover, but the transitional mudflat habitat in the Southern Ponds could provide temporary foraging opportunities until the marshes form. The islands that would be built on residual levees in the ponds could provide some western snowy plover roosting habitat. The populations that use the managed ponds in northern Eden Landing could benefit from these enhancements which would partially offset the losses of existing nesting or roosting habitat in the Inland and Southern Ponds. However, there would still be a net negative effect on habitat. Also, the proposed Bay Trail spine and its optional routes through southern Eden Landing have the potential to bring increased numbers of trail users closer than preferred to nesting plovers in northern Eden Landing, where ponds managed for this species exist.

Overall, because the net habitat change would be the loss of large areas of seasonally dry nesting habitat for western snowy plover and because recreational use of proposed trails may disturb individual plovers, the impacts under Alternative Eden B would be potentially significant.

Alternative Eden B Level of Significance: Potentially Significant

Alternative Eden C. Alternative Eden C is similar to Alternative Eden B at the Bay Ponds, which would have bottom elevations raised and be converted to tidal marsh. But those ponds are not heavily used by western snowy plover because of their depth. Under Alternative Eden C, however, instead of being converted to tidal marsh, the Inland Ponds and Southern Ponds, including Pond E6C, which was drawn down in 2016 to provide additional habitat, would be fitted with water control structures to allow those ponds to be managed for a variety of wildlife. Seasonally, management of some Inland and Southern Ponds would focus on the western snowy plover. Activities that may directly benefit the western snowy plover, such as drying earlier in the year, may enhance nesting density and success.

The other habitat enhancements would also be implemented, though in different locations, and these would benefit individuals present in the ELER. The management of the enhanced ponds would focus on and improve nesting habitat quality that would benefit the western snowy plover.

However, Alternative Eden C would also feature additional public access and recreation features, beyond those described in Alternative Eden B, including the loop trail off of the Bay Trail spine. These trails and other recreational features would increase the risk of recreational disturbance on nesting, foraging, or roosting western snowy plover, which would be expected to offset some of the benefits of the enhanced managed ponds, and reduce the amount of suitable habitat available for nesting individuals. The full effect of disturbance of recreation and public access on sensitive wildlife species is discussed at length in Impact 3.5-18.

Overall, even with the increased recreational disturbance the improved ability to manage the Inland Ponds and Southern Ponds for western snowy plover habitat and the retention of those ponds as enhanced managed ponds would cause Alternative Eden C to have a less-than-significant impact on western snowy plover.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be converted to tidal marsh as in the other alternatives, but the Inland Ponds and Southern Ponds would be retained as managed ponds and enhanced to provide similar, though slightly less flexible control over water depth, salinity, and other characteristics. The benefits would be similar to those described under Alternative Eden C. The addition of dredged material to the Inland Ponds during construction may result in temporary alteration of suitable nesting habitat, particularly to Pond E6C. However, once the material settles and dries, nesting habitat within the Inland Ponds may be improved through increased elevation and enhanced management. The retention of the Inland Ponds and Southern Ponds, which are used by western snowy plover, as managed ponds would persist until ongoing research and monitoring indicated that some or all of those ponds could be converted to tidal flows without significantly reducing populations of western snowy plover in San Francisco Bay relative to the baseline. If instead the need for these ponds to remain as breeding areas for western snowy plover is indicated, Alternative Eden D would thus retain them. Also, the public access trails would be the same as Alternative Eden B (i.e., less extensive than those in Alternative Eden C), and are expected to increase the risk of recreational disturbance on nesting, foraging, or roosting western snowy plover. These impacts would offset some of the benefits of the enhanced managed ponds, and reduce the amount of suitable habitat available for nesting individuals. The full effect of disturbance of recreation and public access on sensitive wildlife species is discussed at length in Impact 3.5-18.

Overall, the retention and improvement of the Inland Ponds and Southern Pond as breeding habitat for western snowy plover until it can be demonstrated that further tidal marsh restoration can proceed without triggering a significant impact would mean that Alternative Eden D would have a less-than-significant impact.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-6: Potential reduction in the numbers of breeding, pond-associated waterbirds (avocets, stilts, and terns) using the South Bay due to reduction in habitat, concentration effects, displacement by nesting California gulls, and other project-related effects.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. The project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed in this Draft EIS/R.

American avocets, black-necked stilts, Forster's terns, and Caspian terns are colonial waterbirds that nest and forage within portions of the SBSP Restoration Project. These birds nest on islands within ponds, on pond levees; in dry salt panne habitat; in marshes on higher ground around marsh ponds; and in other bayside habitats such as water treatment plant settling ponds. Avocets and stilts forage in ponds, marshes, and alternative habitats such as water treatment plants. Avocets also forage on intertidal mudflats when they are not inundated. The terns forage on fish, which they catch in the Bay; along slough channels; in lower-salinity ponds within the SBSP Restoration Project area; and in artificial ponds, lagoons, and reservoirs throughout the South Bay (2007 Final EIS/R).

Based on recent long-term monitoring data, the highest number of American avocets occurred in SBSP Restoration Project ponds during fall and winters months, with an increase from 2002 to 2006 and from 2010 to 2014 (De La Cruz et al., in press). Spring tern populations have increased in SBSP Restoration Project ponds between 2001 and 2014 (*Ibid*). The same study found that gull abundance peaking from 2004 to 2006, after which the population declines; and numbers have recently increased (2011 to 2014), but remained below peak numbers.

Restoration of managed ponds to tidal marsh could result in a loss of nesting and foraging habitat for some of these species. Large areas of unoccupied nesting habitat are available and could offset habitat loss due to conversion to tidal marsh. If available habitat is concentrated, it could make populations more vulnerable to predation. California gulls use the same habitat type as avocets, stilts, and terns. Gulls displaced by loss of nesting habitat due to tidal marsh restoration could disrupt avocet, stilt, and tern colonies (2007 Final EIS/R).

Overall, the loss of habitat in ponds that would be converted to tidal habitats in Phase 2 is expected to impact relatively small numbers of breeding avocets, stilts, and terns through loss of nesting and foraging habitat. These adverse impacts may be offset by the creation of islands for these species and the improvements to other ponds that are designated to become enhanced managed ponds as part of Phase 2 or a future project phase. Recent and ongoing monitoring of converted ponds indicates that populations of avocets and stilts are in decline, potentially as a result of loss of historic nesting islands. In general these species are not moving as ponds are restored. Terns appear to be more mobile and more resilient to these changes, and are moving to new sites as pond are restored to tidal flows, however, they are not moving to newly created pond habitat with islands (*Ibid*). Habitat islands or other enhancements in managed ponds

are believed to be the key to maintaining breeding habitat. Recommendations for effective island breeding habitat (from Ackerman et al. 2014a) have been incorporated into this project to the extent practicable.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Southern Eden Landing would continue to function as managed ponds similar to current conditions and northern Eden Landing would continue to provide the range of effective habitats that were provided and enhanced in Phase 1. The levees would continue to provide de facto flood protection and would be maintained for habitat purposes and for CDFW access and operations and maintenance (O&M). There would be no change to the operation and maintenance of southern Eden Landing.

Under the No Action Alternative, there would be no change in impacts to pond-associated waterbirds.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Under Eden B, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, and the Bay Ponds, Inland Ponds and Southern Ponds would be breached to support the development of tidal marshes and promote the recovery of several threatened and endangered marsh dependent species. Levee modifications, including breaching and lowering or removal of large sections of internal and external Bay Pond levees, and improvements to the landward (easternmost) levee of the Inland Ponds and Southern Ponds for flood risk management would occur. Habitat transition zones and nesting islands would also be constructed. Recreational trails would be constructed along the landward levee of the Inland Ponds and with several options along the perimeter levees of the Southern Ponds. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

Existing pond habitat – useful for nesting and foraging for these species – in the Island Ponds would be converted to marsh habitat, and in the Southern Ponds it would be converted to open water and mudflats (in the short term) and tidal marsh in the long term. Both nesting and roosting habitat for pond-associated waterbirds would be increased through the construction of islands. Island features would be designed to provide breeding habitat for avocets, stilts, and terns, at least in the short term, and would be isolated from terrestrial predators. As these constructed habitat features transition to tidal marsh, the usefulness of these islands for nesting birds may decrease. These islands have some potential to create concentration effects, where the large numbers of birds would become targets for predators such as gulls or disease. Gull management would be a part of ongoing CDFW and SBSP Restoration Project management and should help avoid displacement.

During the transition to the tidal marsh habitat, the Southern Ponds would provide some foraging habitat in the form of mudflats and would enhance the local fisheries. Tidal slough channels could also be used for foraging. Other than the islands, the long-term restored tidal marsh would offer minimal habitat for avocets, stilts, and terns, but some nesting opportunities may still be available on the surrounding levees. Levees that could provide nesting habitat would be lowered or removed and remaining portions that are regraded would become isolated from terrestrial predators, as well as foot and vehicle traffic.

The recreational features may reduce current nesting or roosting activities on the Inland Ponds and Southern Ponds levees and disrupt foraging activities that occur there. These effects are discussed more fully in Impact 3.5-18. In general, however, research (e.g., Trulio et al. 2013) indicates that buffer

distances of several hundred feet from trails or observation platforms (the exact distance varies by species) appears to minimize disturbance.

Small amounts of mudflat foraging habitat outside of the ponds would be lost due to scour from the levee breaches, but improved foraging, in the short term, would be created inside the Southern Ponds as they transition to tidal marsh. These changes are small compared to the amount of habitat available for pond-associated waterbirds in the South Bay and are not expected to reduce populations 10 percent or greater relative to the baseline. As such, these impacts are considered less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C would provide avocet, stilt, and tern nesting habitat benefits as the Inland and Southern Ponds become enhanced managed ponds. The Inland and Southern Ponds would be enhanced with the addition of 11 water control structures that will provide CDFW with greater management flexibility and seasonal control over water quality and depths for a variety of wildlife. Alternative Eden C would add the same long section of recreation trail and a viewing platform provided in Alternative Eden B as well as a loop trail to the Alvarado Salt Works site and bridges over the OAC and ACFCC. The Bay Ponds are moderately deep and do not provide nesting habitat, except on levees and limited pond margins. Shallow areas provide foraging habitat. Pond bottom elevations would be raised through the import of dredge materials and the Bay Ponds would be breached to provide full tidal action to facilitate its transition to tidal marsh habitat. The mid-complex levee would be would be raised to create separation between the Bay Ponds and the other ponds; this raised levee could be used for roosting and nesting pond-associated birds.

The installation of the water control structures would have temporary and minor effects to waterbirds that use adjacent Inland Ponds and Southern Ponds. In the long term, the ability CDFW to better manage water quality and quantity will provide better habitat conditions, including nesting and foraging conditions, for a wide variety of bird species, including pond dependent wildlife. Islands and habitat transition zones would be constructed within the Bay Ponds and along the mid-complex levee, which may support nesting waterbirds. Like Alternative Eden B, the islands created from the remnant levees in the Bay Ponds and internal levees on the Inland Ponds have potential to increase concentration effects somewhat relative to the existing conditions; gull control would be a part of ongoing CDFW management and should help avoid displacement.

As in Alternative Eden B, the proposed recreational trails may remove or otherwise disturb waterbirds that nest along the landward levees of the Inland or Southern Ponds, and the various trail routes through the Southern Ponds. The additional recreational features along either or both sides of the OAC may further disrupt nesting, roosting, or forage activities on the Inland Ponds or at northern Eden Landing. These effects are discussed more fully in Impact 3.5-18.

Overall, the foraging habitat for avocets, stilts, and terns, would be improved with the conversion of the Inland and Southern Ponds to enhanced managed ponds. Foraging habitat would be much reduced in the Bay Ponds and limited to the tidal slough channels. Nesting habitat would be removed or disturbed to some extent through the removal and lowering of levee and addition recreational trails. New nesting and roosting habitat would be available on the constructed islands and habitat transition zones. The habitat changes are small compared to the amount of habitat available for pond-associated waterbirds in the South Bay and are not expected to reduce populations 10 percent or greater relative to baseline conditions. As such, these impacts are considered less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Alternative Eden D would provide features similar to those in Alternative Eden B in the long term (full tidal restoration at southern Eden Landing Ponds), and Alternative C in the short term (mix of tidal marsh and enhanced managed ponds). The primary difference being that under Alternative Eden D, bottom elevations would be raised in both the Bay and Inland Ponds through the import of dredge materials, but the Inland and Southern Ponds would initially be enhanced managed ponds and ultimately (based on the AMP and ongoing monitoring) converted to tidal marsh.

The Inland and Southern ponds, when managed as enhanced pond habitat, could provide foraging and nesting habitat for shorebirds or other waterbirds. Like Alternative Eden C, water control structures on the Inland and Southern Ponds would increase the ability for CDFW to provide improved foraging and roosting habitat for waterbirds. However, in the long term, these benefits would be diminished once the control structures are removed to create breaches to provide full tidal flows to these ponds and vegetated salt marsh develops. The Bay Ponds would be breached and become vegetated as a tidal marsh.

In the short term, these actions could be beneficial; however, in the long term they are expected to reduce the amount of habitat available for nesting, foraging and roosting shorebirds. These actions are not expected to result in a decline in populations of pond-associated waterbirds by 10 percent or greater relative to the baseline and would therefore have a less-than-significant impact.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-7: Potential reduction in the numbers of non-breeding, salt-pond-associated birds (e.g., phalaropes, eared grebes, and Bonaparte's gulls) as a result of habitat loss.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. The project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed in this Draft EIS/R.

Several species of waterbirds that may not otherwise occur in high numbers in the South Bay use the former salt ponds in considerable numbers. These salt pond specialists, which include the eared grebe, Wilson's phalarope, red-necked phalarope, and Bonaparte's gull, are closely associated, at least on the scale of San Francisco Bay, with high-salinity ponds. High-salinity ponds generally support high invertebrate biomass, but low species diversity. Eared grebes, phalaropes, and Bonaparte's gulls use primarily moderate- to high-salinity ponds, where they forage on brine shrimp and brine flies (Harvey et al. 1992). Most individuals of all four of these species breed primarily outside of the SBSP Restoration Project area and occur in the project area only during winter or during spring and fall migration (2007 Final EIS/R).

Eared grebes prefer ponds that are deep enough for them to forage in the underwater column. Phalaropes and Bonaparte's gulls are dabblers preferring shallow ponds. These migratory birds are present during spring, fall and winter months and forage on the available prey in high-salinity ponds. The restoration of high-salinity ponds into lower-salinity managed ponds and tidal marsh would affect these salt-pond-associated birds. Based on long-term monitoring of eared grebes, SPSP project ponds have seen decreased population numbers from 2002 to 2006 under the Initial Stewardship Plan, but since 2011 (during Phase 1) have been increasing (De La Cruz et al., in press).

Within southern Eden Landing, high-salinity ponds are limited to the Inland Ponds (E6C, E6, and E5) and some of the Southern Ponds (E1C, E4C, and E5C). The Inland and Southern Ponds may be inundated year-round or may be managed as "batch" ponds. Water levels at the Inland Ponds are supplemented in the winter by rains, and in the summer through circulation of water from Bay Ponds E4 and E7 or E2C in the case of the Southern Ponds. The salinity is variable depending on rainfall (i.e., higher salinity in the summer when ponds are shallower) with limited exchange with Bay water. In the summer, these ponds may reach the high-salinity levels that typically produce abundant invertebrate prey. The Inland Ponds are generally recirculated in the winter, and are drawn down in the summer depending on management objectives. They currently provide dry salt flats or high salinity ponds. All of the ponds provide potential nesting and roosting on levees and/or islands, but most of the salt pond-associated species do not nest in the area.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The southern Eden Landing Ponds would continue to function as unenhanced managed ponds similar to the Initial Stewardship Plan and Phase 1 enhancements provided at northern Eden Landing would continue to provide a range of effective habitats. Under the No Action Alternative, there would not be an impact on salt-pond-associated, high-salinity specialist birds.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Under Alternative Eden B, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, and the Bay Ponds, Inland Ponds, and Southern Ponds would be breached to support the development of tidal marshes. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Habitat for non-breeding salt-pond-associated waterbirds would decrease, as tidal marshes are established and restored. Currently, there is only moderate use of the southern Eden Landing ponds by phalaropes and somewhat higher use by eared grebes.

The conversion of the Inland Ponds to tidal marsh would reduce the amount of habitat for high-salinity dependent species, particularly in the fall when these species use the area for migration. These species are typically not found in the South Bay during the summer months, as they typically breed outside the area. Foraging habitat, in the form of moderate- and low-salinity ponds at southern Eden Landing would be lost because the area of ponds, overall salinity, and the water depth would gradually decrease over time with the formation of the tidal marsh. There would be reduction in available forage habitat of these species. However, few of these birds use southern Eden Landing. More significant use of ongoing salt production ponds occurs in the areas south of Eden Landing. Overall, these habitat changes are small and not expected to reduce populations of non-breeding, salt-pond-associated birds by 50 percent. As such, the impacts of Alternative Eden B would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C would involve raising pond bottom elevations and breaching and lowering levees in the Bay Ponds, as described in Alternative Eden B, to increase the transition to tidal marsh habitat in the Bay Ponds, but installation of water control structures in the Inland and Southern Ponds to enhance management. Under Alternative Eden C, the Inland Ponds and Southern Ponds would remain managed ponds, with greater ability for CDFW to manage water quality, including salinity, water depth and circulation. Islands and habitat transition zones would be constructed as in Alternative Eden B, but the habitat transition zone would be located along the mid-complex levee. Also, under Alternative

Eden C, the mid-complex levee would be raised to provide hydraulic and habitat separation as well as flood risk management

Currently, there is moderate use of the southern Eden Landing Ponds by phalaropes and somewhat higher use by eared grebes. There would be some reduction in foraging habitat of these species with the conversion to tidal marsh, although this reduction would be less than under Alternative Eden B because of the retention and improvement of management control of the Inland Ponds and Southern Ponds. At the Inland Ponds, enhanced management may improve conditions for salt pond dependent bird species, through increased ability to manage for salinity. However, high salinity foraging habitat is only present in the fall months in the Inland Ponds, and available for these birds generally after breeding, which occurs outside of the Project area. Overall the habitat changes would be small, and populations are unlikely to decline by 50 percent below baseline levels as a result of this action. For these reasons, the impacts of Alternative Eden C would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and Inland Ponds and Southern Ponds would initially become enhanced managed ponds, as described for Alternative Eden C. Later these ponds would also be opened to become tidal marsh. In the short term Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh).

In the long term, the Inland Ponds that provide moderate salinity foraging habitat in the non-breeding season that would be lost with the conversion of southern Eden Landing ponds to tidal marsh. The Inland Ponds currently only provide high-salinity foraging habitat in the fall months and available for these birds generally after breeding, which occurs outside of the Project area. Moderate salinity may support salt pond associated birds in the non-breeding season. In the short term, the Inland Ponds would continue to be managed as salt ponds, with increased ability for CDFW to manage water quality, levels of inundation, and circulation as discussed under Alternative C, which may benefit non-breeding salt pond dependent birds. Due to the abundance of higher-salinity ponds in other areas of the South Bay, it is expected that the small reduction in salt pond habitat resulting from Alternative Eden D would not reduce populations by 50 percent below baseline levels and therefore would have a less-than-significant impact for salt-pond-associated, high-salinity specialist birds.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-8: Potential reduction in foraging habitat for diving ducks, resulting in a substantial decline in flyway-level populations.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed. Diving ducks, such as lesser and greater scaup, bufflehead, canvasbacks, and other species, occur in the South Bay primarily during the nonbreeding season (note that ruddy ducks are addressed specifically in Impact 3.5-9). These species forage in relatively shallow aquatic habitats in the South Bay, including shallow subtidal habitats, intertidal habitats (when flooded at high tide), and low-salinity managed ponds. These species have been shown to be negatively affected by decreases in water depth,

low dissolved oxygen, and increased salinity. Based on long-term monitoring data, diving duck counts have doubled in fall and winter census of the SBSP Restoration Project ponds since 2002, and spring population number have remained constant (De La Cruz et al., in press). Some species, such as lesser and greater scaup have declined significantly.

The SBSP Restoration Project could potentially affect the numbers of diving ducks in the South Bay in several ways. By converting managed ponds that currently provide foraging habitat for diving ducks to tidal habitats or enhanced managed ponds with a different hydrological regime (e.g., shallowly flooded intertidal mudflats), the project would result in an overall loss of managed pond habitat. This conversion would be expected to adversely affect habitat for bufflehead, which occur in the South Bay primarily in managed ponds and make relatively little use of tidal waters. However, subtidal habitat in sloughs and larger channels within restored ponds would provide foraging habitat for species such as canvasbacks and scaup, potentially offsetting the effects of the loss of managed pond habitat (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (No Action Alternative), no new action would be taken. The Bay Ponds currently function as year-round ponds with moderately deep water (1 to 3 feet) suitable for diving duck foraging and roosting habitat during the non-breeding season (winter). The Inland Ponds and Southern Ponds are seasonal "batch" ponds that are shallower, with higher salinity (from being drawn down), and allow more dry areas during the summer and fall, which provides little habitat for diving ducks. All of these ponds would be maintained in their current condition and would continue to provide the same habitat functions. In addition, northern Eden Landing would continue to provide the range of effective habitats that were provided and enhanced in Phase 1. There would be no impacts to diving duck foraging habitat.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would use an offloading facility, booster pumps, and pipelines to import dredge materials and raise bottom elevations in the Bay and Inland Ponds and restore all of southern Eden Landing Ponds to tidal marsh. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) This conversion would result in a long-term loss of the existing pond habitat, which currently provides shallow and moderately deep water foraging and roosting habitat for diving ducks. The sheltered, still-water habitat the ponds now provide to diving ducks in winter would be changed to tidal flows. Foraging habitat would remain at high tide in the short term while sediment accretes in the Southern Ponds. Some foraging habitat would permanently remain in the open water areas of OAC and ACFCC and slough channels created within the existing ponds. Foraging habitat in open waters of the Bay could be temporarily affected by the construction and operation of the dredge material placement infrastructure. Disturbance to diving duck foraging would also occur from new recreational facilities along and through the Inland and Southern Ponds. Although some open water foraging habitat would be lost, substantial amounts of foraging habitat would still be available in other open waters of the Bay and in other managed ponds.

Abundant foraging habitat for diving ducks is available in other ponds nearby, such as a few of the salt ponds still in production, as well as in the Alviso pond complex or Ravenswood pond complex located in the South Bay. Diving ducks would redistribute to nearby habitats as the southern Eden Landing ponds are converted to tidal marsh.

The implementation of ongoing monitoring and management actions would continue under the AMP and would record bird counts to verify that these changes do not result in substantial declines in flyway-level

populations, such as a reduction in the counts of diving ducks 20 percent below baseline levels. The results of the monitoring actions would inform adaptive management actions and the design of future phases of restoration. Examples of management changes that may be implemented in response to reductions in bird use of the ponds include changing management of other ponds in northern ELER or in other pond complexes in the SBSP Restoration Project area to provide additional deep water habitat suitable for diving ducks in the winter.

Due to the current population trends of diving ducks in the South Bay (doubling in fall and winter since 2002), availability of additional foraging habitat nearby, implementation of monitoring and adaptive management actions, these changes are not expected to result in substantial declines in flyway-level populations or reduce the population of diving ducks 20 percent below baseline levels. The impacts of Alternative Eden B on diving ducks would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Under Alternative Eden C, pond bottom elevations would be raised through the import of dredge materials and the Bay Ponds would be restored to tidal marsh, as in Alternative Eden B, but the Inland Ponds and Southern Ponds would become enhanced managed ponds with the addition of water control structures. Under Alternative Eden C, the Inland Ponds and Southern Ponds would remain managed ponds, with greater ability for CDFW to manage water quality, including salinity, water depth and circulation. Islands and habitat transition zones would be constructed as in Alternative Eden B, but the habitat transition zone would be located along the mid-complex levee. Also, under Alternative Eden C, the mid-complex levee would be raised to maintain adequate flood risk management. Similar recreation infrastructure noted for Alternative Eden B would also apply to Alternative Eden C. In addition, Alternative Eden C, also includes two additional trails may result in additional disturbance on diving ducks.

The habitat changes in the Bay Ponds would generally be similar to those discussed above for Alternative Eden B. However, the increased ability to manage water quality, quantity and circulation in the Inland and Southern Ponds would not result in substantial deviation from existing conditions and may enhance shallow foraging habitat for diving ducks during the non-breading season. Water levels in the Inland and Southern Ponds are generally higher in the winter, but currently do not provide as much moderate or deep water foraging habitat, as ponds the Bay Ponds. Substantial amounts of moderate and deep open water habitat for diving ducks is maintained elsewhere in northern ELER and farther in the South Bay, as noted above.

Implementation of ongoing monitoring and management actions would continue using the AMP. Additional foraging habitat is available in other ponds nearby, such as ponds in northern Eden Landing, in salt ponds still used for production, as well as farther in the South Bay in the Alviso Complex. Implementation of monitoring and adaptive management actions would continue to verify these changes do not result in substantial declines.

Due to the availability of additional foraging habitat nearby and the implementation of monitoring and adaptive management actions, these changes are not expected to produce substantial declines in flyway-level populations or reduce the population of diving ducks 20 percent below baseline levels. The impact of Alternative Eden C on diving ducks would thus be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Alternative Eden D offers similar components and resultant impacts on shallow diving duck habitat in the short term as described in Alternative Eden C. In the long term the alternative activities would be similar to those as described in Alternative Eden B. Bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials and the Bay Ponds would transition to tidal marsh habitat, and the Inland and Southern Ponds would initially become enhanced managed ponds and, depending on ongoing monitoring, may later become tidal marsh.

None of the Action Alternatives would provide deep water habitat for foraging diving ducks. Alternative Eden D would continue to provide shallow foraging habitat for diving ducks in enhanced managed ponds of Inland and Southern Ponds in the short term similar to Alternative Eden C. In the long term, Alternative Eden D would reduce shallow water foraging opportunities as the Inland and Southern Ponds become tidal marsh. Diving ducks may be able to forage in the OAC, ACFCC, and internal tidal channels, if the sloughs are sufficiently deep. Additional foraging habitat is available in other ponds nearby, such as ponds in northern Eden Landing, in salt ponds still used for production, as well as farther in the South Bay in the Alviso Complex. Implementation of monitoring and adaptive management actions would continue to verify these changes do not result in substantial declines.

The combined effect of these actions would be net loss of moderately shallow to deep water foraging habitat for diving ducks in southern Eden Landing. The continued restoration of some or all of the Inland and Southern Ponds would proceed only if ongoing monitoring (such as bird counts using managed ponds) indicates that diving ducks use has increased, such that the total counts in the ELER and/or other complexes such as Alviso or Ravenswood within the SBSP Restoration Project are similar to previous counts. These changes are not expected to produce substantial declines in flyway-level populations or reduce the population of diving ducks 20 percent below baseline levels. Impacts associated Alternative Eden D would thus be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-9: Potential reduction in foraging habitat for ruddy ducks, resulting in a substantial decline in flyway-level populations.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Although small numbers of ruddy ducks breed in the South Bay, this species occurs in the project area primarily during their winter migration. In contrast with most of the diving ducks addressed in Impact 3.5-8, ruddy ducks are ducks that, in the South Bay, forage primarily in ponds, with relatively few individuals using tidal habitats or open water in the South Bay. Ruddy ducks account for about 65 percent of the diving ducks in 46 South Bay ponds; diving ducks generally are associated with low- to medium-salinity ponds (Brand et al. 2014, De La Cruz et al., in press). Other studies (Takekawa et al. 2001) have reported that the salt ponds in the South Bay supported up to 27 percent of the Bay's total waterfowl population, including 67 percent of the ruddy ducks. Ongoing and recent monitoring of diving ducks, including ruddy ducks, suggest that the mid-winter populations have increased significantly in the South Bay (De La Cruz et al., in press), and are maintaining pre-Initial Stewardship Plan baseline numbers. While the target has not been met, the overall trend is increasing toward success.These findings reinforce the information presented in the 2007 Final EIS/R, which stated that the majority of the ruddy ducks in

the entire San Francisco Bay Area were in the ponds in the South Bay, with only 2 percent in open water tidal habitats in the South Bay.

Results of the 2012 midwinter waterfowl survey indicate that an even higher proportion of waterbirds, including coots, are supported by the ponds in the South Bay than is reported by Takekawa et al (2001). Over 40 percent of the waterfowl observed were seen in the ponds in the South Bay, a total of 153,196 birds. Ruddy duck numbers were reported as 38,818, representing 10 percent of all waterbirds in the San Francisco Bay estuary and 36 percent of the Lower Pacific Flyway population. Of the total ruddy ducks counted, 77 percent (29,892) were observed in the South Bay Ponds (Richmond et al. 2014). As such, substantial effects on the populations in the South Bay are likely to have a significant impact on the status of the flyway as a whole. The abundance of this species in the South Bay relative to the total flyway population increases the importance of potential effects from project activities.

Because ruddy ducks in the South Bay make little use of tidal waters, the SBSP Restoration Project could result in declines in ruddy duck numbers within the South Bay due to conversion of managed ponds to tidal habitats. Changes to existing pond habitat may affect ruddy duck populations by reducing available foraging habitat during a period of increased energetic stress following reproduction and molt (Tome 1984). Reductions in available forage may also increase density-dependent effects on fitness and increase the daily energy expenditure required to meet metabolic demand (Brand et al. 2014). As suitable pond habitat gradually decreases, some additional energy expenditure would be required for ruddy ducks to move to additional areas. Disease, prey availability, and competitive interactions may increase as a result of reduced wintering habitat. However, there are high levels of primary productivity in the SBSP Restoration Project area, and food sources may not be the limiting factor on ruddy duck populations.

Some ruddy ducks displaced from ponds in the South Bay that are restored to tidal habitats would likely simply shift to other areas, including other managed ponds in the area of the SBSP Restoration Project, salt ponds, or ponds and lakes elsewhere in the South Bay. This phenomenon was documented in bird counts of ruddy ducks in other ponds in northern Eden Landing following the tidal restoration of Pond E9. While use of Pond E9 substantially decreased, other ponds in northern Eden Landing, such as Pond E6A and E6B showed increased use by ruddy ducks. Pond E9 was breached in September or 2009, converting what had been deep-water pond habitat to tidal lagoons and mudflats. Winter bird counts in that area before and after the levee breach indicate that a spatial redistribution of the ruddy duck population occurred but that a large overall decline did not. Ruddy duck numbers in Pond E9 declined over 95 percent between 2011 and 2014. However, the adjacent ponds, E2, E4, E6A E6E, E7, E8, E8X, and E10 all saw large increases in ruddy duck numbers. In total, ruddy duck numbers decreased approximately 16 percent after the breach of Pond E9. This may be a reflection of other construction actions undertaken at ELER to increase long-term suitable habitat in Ponds E6A and E6B.

This decrease in ruddy duck counts is not necessarily evidence of a negative trend in ruddy duck populations in the San Francisco Bay or the Pacific Flyway. Trend analysis of midwinter waterfowl survey results between 1981 and 2012 suggests that ruddy duck numbers in the San Francisco Estuary have been stable over that period even while demonstrating large interannual variability. The scale of the displacement caused by the loss of suitable habitat in Pond E9 is significantly less than the annual variation around the San Francisco Bay. These populations, numbering 38,818 in 2012, shift by many thousands of individuals counted on an annual basis compared to a change of approximately 100 fewer individuals counted within the Eden Landing pond complex (Richmond et al. 2014). However, given the importance of San Francisco Bay to Pacific Flyway numbers of ruddy ducks and the relatively high

percentage of Bay Area ruddy ducks that occur in ponds in the South Bay, a decline in the extent of ponds in the South Bay may result in flyway-level declines in ruddy duck numbers (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Large portions of the southern Eden Landing ponds currently function as year-round ponds with suitable ruddy duck foraging habitat. These ponds and the northern Eden Landing Ponds would be maintained in their current condition and would continue to provide the same habitat functions. There would be no impacts to ruddy duck foraging habitat.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise bottom elevations in the Bay and Inland Ponds and restore the southern Eden Landing Ponds to tidal marsh by restoring tidal flows through the outer levees. Habitat islands and habitat transitions zones would be constructed, and a new trail infrastructure would be constructed along and within the Inland and Southern Ponds. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

The conversion to tidal marsh would result in a loss of existing pond habitat that currently provides foraging and roosting ruddy duck habitat. Permitted hunting in adjacent ponds in the Eden Landing ponds may make the availability of these ponds to ruddy ducks more important. Construction of the recreational trails could increase the visual disturbance to ruddy ducks, although much of the Inland Ponds would be at a distance from the trail and also buffered by a habitat transition zone (see Impact 3.5-18 for full discussion of recreation and public access impacts). After restoration, some marginal tidal foraging habitat would remain in the open water areas of OAC, ACFCC, and the created internal pilot tidal channels. Foraging habitat for ruddy ducks would be available in nearby managed ponds in northern Eden Landing and elsewhere in the South Bay. The project would not impact breeding habitat.

The ruddy duck is a stable species in the South Bay (Richmond et al. 2014). The threshold for a significant impact to ruddy ducks is a 15 percent decline in population. Given the wide availability of other ponds in the South Bay and northern Eden Landing, and the potential for spatial redistribution of the ruddy duck population to other suitable ponds, the conversion of these ponds to marsh would not be expected to cause a 15 percent population decline. With the availability of foraging habitat nearby and the implementation of ongoing monitoring and adaptive management actions to support adequate deep water habitat used by ruddy ducks, Alternative Eden B would have a less-than-significant impact on the ruddy duck population.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Under Alternative Eden C, pond bottom elevations would be raised through the import of dredge materials and the Bay Ponds would be restored to tidal marsh, and the Inland and Southern Ponds would become enhanced managed ponds. A mid-complex levee would be improved to support a habitat transition zone on the Bay Ponds and to provide appropriate levee conditions for moderately deep conditions in the managed Inland Ponds and to maintain adequate flood risk management. Habitat islands would also be created. The same trail infrastructure noted for Alternative Eden B would also be established for Alternative Eden C, but it would also include two additional trails to cross the OAC and ACFCC and connect with other regional trails.

Alternative Eden C would result in some similar habitat losses and temporary construction disturbances as those described for Alternative Eden B because open water foraging habitat would be lost in the Bay Ponds as tidal marsh is created. However, Alternative Eden C would not result in substantial changes in the existing open water habitat at the Inland Ponds or the Southern Ponds. Instead, the ability to manage water quality, quantity, and circulation would be enhanced and foraging habitat for ruddy duck is expected to be maintained to provide moderately deep open water similar to or improved relative to the existing conditions. Overall, the amount of ruddy duck foraging habitat lost would be reduced in comparison with the Alternative Eden B but still greater than the amount lost compared to the No Action Alternative due to conversion of the Bay Ponds. The OAC, ACFCC, and internal pilot tidal channels may provide marginal foraging habitat for ruddy ducks. Foraging habitat for ruddy ducks is also available in nearby managed ponds, including those associated with northern Eden Landing, and salt production ponds.

These changes are not expected to produce substantial declines in flyway-level populations or reduce the population of ruddy ducks 15 percent below baseline levels. With the availability of foraging habitat nearby and no impacts to breeding or nesting habitat (since ruddy ducks do not nest in San Francisco Bay), Alternative Eden C is expected to have a less-than-significant impact on the ruddy duck population.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Alternative Eden D results in impacts to ruddy duck habitat similar to those described under Alternative Eden B and Alternative Eden C. Alternative Eden D would raise bottom elevations in the Bay and Inland Ponds and restore tidal marsh to the Bay Ponds. Alternative Eden D, in the short term would create enhanced managed ponds within the Inland and Southern Ponds similar to those described in Alternative Eden C, but with higher bottom elevations in the Inland Ponds. The difference is that under Alternative Eden D, and with input from AMP and ongoing monitoring, the Inland and Southern Ponds may ultimately be converted to tidal marsh. The ongoing monitoring ensures ruddy duck use continues to maintain similar counts in Eden Landing and/or in other locations around the South Bay, such as the salt production ponds and managed ponds in the Alviso and Ravenswood complexes. Water quality and water depth would remain similar to the existing conditions at the Inland and Southern Ponds in the short and medium term, and foraging habitat for non-breeding ruddy ducks would remain for a decade or more. If and when tidal flows are restored to the Inland and Southern Ponds, foraging habitat would be gradually reduced and then lost as sediments accrete and tidal marsh vegetation becomes established as is expected with the Bay Ponds.

Although Alternative Eden D would not provide as much long-term foraging habitat for ruddy ducks in the Inland or Southern Ponds as Alternative Eden C would, Alternative Eden D would provide more than Alternative Eden B, at least in the short- to medium- term. Alternative Eden D allows for transition to tidal marsh if ongoing monitoring shows that the use by ruddy ducks in other ponds in Eden Landing or other South Bay locations increases or could successfully be accommodated by those changes. The Inland and Southern Ponds would continue to function as managed ponds for many years to a decade or more, providing valuable foraging habitat as tidal marshes are created in the Bay Ponds, potentially reducing the net impact on ruddy ducks. Also, ruddy ducks may be able to forage in other adjacent managed ponds, including the northern Eden Landing. The combined effect of these actions would be a gradual net decrease in the area of foraging habitat for ruddy ducks in this portion of southern Eden Landing. Because southern Eden Landing is 13 percent of the entire SBSP Restoration Project area, changes to foraging habitat are not expected to cause a significant reduction in ruddy duck populations. Given the documented dispersal to other suitable habitats, and large areas of remaining salt ponds available to ruddy ducks for

foraging habitat, Alternative Eden D would not be expected to cause substantial declines in flyway-level populations or cause a 15 percent reduction in population and would therefore be a less-than-significant impact.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-10: Potential habitat conversion impacts on California least terns.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

California least terns are classified as both a federal and a state endangered species. No critical habitat has been proposed or designated for California least terns; therefore, none would be adversely modified by the project. California least terns have bred in the vicinity of the SBSP Restoration Project area in the past, but they now occur in the South Bay primarily as post-breeding dispersants. Most California least terns nest in the San Francisco Bay Area at the Alameda National Wildlife Refuge (NWR) and may forage during the breeding season (e.g., to feed chicks) within the Eden Landing Phase 2 project area. California least terns have occasionally attempted to nest in the Eden Landing Phase 2 project area, but have been unsuccessful due to predation (Marschalek 2012). The closest known nesting colony occurs at Hayward Regional Shoreline Park, approximately 5 miles from southern Eden Landing. In a study of the Alameda NWR colony, foraging occurred in marine and estuarine habitats within 3.5 miles of the colony site (Ackerman et al. 2015). However, foraging by post-breeding dispersants is observed annually within Ponds E1 and E2 at the Bay Ponds and in the adjacent San Francisco Bay. Roosting occurs on the bayward levees of the Bay Ponds and likely also on some of the other internal and external levees around them. This species currently uses the South Bay primarily as a post-breeding staging area in late summer. Former salt ponds are used for both foraging (in lower-salinity ponds supporting fish) and roosting (on levees, islands, and artificial structures such as boardwalks). Although large foraging concentrations are noted in ponds, this species frequently forages on the Bay and in channels as well (2007 Final EIS/R).

Foraging habitat for California least terns in deep managed ponds is expected to decline under alternatives where those deep managed ponds are converted to tidal or seasonal habitats. However, tidal restoration is expected to benefit prey fish populations for the California least tern, and miles of sloughs and channels that would provide foraging habitat for this species are proposed to be restored by the project. California least terns “displaced” from current South Bay foraging locations would likely find alternative foraging areas, either within the project area, the larger South Bay, or elsewhere in the Bay Area. The degree to which a reduction in foraging habitat in ponds would be offset by increases in habitat and prey abundance in the Bay and in restored sloughs and whether the SBSP Restoration Project would have considerable impacts on the species at all are unknown (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Levees would be maintained, as needed, the Bay Ponds would continue to function as moderately deep managed ponds, and the Inland and Southern Ponds would continue to be shallow to moderately deep managed ponds that may be seasonally “batched” and/or drawn down and allowed to dry. The currently moderately deep water in Ponds E1 and E2 would continue to provide foraging habitat. The levees within and around the Bay Ponds at southern Eden Landing Ponds would continue to provide roosting habitat. Northern Eden Landing would continue to provide the range of effective habitats that

were provided and enhanced in Phase 1. The No Action Alternative would have no impact on the California least tern.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. In Alternative Eden B, an offloading facility and pipelines would be used to import of dredge materials and raise bottom elevations in the Bay and Inland Ponds, and the Bay Ponds, Inland Ponds and Southern Ponds (including the known foraging Ponds E1 and E2) would be restored to tidal marsh. Levee lowering and other modifications would occur along the perimeter levees of the Bay Ponds that are available roosting areas, and habitat islands would be created in the Bay Ponds. Pilot channels would be excavated within the Bay Ponds. Constructed islands and habitat transition zones would be included in the restoration on the landward levee of the Inland Ponds and Southern Ponds. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

Currently, California least terns forage in Ponds E1 and E2 and roost on the adjacent levees. During construction, a small portion of the adjacent forging habitat in the Bay would be affected by the construction and operation of the dredge material placement infrastructure. After breaching, terns would most likely continue to use adjacent open water for foraging.

There could be temporary disturbance to California least tern roosting habitat during levee modifications, but the construction of habitat islands would result in a small net change in the amount of roosting habitat while increasing the quality of that habitat. These modifications would also reduce the amount of available roosting habitat. Although deep-water foraging within Ponds E1 and E2 would be lost, tidal marsh habitat would support nursery habitat for estuarine fish that could improve deep-water foraging in the pilot tidal channels within the ponds and the adjacent OAC, ACFCC and San Francisco Bay. Impacts to the California least tern associated with the loss of foraging habitat in Ponds E1 and E2 would be partially offset through improved foraging in internal tidal channels and adjacent open water areas and the creation of roosting islands in the ponds. The activities that occur on the Inland and Southern Ponds are not expected to impact or convert suitable habitat for the California least tern because these ponds are relatively shallow and higher salinity that do not support fish populations and as such are not as suitable for California least terns. Therefore, Alternative Eden B, while likely to have some effect on foraging and roosting habitat for this species, would not be expected to contribute to a population decline, since successful breeding occurs only in other areas. Due to the adjacent habitat improvements and the availability of adjacent open bay foraging habitat, impacts to the California least tern would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Under Alternative Eden C, an offloading facility and pipelines would be used to import dredge materials and raise pond bottom elevations and the Bay Ponds would be breached to create tidal marsh, pilot tidal channels would be excavated, and portions of the perimeter levees around Ponds E1 and E2 would be lowered. In addition, the internal levees of the Bay Ponds would be breached, and habitat islands would be created. The bayward levee of Pond E2 would be improved to provide habitat for a variety of species including the California least tern.

In the Bay Ponds, Alternative Eden C would provide similar California least tern habitat features as described in Alternative Eden B. In addition, the habitat improvements to the western levee of Pond E2

would benefit roosting California least terns in close proximity to existing foraging habitat in the San Francisco Bay and in close proximity to the OAC and ACFCC. The Southern Ponds and Inland Ponds would be enhanced managed ponds, which could also provide some forage habitat for California least terns, because at least some enhanced managed ponds would provide lower salinity, and deeper water habitats. Many of the impacts described under Alternative Eden B would also occur under Alternative Eden C, including those due to construction.

Overall, while there would be some potential long-term California least tern habitat loss, due to the benefits provided by improved fisheries, creation of nesting islands, and presence of nearby deep-water habitat that would provide improved foraging, impacts to California least tern would be less than significant under Alternative Eden C.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, project activities in Bay Ponds E1 and E2 would be similar to the actions described for Action Alternatives Eden B and Eden C. However, under Alternative Eden D, the entire bayward levee of Pond E1 and E2 would be improved to provide habitat for wide range of species, including California least terns, and a habitat transition zone would be constructed internal to the bayward levee. These would enhance roosting habitat for this species. Activities associated with the Inland and Southern Ponds would not be expected to impact suitable habitats for the California least tern, since under current conditions, little use of the Inland Ponds and Southern Ponds occurs. The project's benefits to fisheries and thus to improved foraging conditions outside of southern Eden Landing would be similar to those described for Alternative Eden B.

Alternative Eden D results in similar habitat area losses and habitat enhancements and benefits as described for Alternative Eden B and Alternative Eden C, with increased benefit of roosting habitat along a greater distance immediately adjacent to known foraging habitats in the San Francisco Bay. There would likely be some effect on this species, particularly during construction, but as described under Alternatives Eden B and Eden C, benefits would be provided by improved fisheries, creation of nesting islands, and presence of nearby deep-water habitat that would provide improved foraging. Impacts to California least terns would be less than significant under Alternative Eden D.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-11: Potential loss of pickleweed-dominated tidal salt marsh habitat for the salt marsh harvest mouse and salt marsh wandering shrew and further isolation of these species' populations due to breaching activities and scour.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Tidal restoration actions would require direct alteration of habitats (e.g., levee breaching, levee lowering, and installation of water-control structures) that would affect levees and small amounts of tidal marsh, generally on the outboard side of the ponds. Tidal marsh restoration would however, restore larger tidal prisms within existing channels, which would be expected to result in an increased level of local erosion of existing tidal marshes and local scour of the existing channels. However, in the long term, there would

be an overwhelmingly positive benefit to tidal marsh-associated species from tidal restoration, as thousands of acres of new marsh would be restored, albeit over an extended period. There is very little remaining undiked pickleweed-dominated tidal salt marsh in the area of the SBSP Restoration Project, and the existing narrow corridors of habitat between larger blocks of habitat are necessary for dispersal of mice and shrews among core habitat areas. Therefore, even the limited habitat present in these corridors has high value as dispersal habitat (2007 Final EIS/R). Based on recent monitoring, Phase 1 and other Phase 2 projects have demonstrated an upward trend in pickleweed dependent species (e.g., salt marsh harvest mouse), however, some uncertainty remains as the rate of increase in population deviates from the projected goal.

Because tidal restoration efforts are being phased, new pickleweed-dominated habitat is expected to form within 10-20 years from early phases of restoration before later breaching actions and associated scour occur elsewhere in the South Bay. In the long term, tidal restoration is expected to result in substantial increases in habitat connectivity through marsh development and evolution. The 2007 Final EIS/R concluded that these sorts of project benefits would occur before short-term reductions in dispersal capability have substantial effects on populations in core habitat areas (2007 Final EIS/R). The early results of Phase 1 and Initial Stewardship Plan activities support this general assertion.

For pickleweed marsh-associated species such as the salt marsh harvest mouse and salt marsh wandering shrew, the SBSP Restoration Project is expected to result in considerable increases in tidal marsh habitat in the long term, thereby augmenting populations far beyond the minor, local impacts that would occur during some construction activities. Monitoring of salt marsh harvest mouse habitat and determination of presence would occur as part of the AMP to monitor the success of the SBSP Restoration Project with respect to these species (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The southern Eden Landing Ponds would continue to function as managed ponds and a range of effective habitats provided and enhanced in Phase 1 would continue to be provided at northern Eden Landing. The tidal marshes located on the bayward side of the outboard levees (west of Pond E1 and E2), and marshes associated with OAC and ACFCC, and landward of the complex would remain.

Under the No Action Alternative, the southern Eden Landing Ponds would be maintained in their current condition; therefore, this alternative would have no impact on pickleweed-dominated tidal salt marsh habitat or dependent species.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Under Alternative Eden B, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, levees would be breached in the Bay and Inland Ponds, and all southern Eden Landing ponds would transition from pond to tidal marsh habitat. Existing levees would be lowered and/or breached, or improved as habitat islands and habitat transition zones would also be created. In addition, a connection from the USD treated wastewater pipeline and the ACWD ARP wells would be provided to the Inland Ponds through the landward levee to deliver treated wastewater or brackish groundwater to the habitat transition zones and the adjacent marshes. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

The breaches and water control structures located around the edge of the ponds, including the connection to USD and the ARP wells, may result in the loss of a small amount of existing pickleweed-dominated and other marsh habitat. The levee lowering adjacent to Cargill Marsh is not expected to negatively impact pickleweed habitat, but may instead enhance ability for pickleweed to establish in the newly created tidal marsh habitat. Pickleweed habitat located alongside of the OAC and ACFCC, and adjacent to the landward levee, may be impacted by increased tidal flows or during construction. These impacts may include erosion and scour, and loss of small amount of pickleweed habitat. Narrow corridors of pickleweed habitat would be lost when levees are breached and channels are excavated through existing marsh to connect to the channels outside the ponds. The habitat losses at breaching points would be a short-term impact to pickleweed habitat. In the long-term, the breaches are expected to result in the restoration of large extents of diverse tidal marsh habitat.

The combined area of all of these known and potential effects would be in the low tens of acres of existing marsh. But the expected outcome of Alternative Eden B is the establishment of over 2,000 acres of newly restored tidal marsh habitat. This diverse tidal marsh habitat would be dominated by pickleweed in the main marsh plain, with corridors of low marsh dominated by Pacific cordgrass and high tide refugia in higher marsh, dominated by marsh gumplant, which would provide increased breeding and foraging habitat and dispersal corridors for the salt marsh harvest mouse and the salt marsh wandering shrew. These habitats would be interspersed with habitat islands and habitat transition zones that will provide substantial amounts of high-tide refugia for these species.

Overall, Alternative Eden B would increase the total area, and provide a wide range of elevations for pickleweed-dominated tidal marsh habitat in the long term. Any losses would be temporary and would be more than offset by the restoration of tidal marsh habitat in the Bay, Inland and Southern Ponds. The impact to the salt marsh harvest mouse and salt marsh wandering shrew would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden B Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden C. Under Alternative Eden C, pond bottom elevations would be raised through the import of dredge materials and the Bay Ponds would be converted to tidal marsh (as in Alternative Eden B), and the Inland and Southern Ponds would be enhanced managed ponds. The Inland Ponds and Southern Ponds would be enhanced through the improvement, partial removal or lowering of existing levees and installation of additional water control structures. The mid-complex levee would be improved and habitat transition zone would be constructed bayward of it.

Alternative Eden C includes restoration of tidal marsh habitat in the Bay Ponds and proposes the same number (in similar location) of breaches along the outer levee as proposed under Alternative Eden B. However, under Alterative Eden C, pipelines and discharge structures would not connect the Inland Ponds to the USD treated wastewater pipeline or to the ARP wells (Alternative B includes these connections), and no impacts to the pickleweed marsh would occur at this location. Internal pond to pond water control structures and breaches may impact existing narrow and isolated pickleweed habitat present along the pond margins. Similar to Alternative Eden B, the peripheral levee breaches and channels would remove a small amount (several acres) of pickleweed habitat. Restoration of tidal marsh habitat in the Bay Ponds would result in more pickleweed-dominated marsh habitat than offered in the No Action Alternative (Alternative Eden A), but significantly less than in Alternative Eden B. Like Alternative Eden B, the proximity of the Bay Ponds to existing salt marsh harvest mouse and salt marsh wandering shrew occupied habitat (in Whale's Tail and Cargill Marsh, OAC and ACFCC) would provide additional habitat

and dispersal for these special-status species. Habitat in the Inland Ponds and Southern Ponds would not be expected to support pickleweed vegetation and would remain open water managed ponds unsuitable for these species.

Therefore, Alternative Eden C would bring a net increase in the total area of pickleweed-dominated tidal marsh habitat. The losses would be temporary and would be more than offset by the restoration of over 1,200 acres of tidal marsh habitat in the Bay Ponds. The impact to the salt marsh harvest mouse and salt marsh wandering shrew would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. Under Alternative Eden D, similar components of both Alternative Eden B and Eden C would be implemented. Bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be restored to tidal marsh, and, in the short term, the Inland Ponds and Southern Ponds would become enhanced managed ponds. In the long term, depending on the results of monitoring and the decision processes described in the AMP, the Inland Ponds and Southern Ponds could be left as managed ponds or converted to tidal marsh, as in Alternative Eden B.

Like Alternative Eden B and Eden C, a small amount of loss of pickleweed-dominated habitat would occur as a result of the breaches, water control structures on the OAC and ACFCC. The increase in tidal flux may also result in areas of local erosion, scour and removal of pickleweed-dominated habitat, at first associated with the connection of Bay Ponds to the OAC, and then later with the Southern and Inland Ponds along the OAC and ACFCC. These small losses would be offset by the restoration of a large amount of tidal marsh, habitat islands and habitat transition zones that are likely to support pickleweed-dominated vegetation. The proximity of the pickleweed habitat in OAC, ACFCC, Whale's Tail and Cargill Marshes to the Bay Ponds and improved habitat on the outboard levee and the habitat transition zones, may help facilitate recruitment of the pickleweed habitat and support dispersal of and habitat for special-status species including the salt marsh harvest mouse and salt marsh wandering shrew. If and when the Inland and Southern Ponds are converted to tidal marsh habitat, they too would likely support pickleweed-dominated vegetation and may provide suitable habitat for special-status species that may disperse from the surrounding areas.

Therefore, Alternative Eden C would bring a net increase in the total area of pickleweed-dominated tidal marsh habitat. The losses would be temporary and would be more than offset by the restoration of over 1,200 acres of tidal marsh habitat in the Bay Ponds in the initial stage and up to 800 more acres or more in the Inland Ponds and/or the Southern Ponds in the second stage. The impact to the salt marsh harvest mouse and salt marsh wandering shrew would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden D Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Phase 2 Impact 3.5-12: Potential disturbance to or loss of sensitive wildlife species due to ongoing monitoring, maintenance, and management activities.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Management, O&M, and monitoring are expected to occur over the life of the SBSP Restoration Project in all parts of the program-level Project area, not just those included in the Phase 2 actions. Many of these activities would be directed toward the monitoring of, or management for, particular resources of concern, and thus the net effect of these activities would be beneficial. However, these activities also have the potential to adversely affect biological resources, at least in the short term. Specifically, monitoring and management activities have the potential to cause disturbance to breeding species and even site, nest, or colony abandonment. These activities may inadvertently contribute to low population numbers (2007 Final EIS/R).

Monitoring activities would include surveys of managed ponds and restored marshes. Monitoring would entail surveys for vegetation, birds, and harbor seals conducted on foot, by car, and possibly by boat and airplane. Monitoring for nesting success at bird colonies would entail approaching or entering the colonies to count and measure. Monitoring of harvest mouse populations would entail trapping within restored marshes and marsh areas that are not part of a Project action. Vegetation mapping would be conducted using aerial photos and ground-truthing. Monitoring of fish would be conducted through counts (e.g., of salmonids) and sampling with nets or other methods (for estuarine fish). Impacts would primarily be minor and short term (e.g., flushing individual birds or seals along the survey route) (2007 Final EIS/R).

Following the breaching of levees around a pond restored to tidal action, the main management activities that may occur within restored tidal habitats are habitat and species monitoring, predator management and invasive plant management. Vector control activities—including monitoring and mosquito abatement—would also occur periodically, particularly along habitat transition zones. Management and maintenance activities associated with the SBSP Restoration Project would occur primarily in managed ponds and in recreational access areas such as trails. Examples of such activities include:

- Raising or lowering water levels within ponds via inlet and outlet structures;
- Controlling vegetation on islands, in areas designed as open water habitat and along trails using mechanical control, spraying with saltwater, spraying with approved herbicides, or other means;
- Predator management, including trapping and removal of mammals and nuisance birds;
- Periodic augmentation of sediment or other ground cover on islands; and
- Maintenance of levees, berms, trails, boat launches, viewing platforms, gates, and water-control structures.

As part of CDFW's current practices under the AMP, the SBSP Restoration Project incorporates measures to minimize impacts from monitoring, maintenance, and management, and it is anticipated that a number of measures, including pre-construction surveys and biological monitoring, to avoid and minimize such impacts to federally listed species, would be required by the BO for this project. Activities that are sufficiently loud or obtrusive enough to cause disturbance of nesting birds or pupping harbor seals (although pupping harbor seals are not known to use ELER and the closest known occurrence is more than 6 miles away),would be limited to the period September 15 through February 1, to the extent practicable, to minimize potential impacts. (Effects to harbor seals are also addressed in Impact 3.5-17.) If seasonal avoidance is not possible, habitat assessments and/or pre-construction surveys would be conducted for nesting birds and other sensitive species. If any nesting pond-associated waterbirds are detected in areas that could be disturbed by project-related construction activities, project implementation

would be delayed or redesigned to minimize potential impacts to actively nesting birds (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Southern Eden Landing would continue to function as seasonal and managed ponds under various operational regimes depending on the target water depth and water quality for each pond. The outboard, internal and landward levees would continue to be inspected and maintained as they presently are. As under current conditions, the ponds would continue to be actively managed throughout the year to provide a wide range of water and salinity levels for a variety of bird species guilds and regulatory goals for water quality. Water will continue to be circulated as needed to maintain salinity, dissolved oxygen and to manage other parameters. Monitoring, including bird surveys and nest success surveys, would continue. In addition, the monitoring, maintenance, and management at northern Eden Landing would continue as described in the 2007 Final EIS/R and various permitting documents. Impacts to sensitive wildlife species due to ongoing monitoring, maintenance, and management activities would be less than significant.

Alternative Eden A Level of Significance: Less than Significant

Alternative Eden B. Under Alternative Eden B, monitoring would include annual bird surveys, nest success, and other activities as described in the AMP. Maintenance activities would include trail upkeep, predator control, general vegetation control, invasive plant species control, and vandalism repairs. These activities would take place in the newly tidal areas instead of in the existing ponds. Fewer outboard and internal levees would be maintained (or repaired on failure) than in Alternative Eden A, but the landward eastern levee would be maintained for flood risk management and recreation purposes. The trail routes would also be maintained and regraded as needed; this is not expected to be necessary more than every few years. The tidal marsh, pilot channels, habitat transition zones and islands would be monitored to determine species trends and use. This alternative would also require occasional maintenance of the habitat transition zone that would be placed along the landward levee along the eastern side of the Inland Ponds and Southern Ponds. This would consist primarily of invasive plant control and mosquito abatement as necessary. Similar efforts could be required for the habitat islands formed from the remnant levees, but this may not

Overall, Alternative Eden B could result in a decrease in the amount of levee and water control structure operations, maintenance, and repair relative to Alternative Eden A and to current conditions.

The results of monitoring would inform adaptive management and the design of future phases of restoration. With implementation of program-level avoidance and minimization measures from the 2007 Final EIS/R, the AMP, and other CDFW management documents as well as compliance with expected permit and BO conditions, impacts to biological resources as a result of monitoring, maintenance, and management activities would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Monitoring, maintenance, and management activities for Alternatives Eden B and Eden C are expected to be similar, except monitoring and maintenance would be more extensive under Alternative Eden C (and Eden D) due to an increased number of constructed elements, including water control structures which require regular inspection and manipulation. In addition, Alternative Eden C would retain some internal levees, and construct two additional recreational trail spurs with associated bridge infrastructure. Rather than the improved levee being on the east side of the Inland Ponds, as in

Alternative Eden B, the improved levees would be on the outboard levee (for habitat) and along the mid-complex levee (for flood risk management). The latter of these would also have a habitat transition zone. These features would need similar maintenance and repair as described for Alternative Eden B.

Monitoring under Alternative Eden C would include bird surveys and other activities as described in the AMP. Activities would include trail maintenance, predator control, general vegetation control, and vandalism repairs. Levees would be maintained (or repaired on failure, as practicable) as described in the Alternative Eden A. The improved levees and water control structures would all require more monitoring and maintenance than in the baseline condition or Alternative Eden A. Alternative Eden C would also contain more public access features and trails, most notably along one or both sides of the OAC channel out to the former site of the Alvarado Salt Works (see Impact 3.5-18 for full discussion on recreation and public access impacts). These features and trails would increase trail and viewing platform maintenance activities for Alternative Eden C.

The results of the monitoring would inform adaptive management and the design and future SBSP Restoration Project actions. With implementation of program-level avoidance and minimization measures from the 2007 Final EIS/R, the AMP, and other CDFW management documents as well as compliance with expected permit and BO conditions, impacts to biological resources as a result of monitoring, maintenance, and management activities would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Monitoring, maintenance, and management activities for Alternatives Eden D are expected to be similar to Alternatives Eden B and Eden C, except monitoring and maintenance would be more extensive under Alternative Eden C and Eden D due to an increased number of constructed elements, including water control structures that require regular inspection and manipulation. In addition, Alternative Eden D would retain some internal levees (as with Alternative Eden C), but would not include the two additional recreational trail spurs or associated bridge infrastructure considered in Alternative Eden C. Similar to Alternative Eden C, Eden D would include improvements to the outboard levee (for habitat) and along the mid-complex levee (for flood risk management) and would require occasional maintenance of the habitat transition zone there, which would consist primarily of invasive plant control and mosquito abatement as necessary.

Monitoring under Alternative Eden D would include bird surveys and other activities as described in the AMP. The results of these surveys and the AMP will be used to determine if and when the Inland and Southern Ponds would be restored to tidal marsh. These additional project changes (in a decade or more), would vary the nature of maintenance activities, but are not expected to result in a significant change in the monitoring activities.

Maintenance activities would include trail upkeep, predator control, general vegetation control, and vandalism repairs. Levees would be maintained (or repaired on failure) as described in the Alternative Eden A. The improved levees and water control structures would all need more monitoring and maintenance than in the baseline condition or in Alternative Eden A. Alternative Eden D would also contain public access features and trails. These features and trails would require similar levels of trail maintenance as Alternative Eden B, and less that Alternative Eden C.

The results of the monitoring would inform adaptive management and the design of future phases of restoration. With implementation of program-level avoidance and minimization measures from the 2007 Final EIS/R, the AMP, and other CDFW management documents as well as compliance with expected

permit and BO conditions, impacts to biological resources as a result of monitoring, maintenance, and management activities would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-13: Potential effects of habitat conversion and pond management on steelhead.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

The federally listed threatened steelhead, California Central Coast Distinct Population Segment (DPS), is known to spawn in non-tidal portions of several South Bay creeks, including Coyote Creek, Stevens Creek, San Francisquito Creek, Alameda Creek (accessed by the ACFCC), and the Guadalupe River. This anadromous species makes use of tidal habitats during its migrations between freshwater, non-tidal habitats, and marine habitats. Tidal brackish channels provide habitat for juveniles during the process of smoltification (i.e., physiological adaptation to the saltwater environment). As a result, steelhead are expected to occupy and forage in channels within tidal marshes in the South Bay, potentially anywhere in the Phase 2 project areas, but particularly along the sloughs leading to and from spawning streams (2007 Final EIS/R).

The SBSP Restoration Project is expected to have a net benefit to steelhead by increasing estuarine habitat. Such habitat may be especially important as rearing habitat for juveniles. However, it is possible that migrating adult steelhead or foraging juveniles in estuarine habitats could inadvertently enter managed ponds and become entrained. If such fish are able to tolerate the conditions within the ponds and eventually return to tidal sloughs via pond outlets, the impact on such fish would likely not be substantial. However, managed ponds may have more shallow water, higher salinity, lower dissolved oxygen levels, or increased predation pressure (due to more limited plant cover or concentrations of fish in smaller areas) than tidal habitats. As a result, entrainment in managed ponds may impair the health or cause the mortality of steelhead (2007 Final EIS/R).

There is also some potential for steelhead to become temporarily “stranded” in restored marshes. For example, steelhead may enter marshes during high tides and become trapped in marsh ponds or pools (e.g., pools that form within borrow ditches, behind borrow ditch blocks). Such fish could potentially be subject to increased predation by being concentrated in small areas, but they are unlikely to perish due to low water quality or lack of food before another high tide enables them to “escape” back into channels. Overall, marsh restoration is expected to have a net benefit on steelhead by providing numerous channels that would serve as rearing habitat for juveniles. Most marshes that are actively restored, as opposed to those forming unintentionally from accidental breaches (e.g., under the No Action Alternative), are expected to be well drained, with complex channel networks that would provide extensive foraging habitat and cover for steelhead without the threat of entrapping them (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The southern Eden Landing Ponds would continue to function as managed ponds. In accordance with the NOAA Fisheries BO, when a viable steelhead run is restored upstream of ACFCC, improvements would be made to avoid or minimize potential entrainment of anadromous fish in managed ponds, including steelhead. One of three options would be implemented: a fish screen would be installed

on the pond intake, those ponds would be managed seasonally to avoid intake during the in/out migration periods, or water control and pond management would occur through other sources. Because of the management controls discussed above, under the No Action Alternative, there would be a less than significant impact to steelhead as the ponds would be maintained and managed to preserve their current function and condition.

Alternative Eden A Level of Significance: Less than Significant

Alternative Eden B. Under Alternative Eden B, actions would include construction and operation of the offloading facility and associated infrastructure, raising bottom elevations in the Bay and Inland Ponds, breaching or otherwise connecting the Bay, Inland and Southern Ponds to tidal flows restore them to tidal marsh, constructing habitat transition zones, and providing a variety of other habitat enhancements (e.g., islands for birds). Many of the internal levees would be breached and/or lowered, and pilot channels would be excavated. Portions of the perimeter levees would be improved to provide high tide refugia habitat for birds, the salt marsh harvest mouse, and other species and for flood risk management. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Pilot channels would facilitate draining and filling and also minimize areas of ponding at low tide that could trap fish and expose them to increased predation risk.

Construction of the offloading facility would occur in the work window for steelhead which spans from June 1 through November 30. The facility would likely also be operated during the steelhead work window, assuming a similar restriction would apply to projects that supply the dredged material. As a result, no direct effects to steelhead are expected to occur from construction of the offloading facility. In the event dredge material is received outside of the steelhead work window, operation of the offloading facility, feed water system pumps, and the booster pumps would generate moderate underwater noise and that could lead to behavioral changes. The operation of the offloading facility, feed water system, and booster pumps during the construction period would not be loud enough to cause injury or mortality of the steelhead. Entrainment would be avoided, due to the presence of fish screen placed on the feed water system intake. Shading of open water habitat and removal of habitat through use of piers and pipelines are not expected to result in effects on steelhead, as only a very small portion of the Bay would be affected and these areas would likely be avoided.

The breach locations on the OAC would provide access to the Bay and Inland Ponds for outmigrating steelhead smolts and for returning adults in ACFCC. Upstream reaches of Alameda Creek still have barriers to steelhead spawning habitat; however, access to tidal marsh near the mouth of the ACFCC would create extensive beneficial habitat for out-migrating steelhead once a restored run is established. The Bay Ponds would be connected to the ACFCC via an excavated channel through the tidal area of the J-Ponds. The Bay Ponds would be breached at Ponds E2 and E4 and the ACFCC would be connected to an appropriately sized water control structure. This would provide a new slough connection for outmigrating juvenile steelhead from the ACFCC into the large Bay Ponds, which would provide potential use as nursery (rearing) habitat.

Similar water control structures at the Southern Ponds would connect to the ACFCC and could also allow access to estuarine steelhead habitat in the Southern Ponds; however, the Southern Ponds are shallow and currently offer limited habitat value for steelhead juveniles relative to the Bay Ponds. As a result, despite the creation of a pilot channel, there is a reduced potential for adults migrating upstream or juveniles dispersing downstream to preferentially be attracted to the Southern Ponds. Under Alternative Eden B, all ponds would no longer be managed and would be subject to tidal action, though muted through a large

water control structure into the Southern Ponds, such that outgoing tides would likely allow steelhead to exit the tidal area or remain in adequate open water area during desmoltification.

Steelhead are not expected to be within the southern Eden Landing themselves when the levees are modified, when dredge material is placed in the Bay and Inland Ponds, or when islands and habitat transition zones are created. While upstream spawning habitat is not present in OAC, the breach and tide channels are likely to only incidentally support steelhead juveniles. Immediately after breaching, changes in water quality (i.e., high turbidity, low dissolved oxygen) could result in effects on steelhead, if present. These effects would be minimized through use of avoidance and minimization measures, such as those from the 2007 Final EIS/R, the AMP, and other CDFW management documents, as well as compliance with expected permit and BO conditions. In-water work would be timed to the extent possible to avoid impacts to steelhead that might be up-migrating through ACFCC and incidentally through OAC, or when they are out-migrating. In addition, breaching would likely occur on the ingoing tide to allow sediments the opportunity to settle out in the ponds prior to the outgoing tide. If fish rescue and/or relocation are required during construction, these activities would be completed under an agency-approved plan to limit impacts.

Actions taken in Alternative Eden B would continue to create diversified estuarine habitat offering shelter and foraging habitat for juvenile steelhead. The net effect of actions taken under Alternative Eden B would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden B Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden C. Under Alternative Eden C, steelhead would receive similar habitat enhancements as Alternative Eden B at the Bay Ponds. These enhancements would occur via newly added access to the Bay Ponds created by breach, channel, and water control structure through the J-Ponds and the ACFCC. Construction and operation of the offloading facility and associated infrastructure, and bottom elevations would be raised in the Bay Ponds through the import of dredge materials, as in Alternative Eden B. However, the Inland Ponds and Southern Ponds would be retained and enhanced as managed ponds. The other main difference between Alternatives Eden B and Eden C with regard to fish habitat is that the location of the connection with the ACFCC. Whereas in Alternative Eden B, the channel and connection would be closer to the Bay and cut across the Alameda County-owned marsh; in Alternative Eden C, the connection would be located somewhat more eastward and extend north through the J-Ponds and into Pond E4. In addition, the Inland and Southern Ponds would become enhanced managed ponds instead of being made fully tidal. These ponds are unlikely to incidentally support steelhead juveniles but would be typically managed in a manner that would preclude the species from the Southern Ponds. Nevertheless, entrainment may occur within these ponds if steelhead juveniles incidentally migrate in the Inland or Southern Ponds.

The same construction related effects on steelhead associated with the offloading facility and associated infrastructure described under Alternative Eden B would also occur under Alternative Eden C.

Like Alternative Eden B, the Bay Ponds would be breached on the north side to connect them to the OAC and to restore fully tidal flows. This would enhance habitat connectivity for steelhead during and after the transition from mudflat to vegetated tidal marsh. Pilot channels would facilitate draining and filling and also minimize areas of ponding at low tide that could trap fish and expose them to increased predation risk.

General construction impacts and the avoidance measures described for Alternative Eden B would apply to Alternative Eden C. The restored tidal marsh in the Bay Ponds would create similar beneficial habitat for out-migrating steelhead as Alternative Eden B. Like Alternative Eden B, actions taken in Alternative Eden C would continue to create diversified estuarine habitat offering shelter and foraging habitat for steelhead. Actions proposed for Alternative Eden C would be only slightly less beneficial to steelhead as those proposed under Alternative Eden B because in the former, the Inland or Southern Ponds would provide some limited habitat and access for steelhead that would not be provided in the latter.

Overall, the improvement in nursery and foraging habitat by the restoration of Bay Ponds to tidal marsh would outweigh the potential impact to steelhead from entrainment at Inland and Southern Ponds. As a result, the impact of Alternative Eden C on steelhead is expected to be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. Under Alternative Eden D, construction and operation of the offloading facility and associated infrastructure would raise bottom elevations in the Bay and Inland Ponds and the Bay Ponds would be restored to tidal marsh, but all breaches to the Bay Ponds would occur from the OAC. No breaches to the Bay Ponds would be constructed from the ACFCC. The Inland Ponds and Southern Ponds would be retained and enhanced as managed ponds under tidal marsh formed in the Bay Ponds and then could be similarly opened to full tidal flows. Pilot channels would facilitate draining and filling and also minimize areas of ponding at low tide that could trap fish and expose them to increased predation risk. The sole connection from the ACFCC would occur at the existing water control structure that would provide managed connectivity with the Southern Ponds. In the long-term, most of the water control structures in the Inland and/or the Southern Ponds may be removed or modified to provide fully tidal flows to the Inland Ponds and Southern Ponds, as in Alternative Eden B. The water control structures connecting the ACFCC would not be removed but would be operated with full flows, providing muted tidal conditions.

The same construction effects on steelhead associated with the offloading facility and associated infrastructure described under Alternative Eden B and Eden C would also occur under Alternative Eden D.

As described in Alternative Eden B, the Southern Ponds offer limited habitat value for steelhead juveniles relative to the Bay Ponds, and if entrained into the Southern Ponds, muted tidal action and access through the large water control structure would allow access to open water areas during desmoltification.

In the short term, the construction and operational impacts to steelhead would be similar to those described in Alternative Eden C. In the long term, the impacts to steelhead in the Southern Ponds would be similar to those described in Alternative Eden B, except that there would be no access from the ACFCC to the Bay Ponds. Because Alternative Eden D would not provide direct connections from the ACFCC to the Bay Ponds, the steelhead would not receive the same types of benefits as in the other Action Alternatives. There would still be some benefits from having tidal marsh form in the Bay Ponds, and adult steelhead could enter them from the OAC and forage there. Steelhead are not expected to regularly enter or become entrained in the Southern Ponds (due to management of the water control structures there) in the short term, but may have access to muted tidal channels during the long term. As a result, impacts on steelhead under Alternative Eden D are expected to be less than significant under CEQA and beneficial under NEPA.

Alternative Eden D Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Phase 2 Impact 3.5-14: Potential impacts to estuarine fish.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Overall, the long-term SBSP Restoration Project effects on estuarine fish are expected to be beneficial. In the South Bay, managed ponds support lower diversity of native fishes than tidal habitats, and only a few species are present in managed ponds in large numbers. Conversely, many of the fish recorded in the South Bay use tidal channels and mudflats at high tide, when they are inundated. These tidal habitats are particularly important as nursery habitat for juvenile fish. Thus, these tidal channels and mudflats are productive foraging habitats for estuarine fish in this system (Harvey 1988), and conversion of managed ponds to tidal habitats is expected to result in substantial increases in suitable habitat for estuarine fish populations in the South Bay (2007 Final EIS/R).

Based on observations of other SBSP actions and monitoring, the numbers of native estuarine fish have been trending positively, though there is some uncertainly in that conclusion given the relatively short duration of the observations so far. In general, though, it appears clear that former ponds restored to tidal action support more diverse, native fish communities than sloughs do and that more native species are found in restored ponds than in managed ponds.

Potential effects in green sturgeon (*Acipenser medirostris*) and longfin smelt (*Spirinchus thaleichthys*) are covered as part of this general discussion of estuarine fish. Green sturgeon are listed under the Federal ESA as endangered. Green sturgeon are anadromous fish that spend most of their adult life in the ocean or Bay, only entering freshwater rivers of the Sacramento River Basin to spawn (Moyle 2002). Juveniles spend 1 to 4 years rearing in freshwater, occupying shallow, low-flowing environments and feeding on amphipods and mysid shrimp. Green sturgeon are known to occur in the South Bay, but do not spawn in this area and are not expected to enter the ponds. The longfin smelt a state-listed threatened species that is also a candidate for listing under the FESA. Longfin smelt are present year-round in the South Bay. They have been caught in Coyote Creek and Alviso Slough in the far South Bay. Fish surveys conducted in 2013 by James Hobbs of U.C. Davis in Mt. Eden Creek and OAC did not detect green sturgeon, longfin smelt, or any other special-status fish species (J. Hobbs, pers. comm. 2016; Hobbs 2012).

The potential for adverse effects of restoration on estuarine fish is primarily from low water quality in discharges from seasonal ponds or managed ponds. However, through adaptive management, USFWS and CDFW have developed methods for minimizing discharges with low dissolved oxygen or high salinities. In general, though, the conversion of seasonal ponds and/or unenhanced managed ponds to tidal habitats or enhanced managed ponds as part of the SBSP Restoration Project would further reduce this potential impact (2007 Final EIS/R) by allowing full tidal exchange and adding control over circulation and ability to address water quality. Further, because Phase 2 actions would generally increase the transition of former salt-production ponds into tidal marsh, the expectation is that there would be and improvement in the amount and quality of habitat for estuarine fish.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The southern Eden Landing ponds would continue to function as seasonal and managed ponds. The Bay Ponds would continue to support fish populations. Fish populations may also occur in the

smaller Inland Ponds and Southern Ponds, but these would continue to be limited by intake at the water control structure and relatively high pond bottom elevations. These managed ponds allow discharge for longer portions of the day, draining into channels and sloughs at lower water surface elevations. Estuarine fish would continue to benefit from the created and enhanced habitats construction at northern Eden Landing in Phase 1. Existing impacts to estuarine fish could include low water quality in discharges from managed ponds; however, these impacts are generally minor already because pond managers monitor and manage for low water quality discharges. Also, there is some potential for entrapment of estuarine fish within these ponds, though any fish entering at higher, flooding tides could exit the same water control structure at lower, ebbing tides. No activities or pond management changes would be proposed under Alternative Eden A; therefore, there would be no impacts to estuarine fish relative to the baseline condition as a result of this alternative.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Under Alternative Eden B, actions would include the placement of dredge materials in the Bay and Inland Ponds to raise pond bottom elevations, breaching the southern Eden Landing Ponds to restore them to tidal marsh, constructing habitat transition zones, and constructing habitat islands. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) The locations of levee lowering and breaching would be chosen in part to align with historic slough locations that would facilitate the development of complex estuary habitats. Pilot channels would be added to minimize areas of ponding at low tide that could trap fish and expose them to increased predation risk. Many of the perimeter and internal levees would be breached or lowered to improve flows and aquatic habitat connectivity, while others would be enhanced to provide high tide refuge or habitat for birds and flood risk management.

Construction and operation of the offloading facility and associated infrastructure could result in effects on estuarine fish. These effects could arise from underwater noise or visual disturbance, entrainment within pumps, shading of open water habitat and temporary removal of a small amount of foraging habitat. (Effects to bottom dwelling species from the submerged pipeline reducing north-south movement across the mudflats is discussed in Impact 3.5-4).

Installation of the piers through pile driving and operation of pumps would create underwater noise that may affect movement, foraging, and may cause temporary threshold shifts in hearing ability. The sound pressure levels are not expected to result in levels that would injure or cause mortality of estuarine fish (206 decibels), but instead may make the surrounding open water areas temporarily unsuitable for the species. An underwater noise analysis would be completed during project permitting to detail temporary affects to estuarine fish that may result from underwater noise. In order to reduce potential impacts from underwater noise on such fish, Best Management Practices (BMPs) for pile driving would be implemented, as applicable, depending on the pile driving methods. These BMPs may include the use of a cushion block, bubble curtains, and the “soft start” technique where pile driving intensity is slowly ramped up. In addition, the use of fish screens as described in the Chapter 2, Alternatives, would minimize the potential for entrainment, considering most estuarine fish individuals would be migrating or foraging adults or juveniles, and not larvae that may be impinged upon the screens. Shading of open water habitat and removal of habitat through use of piers and pipelines are not expected to result in effects on estuarine fish.

After placement and settlement of dredge materials, the Bay Ponds and Inland Ponds would be breached to connect them to the OAC, and the ACFCC would be connected to the Bay Ponds through a water

control structure, a pilot channel, and a breach into Pond E4/E7. Both the OAC and ACFCC already contain tidal channels that provide potential habitat for estuarine fish, including longfin smelt and green sturgeon. This added connectivity would allow them use of the Bay Ponds and Inland Ponds. Water control structures would also connect the ACFCC to the Southern Ponds, and this connectivity could also benefit estuarine fish.

While adult green sturgeon do not spawn in the vicinity of the project, sub-adults utilize a wide variety of estuarine habitats in San Francisco Bay. Longfin smelt may spawn in the freshwater areas upstream in the ACFCC, and both young and adults may be present at Eden Landing. Given the abundant fish populations currently present in the Bay Ponds, the proximity of the southern Eden Landing ponds to San Francisco Bay, and the existing suitable habitat in the OAC and ACFCC, the restored tidal marsh and channels are expected to provide extensive and diverse foraging and nursery habitat for estuarine fish. Both the breaches and water control structure would improve fish access to estuarine habitat throughout the southern Eden Landing, though the shallower Inland and Southern Ponds would have less added habitat value for estuarine fish than the Bay Ponds would.

Estuarine fish may be present in southern Eden Landing when the levees are modified or when channels, islands, and habitat transition zones are created, which could result in direct injury or kill of estuarine fish, although this is unlikely since there are abundant adjacent open water areas that provide escape refugia. There could also be short-term impacts of construction activities (e.g. increased turbidity) nearby the breaches and channel excavations. These are not expected to significantly affect estuarine fish, which are well adapted to turbidity in the South Bay. Also, in-water work would be timed to the extent possible to avoid impacts to estuarine fish that might be present within the ponds or adjacent sloughs. If fish rescue and/or relocation would be required during construction, these activities would be completed under an agency-approved plan to limit impacts. The planned tidal restoration would result in more extensive channel networks, higher-order sloughs, tidal marsh and overall greater habitat diversity that is expected to be beneficial to estuarine fish.

The potential small, temporary impacts on estuarine fish would be more than offset by the long-term benefits and creation of diverse estuarine habitats that would support estuarine fish, including special-status species. Impacts to estuarine fish under Alternative Eden B would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden B Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden C. Under Alternative Eden C, estuarine fish (including green sturgeon and longfin smelt) would receive similar habitat enhancements at the Bay Ponds as Alternative Eden B. These enhancements would occur via newly added access to the Bay Ponds created by breach, channel, and water control structure through the J-Ponds and the ACFCC. Construction and operation of the offloading facility and associated infrastructure would raise the bottom elevations in the Bay Ponds. However, but the Inland Ponds and Southern Ponds would be retained and enhanced as managed ponds. The other main difference between Alternatives Eden B and Eden C with regard to fish habitat is that the location of the connection with the ACFCC. Whereas in Alternative Eden B, the channel and connection would be closer to the Bay and cut across the Alameda County-owned marsh; in Alternative Eden C, the connection would be located somewhat more eastward and extend north through the J-Ponds and into Pond E4. In addition, the Inland and Southern Ponds would become enhanced managed ponds instead of being made fully tidal. These ponds may incidentally support estuarine fish. Nevertheless, entrainment may occur within these ponds.

The same construction effects on estuarine fish associated with the offloading facility and associated infrastructure and BMPs described under Alternative Eden B would also occur under Alternative Eden C. Like Alternative Eden B, the Bay Ponds would be breached on the north side to connect them to the OAC and to restore fully tidal flows. This would enhance habitat connectivity for estuarine fish during and after the transition from mudflat to vegetated tidal marsh. Pilot channels would facilitate draining and filling and also minimize areas of ponding at low tide that could trap fish and expose them to increased predation risk. The enhanced managed ponds may increase habitat value for estuarine fish, but also result in increased abundance of non-native fish species and predation.

General construction impacts and the avoidance measures described for Alternative Eden B would apply to Alternative Eden C. The restored tidal marsh in the Bay Ponds would create similar beneficial habitat for estuarine fish as Alternative Eden B. Like Alternative Eden B, actions taken in Alternative Eden C would continue to create diversified estuarine habitat offering shelter and foraging habitat for estuarine fish. Actions proposed for Alternative Eden C would be slightly less beneficial as those proposed under Alternative Eden B because the, in the former, the Inland or Southern Ponds would provide some limited habitat and access for fish that would not be provided in the latter.

Overall, the addition of estuarine fish habitat acreage and the improvement in nursery and foraging habitat that would be created by the restoration of Bay Ponds to tidal marsh would outweigh the potential impact from construction, entrainment, non-native fish, or predation. The changes at the Inland and Southern Ponds are not expected to result in significant changes relative to the existing condition or the No Action Alternative. As a result, the impact of Alternative Eden C on estuarine fish is expected to be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. Under Alternative Eden D, the offloading and associated infrastructure would be constructed and operated as with the other alternatives. The bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials and the Bay Ponds would be restored to tidal marsh, but all breaches to the Bay Ponds would occur from the OAC. No breaches to the Bay Ponds would be constructed from the ACFCC. The Inland Ponds and Southern Ponds would be retained and enhanced as managed ponds under tidal marsh formed in the Bay Ponds and then could be similarly opened to full tidal flows. Pilot channels would facilitate draining and filling and also minimize areas of ponding at low tide that could trap fish and expose them to increased predation risk. The sole connection from the ACFCC would occur at the existing water control structure that would provide managed connectivity with the Southern Ponds. In the long-term, most of the water control structures in the Inland and/or the Southern Ponds may be removed or modified to provide fully tidal flows to the Inland Ponds and Southern Ponds, as in Alternative Eden B, which would benefit estuarine fish by allowing them to access and forage in these ponds as well. The water control structures connecting the ACFCC would not be removed but would be operated to allow full flows. The construction and operational impacts to steelhead would be similar to those described in Alternative Eden C. Because Alternative Eden D would not provide direct connections from the ACFCC to the Bay Ponds, estuarine fish would not receive the same degree of benefits as in the other Action Alternatives, though they would benefit from the connection via the OAC.

The same construction and operation effects on estuarine fish associated with the offloading facility and associated infrastructure and BMPs described under Alternative Eden B and Eden C would also occur under Alternative Eden D.

Overall, the addition of estuarine fish habitat acreage and the improvement in nursery and foraging habitat that would be created by the restoration of Bay Ponds to tidal marsh in the initial stage would outweigh the potential impact from construction, entrainment, non-native fish, or predation. The initial stage's enhancements at the Inland and Southern Ponds are not expected to result in significant changes relative to the existing condition or the No Action Alternative.

Further, if and when the Inland and Southern Ponds are opened to tidal flows in the second stage, there would be additional habitat for estuarine fish added then. As a result, the impact of Alternative Eden D on estuarine fish is expected to be less than significant under CEQA and beneficial under NEPA.

Alternative Eden D Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Phase 2 Impact 3.5-15: Potential impacts to piscivorous birds.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

The piscivorous birds (e.g., pelicans, cormorants, grebes) of the South Bay forage in a variety of habitats and locations where prey fish are available. The low-salinity salt ponds that support fish, tidal sloughs and channels, edges of intertidal mudflats, non-tidal ponds and channels, and artificial lakes provide the highest-quality foraging areas. Large "frenzies" of feeding activity may be observed at these locations, presumably when conditions result in large fish concentrations. Brown pelicans usually plunge-dive for fish and therefore require water several feet deep, but American white pelicans and cormorants swim while feeding and can thus feed in shallower water. Although double-crested cormorants, western grebe (*Aechmophorus occidentalis*), Clark's grebes (*Aechmophorus clarkii*), and brown pelicans forage to varying degrees within the open waters of the Bay, American white pelicans do not, instead preferring non-tidal waterbodies (Goals Project 2000; Harvey 1988) (2007 Final EIS/R). Recent and ongoing monitoring of eared grebe suggests that bird counts initially declined in ponds, but have recently increased and in general are trending toward maintenance of baseline numbers. Other long-term monitoring data, suggest that fall abundance of piscivorous birds in SBSP Restoration Project ponds has increased from 2002 to 2005 and from 2008 to 2012. The winter and spring populations have increased slightly between 2002 and 2014 (De La Cruz et al., in press).

The effects of the SBSP Restoration Project on foraging piscivores depend in part on the project's effects on both the abundance and the availability of prey fish. Existing managed ponds with connections to the Bay may concentrate fish, thus potentially facilitating their capture by piscivorous birds. As a result, conversion of some low-salinity ponds to tidal habitats (as planned in parts of all of the Action Alternatives for Eden Landing) would reduce foraging habitat in managed ponds. However, as noted in the discussion of estuarine fish (Impact 3.5-14), tidal restoration is expected to result in a considerable increase in the overall habitat area and may improve abundance of estuarine fish in the South Bay. The tidal sloughs and channels that would develop in restored marshes are expected to be used heavily by foraging piscivores. The SBSP Restoration Project is expected to have a net benefit to most piscivorous species, because the minor impacts from the loss of managed ponds would be offset by improvements in foraging quality through increased shallow-water habitat for fish and invertebrates (2007 Final EIS/R).

The most important piscivorous species addressed in this section who's use could decline substantially due to the loss of managed pond habitat is the American white pelican (California species of special

concern), which does not forage heavily in tidal habitats (2007 Final EIS/R). However, foraging of pond-associated piscivorous birds is expected to redistribute to other managed ponds in the area (e.g. other ponds in northern Eden Landing [approximately 1,720 acres], Cargill-managed ponds [thousands of acres]), and other managed ponds such as Ravenswood Pond SF2 and others (approximately 350 acres) and therefore losses from the South Bay are not expected to result in substantial declines of the west coast or continental populations.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The ponds at southern Eden Landing would continue to function as a mix of managed and seasonal ponds. The Bay Ponds in particular currently offer a mix of low-salinity pond foraging habitat for piscivorous birds. Northern Eden Landing would continue to provide the range of effective habitats for piscivorous birds that were provided in Phase 1. Certain levees would continue to be maintained for water management, for inland flood risk management, and for PG&E access. The No Action Alternative would maintain the managed ponds in their current state, which provides suitable habitat for piscivorous birds. Piscivorous birds would not be impacted under Alternative Eden A.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and otherwise connect all of southern Eden Landing to regular tidal flows to facilitate their conversion to tidal marsh habitat. The alternative would also construct habitat transition zones against the eastern interior border and create islands from the remnant levees. It would also add other habitat enhancements and various flood risk management and public access features (trails and a viewing area), the latter on the eastern edge of the pond complex. A channel would be excavated between the ACFCC and the Bay Ponds to improve fish habitat connectivity and access to the large Bay Ponds. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

As discussed above, some piscivorous birds forage within open waters of the Bay. The construction and operation of the dredge material placement infrastructure would affect areas between the offloading facility and Pond E2. Although a small portion open water habitat would be affected, substantial amounts of foraging habitat would still be available in other open waters of the Bay. After this infrastructure is removed, piscivorous birds would most likely continue to use adjacent open water for foraging.

Tidally delivered sediment would continue to accrete in the Southern Ponds, allowing for a long-term transition to tidal marsh. Initially, the Southern Ponds would be good fish nursery habitat and continue to support piscivorous birds. As sediment accretion continues, most of the pond interiors would become vegetated, also enhancing cover for fish thereby reducing deep water and habitat for foraging birds.

Bird nesting and roosting habitat would be increased through the construction of islands and habitat transition zones. With selective breaching along historic slough meanders and the addition of island habitat, these restored aquatic areas would convert open water foraging habitat into a complex tidal marsh habitat that will continue to provide habitat for piscivorous bird species that forage in the tidal channels, sloughs, and open subtidal habitats.

Some sections of levees that could provide roosting habitat would be removed when the pond levees are lowered and breached. Pond-associated piscivores, such as the American white pelican, would likely redistribute locally as a result of the loss of managed pond habitat (e.g., to Cargill-managed ponds or to

retained managed ponds in northern Eden Landing), and losses from the South Bay would not be expected to result in substantial declines of the west coast or continental populations.

Also, the construction and use of the recreational trails could reduce roosting habitat along the levees, but the trails would be largely limited to the eastern edges of southern Eden Landing, leaving large areas of levees and islands for roosting and waters for foraging (see Impact 3.5-18 for full discussion on recreation and public access impacts).

Overall, the actions taken in Alternative Eden B would reduce the amount of open water habitat for piscivorous bird species, but would retain some foraging habitat for species that use tidal channels, sloughs, and open subtidal habitats and improve forage for estuarine fish (which would provide forage for piscivorous birds), but pond use by these bird species may decline locally. However, piscivorous birds that prefer using managed ponds may be somewhat affected by this alternative, but would not be expected to be substantial on west coast or continental populations. Therefore, the impact of Alternative Eden B would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C is similar to Alternative Eden B at the Bay Ponds but differs because it would raise bottom elevations in only the Bay Ponds and retain the Southern Ponds and the Inland Ponds as enhanced managed ponds. There would also be a channel excavated between the ACFCC and the Bay Ponds to improve fish habitat connectivity and access to the large Bay Ponds. There would also be a greater extent of public access trails added than in Alternative Eden C, notably along one or both side of the OAC near the eastern end of the pond complex. There would again be habitat islands built from the remnant levees, and the mid-complex levee would be raised and improved and would also support a habitat transition zone projecting westward into the Bay Ponds.

As described for Alternative Eden B, the impacts associated with the Bay Ponds and islands and habitat transition zones would be similar under Alternative Eden C. The loss of the large Bay Ponds to tidal flows and the loss of some levee surfaces for roosting may cause pond use by piscivorous bird species to decline locally. Unlike Alternative Eden B, the retention and improvement of managed ponds may benefit pond-associated piscivorous birds if the Southern Ponds or the Inland Ponds are managed as open water foraging habitats suitable for piscivorous birds. To some extent, the AMP will guide any necessary changes to management of these ponds to balance the habitat requirements of multiple species and guilds of birds and other wildlife and according to season (summer, winter, spring/fall migration).

Overall, pond use by piscivorous birds may be somewhat adversely affected by this alternative, but they are expected to redistribute to suitable foraging habitat to nearby managed pond habitat, and population declines would not be expected to be substantial on the west coast or continental populations. The impact of Alternative C would therefore be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and the Inland Ponds and Southern Ponds would initially become enhanced managed ponds, as described for Alternative Eden C. Later, the water control structures could be removed, the mid-complex levee regraded and breached, and these ponds opened to tidal flows. In the short term, Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland

Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh). The habitat transition zone would be placed on the interior of the westernmost Bay Ponds levees, projecting eastward into Ponds E1 and E2. There would be no added fish habitat connections between the ACFCC and the Bay Ponds and so less direct benefit of this aspect of the fish habitat improvements.

As described for Alternative Eden B, the impacts associated with the Bay Ponds and islands and habitat transition zones would be similar under Alternative Eden D. The loss of the large Bay Ponds to tidal flows and the loss of some levee surfaces for roosting may cause pond use by piscivorous bird species to decline locally. In the early years, the retention and improvement of managed ponds may benefit pond-associated piscivorous birds if the Southern Ponds or the Inland Ponds are managed as open water foraging habitats suitable for piscivorous birds. To some extent, the AMP will guide any necessary changes to the management of these ponds to balance the habitat requirements of multiple species and guilds of birds and other wildlife and according to season (summer, winter, spring/fall migration). In the later years, if the Inland Ponds and Southern Ponds are opened to tidal flows, the loss of managed pond habitat may have some additional but similar effects on these birds.

The public access features would be the same as those in Alternative Eden B and so would be located at some distance from the parts of Eden Landing most heavily used by piscivorous birds. There would be minimal potential for disturbance of roosting or foraging piscivorous birds.

Overall, pond use by piscivorous birds may be somewhat adversely affected by this alternative, but given the timing of actions under this alternative, they are expected to redistribute to suitable foraging habitat in nearby managed pond habitat, and population declines would not be expected to be substantial on the west coast or continental populations. The impact of Alternative Eden D would therefore be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-16: Potential impacts to dabbling ducks.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions on dabbling ducks are assessed.

Dabbling ducks forage in a variety of habitats in the South Bay, including mudflats, shallow subtidal habitats, tidal sloughs and marsh channels, marsh ponds, managed and muted tidal marsh, seasonal wetlands, managed ponds, and water treatment plants. In these areas, dabbling ducks feed on a variety of aquatic plants and invertebrates within the ponds. Because dabbling ducks do not typically dive for food, they usually forage in water less than 12 inches deep (Goals Project 2000). Within ponds, salinity is also important for these birds. The plants on which they feed cannot tolerate high salinities, and thus dabbling duck abundance tends to be highest on lower-salinity ponds (20 to 63 ppt). Dabbling duck abundance is moderate in medium-salinity ponds (60 to120 ppt), wherein foraging shifts to invertebrate prey, with few in ponds with salinity greater than 154 ppt (2007 Final EIS/ R).

Because large numbers of dabbling ducks use shallow managed ponds in the South Bay for foraging and roosting, conversion of ponds to tidal habitats may have some effect on South Bay numbers of these birds. However, as ponds are converted to tidal marsh, dabbling ducks may be able to retain some use of open water foraging habitat at higher tides. Roosting habitat may be retained on remnant levees,

particularly those adjacent to habitat transition zones or otherwise well-buffered. Foraging habitat provided by tidal channels and sloughs and marsh ponds at low tide would be much reduced relative to existing conditions. There is low potential for density-dependent mortality due to disease (such as avian botulism; see Impact 3.5-22), predation, and disturbance by predators and humans as the ducks that use managed ponds are concentrated into fewer areas as a result of pond conversion. Based on long-term monitoring data, the winter populations of dabbling ducks doubled from 2002 to 2006 during Initial Stewardship Plan operations in the SBSP Restoration Project ponds. The fall and spring pond counts have increased during the same period and since implementation of Phase 1 have leveled with some fluctuations. These results may indicate the ponds have reached carrying capacity (De La Cruz et al., in press), alternatively, the spatial and temporal redistribution of dabbling duck use of tidal restoration areas, enhanced managed ponds and other remaining managed ponds have reached equilibrium. Additional tidal restoration could result in similar dispersion of some dabbling ducks over the entire SBSP Restoration Project area. A possible exception to this expected dispersion is the northern shoveler, the most abundant wintering dabbling duck, which appears to prefer ponds to open bay or tidal marsh habitat. The response of this species to Phase 2 actions will be monitored under the AMP, but this species has been observed in large numbers using a wide range of salinity in the ponds, from low (30 ppt) to moderately high (120 ppt) which will remain available throughout Eden Landing and the South Bay.

Overall, tidal restoration is expected to support a large amount of foraging and some roosting by dabbling ducks and remaining managed ponds or enhanced managed pond habitat available is expected to offset these adverse effects (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The ponds at southern Eden Landing would continue to function as a mix of managed open water and seasonal ponds. The Bay Ponds in particular will continue to provide a large area of low-salinity pond foraging habitat for dabbling ducks. Certain levees would continue to be maintained for water management, for inland flood risk management, and for O&M access. Northern Eden Landing would continue to provide the range of habitats for dabbling ducks that were provided in Phase 1. The No Action Alternative would maintain the managed ponds in their current state, which provides suitable habitat for dabbling ducks. Under the No Action Alternative, there would be no impact to dabbling ducks or their habitat.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and otherwise connect all of southern Eden Landing to regular tidal flows to facilitate their restoration to tidal marsh habitat. The alternative would also construct habitat transition zones against the eastern interior berm and create islands from the remnant levees. It would also add other habitat enhancements and various flood risk management and public access features (trails and viewing platforms), the latter on the eastern perimeter of the pond complex. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

Tidally delivered sediment would continue to accrete in the Southern Ponds, allowing for a long-term transition to tidal marsh. The Southern Ponds would initially support some intertidal mudflats, which would provide good forage habitat for dabbling ducks at higher tides. As sediment accretion continues, most of the pond interiors would become vegetated, with invertebrate populations and good forage

quality. Because dabbling ducks tend to use shallow waters, foraging habitat value currently provided by the seasonal and open water managed ponds that the Inland Ponds and Southern Ponds would be much reduced.

The planned tidal restoration would likely result in more extensive channel networks, higher-order sloughs, and overall greater habitat diversity, which is expected to provide some foraging habitat and cover for dabbling ducks. Marsh habitat above the high tide line in the habitat transition zones could increase roosting habitat, but little value would be provided for foraging and nesting birds. Bird roosting habitat would be directly increased through the construction of islands and habitat transition zones. With selective breaching along historic slough meanders and the addition of island habitat, these restored aquatic areas would develop into complex tidal marsh habitat with benefits to dabbling duck species that forage for plants and invertebrates in shallow tidal channels, sloughs, and open subtidal and intertidal habitats.

Some sections of levee that could provide roosting habitat would be removed when the pond levees are lowered and breached. Also, the construction and use of the recreational trails could reduce roosting habitat along the levees, but the trails would be largely limited to the eastern perimeter of southern Eden Landing, leaving large areas of levees and islands for roosting and waters for foraging (see Impact 3.5-18 for full discussion on recreation and public access impacts).

Overall, open water pond foraging habitat for dabbling ducks would decline under Alternative Eden B, but tidal marsh and mudflat foraging habitat would improve within small geographic areas. Dabbling ducks would benefit from increased roosting habitat conditions on the islands and habitat transition zones while some existing habitat on levees would be reduced. Further, the implementation of ongoing monitoring and management actions would continue using the AMP.

Overall, the loss of significant amounts of open water foraging habitat and increases in conditions of roosting, and following the implementation of the AMP, the impact of Alternative Eden B to dabbling ducks would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C is similar to Alternative Eden B at the Bay Ponds but would raise bottom elevations in only the Bay Ponds and retain the Southern Ponds and the Inland Ponds as enhanced managed ponds. There would also be a greater extent of public access trails added than in Alternative Eden C, notably along one or both side of the OAC near the eastern end of the pond complex. There would also be habitat islands built from the remnant levees, and the mid-complex levee would be raised and improved and would support a habitat transition zone projecting westward into the Bay Ponds.

As described for Alternative Eden B, the actions in the Bay Ponds proposed for Alternative Eden C would benefit dabbling duck species that use tidal channels, sloughs, and open subtidal habitats to forage for plants and invertebrates within small geographic areas, but overall foraging habitat would be much reduced. The planned tidal restoration there would likely result in more extensive channel networks, higher-order sloughs, and overall greater habitat diversity, which is expected to provide some foraging habitat and cover for dabbling ducks. The habitat islands and habitat transition zones for roosting and the tidal marsh foraging habitat created under Alternative Eden C would also be expected to benefit dabbling ducks.

Unlike in Alternative Eden B, the retention and improvement of managed ponds would benefit dabbling ducks because the Southern Ponds or the Inland Ponds could be managed as shallow water habitats suitable for foraging by dabbling ducks. To some extent, the AMP will guide the necessary management of these ponds as they are used to balance the habitat demands of multiple species and guilds of birds and other wildlife.

The extent of pond-associated foraging habitat for dabbling ducks would decline under Alternative Eden C (but less so than under Alternative Eden B), but the quality of that habitat in the enhanced Southern Ponds and Inland Ponds would increase. Tidal marsh and mudflat foraging habitat in the Bay Ponds would also improve. Dabbling ducks would also benefit from increased roosting habitat on the islands and habitat transition zones. Further, the implementation of ongoing monitoring and management actions would persist using the AMP.

Overall, following the implementation of the AMP, the impact to dabbling ducks under Alternative Eden C would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and Inland Ponds and Southern Ponds would initially become enhanced managed ponds, as described for Alternative Eden C. Later, the water control structures could be removed, the mid-complex levee breached, and these ponds opened to tidal flows. In the short term, Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh). The habitat transition zone would be placed on the interior of the westernmost Bay Ponds levees, projecting eastward into Ponds E1 and E2.

As described for Alternative Eden B and Eden C, the actions in the Bay Ponds proposed for Alternative Eden D would benefit dabbling duck species within small geographic areas, but overall foraging habitat would be much reduced. Initially, the Southern Ponds would be good forage habitat for dabbling ducks at higher tides. As sediment accretion continues, most of the pond interiors would become vegetated, with invertebrate populations and would provide some foraging habitat and cover. The habitat islands and habitat transition zones for roosting would also be expected to benefit dabbling ducks.

In the early years, the retention and improvement of managed ponds would benefit dabbling ducks because the Southern Ponds or the Inland Ponds could be managed as shallow water habitats suitable for foraging by dabbling ducks. The AMP will guide the necessary management of these ponds as they are used to balance the habitat demands of multiple species and guilds of birds and other wildlife. But in the later years, if the Inland Ponds and Southern Ponds are opened to tidal flows, the loss of managed pond habitat may have some additional detrimental effects on these birds.

The extent of pond-associated foraging habitat for dabbling ducks would decline under Alternative Eden D (but less so than under Alternative Eden B), but the quality of that habitat in the enhanced managed ponds would increase in the Inland and Southern Ponds. That condition would persist for a decade or more, after which the opening of the Inland Ponds and Southern Ponds to tidal flows would begin. Tidal marsh and mudflat foraging habitat in the Bay Ponds would improve. Dabbling ducks would also benefit from increased roosting habitat on the islands and habitat transition zones. Further, the implementation of ongoing monitoring and management actions would persist using the AMP.

Overall, following the implementation of the AMP, the impact to dabbling ducks under Alternative Eden D would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-17: Potential impacts to harbor seals.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Harbor seals are currently the only marine mammals that are permanent residents of San Francisco Bay. Harbor seals forage in nearshore marine habitats on a variety of fishes and invertebrates. Seals may use more than 10 sites around the Bay at any given time (Goals Project 2000), and any undisturbed intertidal habitat accessible to the open Bay could potentially be used by harbor seals. Because of the low numbers of areas where large numbers of harbor seals congregate in the South Bay, the disturbance of a primary haul-out or pupping area as a result of SBSP Restoration Project construction would be a significant impact (2007 Final EIS/R).

The nearest known harbor seal haul-outs are at Newark Slough, across the Bay at Bair Island (both about 6 miles away), near Mowry Slough (approximately 8 miles away), and at the mouth of Coyote Creek near Calaveras Point (about 11 miles away). These are generally too far away to be affected by airborne noise or other construction-related disturbances at southern Eden Landing. Harbor seals are expected to be present in the waters of the Bay near the offloading facility during its construction and operation of the pumps, and may be exposed to underwater noise above NMFS established thresholds of incidental harassment. An underwater noise analysis would be completed during project permitting to detail temporary affects to harbor seal that may result from underwater noise. In order to reduce potential impacts from underwater noise on harbor seal, BMPs for pile driving will be implemented, as applicable. Depending on the pile driving methods, these BMPs may include the use of a cushion block, bubble curtains, and the "soft start" technique where pile driving intensity is slowly ramped up.

In the long term, the project is expected to have a net benefit to harbor seals through enhancement of prey fish populations and the restoration of miles of tidal sloughs and channels that would serve as foraging areas and provide new haul-out sites. Although the effects of the SBSP Restoration Project on harbor seals are expected to be beneficial overall, the AMP includes a description of monitoring and adaptive management activities concerning this species (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The ponds at southern Eden Landing would continue to function as a mix of managed and seasonal ponds. There would be no changes to seal habitats or effects on individuals. No construction would occur under the No Action Alternative, so there would be no construction impacts to seals. Therefore, there would be no impacts of Alternative Eden A on harbor seals.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would construct and operate an offloading facility and associated infrastructure, raise pond bottom elevations and breach the Bay and Inland Ponds, and otherwise connect all of southern Eden Landing to regular tidal flows to facilitate their conversion to tidal marsh habitat. The alternative would also construct habitat transition zones against the eastern interior

border and create islands from the remnant levees. It would also add other habitat enhancements and various flood risk management and public access features (trails and viewing platforms). A channel would be excavated between the ACFCC and the Bay Ponds to improve fish habitat connectivity and access to the large Bay Ponds. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Because bottom sediments in the Bay and Inland Ponds would be raised to marsh plain elevations, these ponds are expected to recruit salt marsh vegetation when breached.

The construction and operation of the offloading facility and the associated infrastructure (pipelines, booster pumps, etc.), may result in visual and noise disturbance to harbor seals. These disturbances may result in wide range of potential behavioral changes, and would be limited to those individuals present in the open waters near the facility. An underwater noise analysis would be completed during project permitting to detail temporary affects to harbor seal that may result from underwater noise. In order to reduce potential impacts from underwater noise on harbor seal, BMPs for pile driving will be implemented, as applicable, depending on the pile driving methods. These BMPs may include the use of a cushion block, bubble curtains, and the "soft start" technique where pile driving intensity is slowly ramped up. No noise or visual effects on existing haul outs sites are anticipated due to geographic separation; the offloading facility is more than 1 mile from the closest known haul out at Bair Island.

Tidally delivered sediment would accrete in the Southern Ponds, allowing for a long-term transition to tidal marsh. Initially, the Southern Ponds would be good fish nursery habitat. As sediment accretion continues, most of the pond interiors would become vegetated, enhancing fish populations.

With implementation of measures to avoid and minimize impacts (i.e., seasonal avoidance and pre-construction surveys), the potential for adverse impacts on harbor seals as part of construction would be expected to be limited and short term (see Impact 3.5-1). Because implementation of the project may result in increased estuarine fish abundance, there would be improved seal foraging habitat. Overall, the impact of Alternative Eden B would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden B Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden C. Alternative Eden C would raise bottom elevations, breach, and otherwise connect the Bay Ponds to tidal flows to facilitate their conversion to tidal marsh habitat. A mid-complex levee would be built for flood risk management and to separate them from the rest of southern Eden Landing, which would be enhanced managed ponds fitted with water control structures to allow more complete and timely control over water levels and quality in the Inland and Southern Ponds. The habitat transition zone would extend westward into the Bay Ponds, and there would again be remnant levees that would form islands.

The same construction effects on harbor seals associated with the offloading facility and associated infrastructure and BMPs described under Alternative Eden B would also occur under Alternative Eden C.

The same benefits to harbor seals associated with fisheries improvement described in Alternative Eden B would be expected from Alternative Eden C's tidal marsh restoration and connection to the Bay Ponds. However, the Inland Ponds and Southern Ponds would be retained and managed more for the benefit of various species and guilds of birds, and would be less likely to add the same types of benefits to seals. Still, the overall effect of Alternative Eden C would be an increase in amount and quality of forage habitat for seals.

With implementation of measures to avoid and minimize impacts (i.e., seasonal avoidance and pre-construction surveys), the potential for adverse impacts on harbor seals as part of construction would be expected to be limited and short term (see Impact 3.5-1). Because implementation of the project may result in increased estuarine fish abundance, there would be improved seal foraging habitat. Overall, the impact of Alternative Eden C would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and Inland Ponds and Southern Ponds would initially become enhanced managed ponds, as described for Alternative Eden C. Later, the water control structures could be removed, the mid-complex levee breached, and these ponds opened to tidal flows.

The same construction effects on harbor seals associated with the offloading facility and associated infrastructure and BMPs described under Alternative Eden B and Eden C would also occur under Alternative Eden D.

In the short term, Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh). Because there would be no added connection between the ACFCC and the Bay Ponds, the direct benefit of this aspect of the fish habitat improvements is not expected in Alternative Eden D. But overall, the effect of Alternative Eden D would be a net improvement in the amount and quality of forage habitat for harbor seals.

With implementation of measures to avoid and minimize impacts (i.e., seasonal avoidance and pre-construction surveys), the potential for adverse impacts on harbor seals as part of construction would be expected to be limited and short term (see Impact 3.5-1). Because implementation of the project may result in increased estuarine fish abundance, there would be improved seal foraging habitat. Overall, the impact of Alternative Eden D would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden D Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Phase 2 Impact 3.5-18: Potential recreation-oriented impacts to sensitive species and their habitats.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Improved recreational access to baylands within the South Bay is an important objective of the SBSP Restoration Project. Increased recreational use and the maintenance of trails and other public access and recreational facilities have the potential to disturb wildlife, result in the trampling of vegetation, decrease nesting success, increase predation, increase the introduction of non-native species, and decrease habitat quality. Ultimately, such impacts could result in decreases in the abundance of breeding, foraging, and roosting wildlife (2007 Final EIS/R).

Potential Eden Landing Phase 2 impacts include:

- Human disturbance of nesting birds can result in abandonment of nests and chicks, resulting in decreased reproductive success and increased predation, particularly of eggs and young. Disturbance of foraging and roosting may decrease the effectiveness or increase the stress of these activities. The trails and viewing platforms that are part of the Eden Landing Phase 2 alternatives all have some potential to increase these types of disturbance of the various bird species and guilds discussed in the rest of the impacts listed in this section.
- California Ridgway's rails along levee trails may be subject to higher predation risk because they may avoid high cover along trails during high tides (instead wading within the flooded marsh or using areas of sparser cover) due to human presence on the levee. Disturbance of rails could potentially lead to abandonment of nests and chicks, territorial displacement, exposure to predation or increased energetic requirements due to flushing, any of which may result in decreased survivorship and lower reproductive success (Overton 2007, USFWS 2013).
- Levee-top trails may impede the movement of Ridgway's rail or salt marsh harvest mouse populations between current and future restored tidal marsh habitats because of human disturbance and lack of vegetative cover.
- Nesting western snowy plovers may also be adversely affected by increased human use of the SBSP Restoration Project area. Disturbance could lead to territorial aggression, and reduced egg viability or nest abandonment and increased predation, particularly if disturbance causes plovers to remain off the nest for more than a few minutes. Recreation could have these same effects on other nesting birds, such as stilts, avocets, and terns.
- Increases in litter provide attractive food sources for predators, such as ravens, which pose an increased risk to predation on California Ridgway's rail, western snowy plovers and other nesting birds (USFWS 2013).
- Increased recreational use of levee trails could potentially reduce habitat quality in managed ponds for nesting, roosting, and foraging waterbirds. Although some species and individuals habituate to human activity, others would maintain some distance between areas they select for nesting, foraging, or roosting and trails or viewing platforms. The intervening distance is essentially little used by these individuals, reducing the extent of suitable habitat available.
- Waterfowl hunting is allowed in season (late October through January) in some of the ELER pond areas. Hunting is managed, permitted, and controlled by CDFW to minimize impacts on non-target wildlife, but the potential for disturbance even to species not being hunted exists.
- There is no expectation that the recreational activities associated with this project as designed and informed by the AMP could result in impacts to other wildlife species, such as fish or small mammals, approaching the level of significance (2007 Final EIS/R).

Recent studies on the impacts of recreational trails on bird species suggest that waterbirds, shorebirds, and western snowy plover would all be impacted by the addition of new trails near foraging and nesting habitats (Trulio et al. 2012a; Trulio et al. 2012b; Trulio et al. 2013). Recommendations from the studies suggest that new trails should be sited at least 100 to 165 feet away from shorebird foraging habitat, and new trails should be adjacent to wide rather than narrow borrow ditches where possible (Trulio et al. 2013). Trails should be located at least 600 feet away from western snowy plover nesting habitat (Trulio et al. 2012a, Pearl et al. 2015), and should be at least 400 feet away from waterfowl foraging

habitat (Trulio et al. 2012b). Also, a study of tern and avocet nests on islands created at Pond SF2 suggests that the islands created greater than 300 feet from trails and 600 feet from viewing platform were not significantly affected by recreational access, though recreational use of the Pond SF2 trail has been low (Ackerman et al. 2014b).

As described in Chapter 2, the SBSP Restoration Project's goal of completing the Bay Trail spine through southern Eden Landing would be advanced by adding one of several new trail alignments as part of the project, but the specific route would be dependent on the availability of levees and other lands not owned by CDFW. The various trail alternatives differ significantly in their routes through the Phase 2 project area, as shown on Figures 2-3, 2-4, and 2-5. Solely on CDFW-owned lands, the Bay Trail would extend from the existing terminus in northern Eden Landing along the eastern border of the Reserve, across the 20-tide-gate structure over the OAC channel into southern ELER, and then continue on CDFW levees to the southeast corner of Pond E6C. From there, three routes are proposed to connect the trail to the ACFCC levee. These routes are as follows:

- Route 1: On CDFW Property only, but crossing over a ACFCWCD stormwater detention basin channel in their "J" Ponds.
- Route 2: On CDFW & Cargill Property on the eastern and southern levees of the Southern Ponds, where they wrap around the Cargill-owned CP3C pond (Cargill owns the levees bordering this pond). The property would be required to be owned in fee title by another owner, as Cargill's policy is no public access is allowed on their land.
- Route 3: On CDFW & Alameda County Property on the CDFW-owned levee on the eastern side of Pond E4C and then route onto County land to the east.

Most routes cannot be implemented in their entirety without land or easement acquisition. Even Route 1, which would be entirely on CDFW-owned levees or lands along the southern edge of Pond E6C and around the western edge of the Southern Ponds (the solid purple line on the maps), would cross over a storm water management channel and may require permission of, or coordination with, ACFCWCD to do so.

The northern portion of the trail and one of the three routes through the southern portion described above are in every Action Alternative. Together, and along with a viewing platform along the existing ACFCC Regional Trail, these components make up a "core" of new public access that would be added in Phase 2, regardless of the alternative that is eventually selected for implementation. The impacts discussions below describe the greatest potential for impacts related to recreational trail use disturbing sensitive wildlife species from the different routes and what the adjacent habitats (and thus types of wildlife) would be under the different Action Alternatives.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no additional recreation access is planned. The "core" of new public access features described above would not be added. The ponds at southern Eden Landing would continue to function as a mix of managed and seasonal ponds. Recreation opportunities at northern Eden Landing would remain as implemented in Phase 1 and would not be extended into southern Eden Landing. Existing trails and other public access features in northern Eden Landing and the East Bay Regional Parks District's regional trails along the ACFCC would continue to be maintained and used. Overall, under the No Action Alternative, there would be no new impacts to sensitive species and their habitats from recreation-orientated activities.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would add the "core" of new public access components described in the paragraphs above. If selected, Route 1 would be constructed on approximately 7,500 feet of perimeter levees along the southern edge of Pond E6C and the northern edge of Pond E5C and E1C. Route 2 would be constructed on approximately 10,500 feet of perimeter levee along the landside portion of the Southern Ponds, spanning from the northern corner of Pond E4C, to the south and east around Pond E4C and then west and south along Pond CP3C ending at Cal Hill. Route 3 would be constructed on approximately 3,500 feet of perimeter levee along the landside portion of Pond E4C and then extend east for about 1,000 feet prior to connecting to Westport Way. Under Alternative Eden B, southern Eden Landing would be restored to tidal marsh and would not retain managed ponds for pond-associated wildlife, thus limiting the types of effects that are possible.

Increased recreational access resulting from Phase 2 activities has the potential to impact sensitive species and their habitats, largely from disturbance associated with trail users. However, such disturbance would likely be limited to relatively narrow corridors along the perimeter of the restored ponds where trails are placed on improved levees. Impacts from these trail improvements are expected to be minor because, with the exception of Route 1 and a portion of Route 2, all trails and viewing platforms would be on the eastern edge of Eden Landing or even further east and away from sensitive wildlife. In Alternative Eden B in particular, the entirety of southern Eden Landing would be restored to tidal marsh, leaving very large areas of the Reserve unaffected by the use of newly added trails along the eastern perimeter.

The proposed Phase 2 trails would likely decrease waterfowl foraging and roosting activity within 400 feet of the trail (Trulio et al. 2012b). In the Southern Ponds, as the habitat transitions from pond to mudflat to tidal marsh, the species impacted would also shift. Mudflat foraging habitat for shorebirds along the trail is expected to reduce foraging activity within 165 feet of the trail (Trulio et al. 2013). Thus the length of the trail along each habitat type could be correlated with potential effects to different types of species. Due to the large area of the ponds, however, affected foraging areas would be relatively small compared to the total restored pond area.

The viewing platform would be installed along the Alameda Creek Regional Trail which also receives regular visitation (see Section 3.6, Recreation Resources). Although project actions may cause roosting to occur at higher elevations and in closer proximity to recreational trails, islands for roosting and nesting birds would be constructed from the remnant levees (for the short term) and would be constructed in various locations within ponds in southern Eden Landing, away from trails, to reduce the potential for disturbance. Potential effects would be monitored and managed, and implementation of the AMP would ensure that impacts do not reach significant levels.

Use of these newly added features are not expected to lead to a significant impact on sensitive wildlife species, though there is potential for adverse impacts. Public access has considerable potential to improve public education concerning the importance of the SBSP Restoration Project, habitat restoration and South Bay conservation in general. Such education and public enjoyment of the South Bay's biological resources may be important in maintaining public support for bonds that could be sources of funding for future phases of restoration and long-term monitoring and management of SBSP Restoration Project-area habitats. With monitoring and implementation of the AMP, the impact of recreation would be expected to be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C contains the same "core" public access features as Alternative Eden B, with several additional components. The first would be a pedestrian and bicycle bridge over the ACFCC to connect to the Bay Trail spine in and around the Coyote Hills Regional Park. The second would be a pair of trails along either side of the OAC (on levees along Pond E6A and E6) to a viewing platform located at the former location of the Alvarado Salt Works. A pedestrian/bicycle bridge would connect these two trails, which would thus form a loop out from the Bay Trail Spine. These new trails and one viewing platform would allow for recreational use in an area not previously accessible for this purpose.

Increased recreational access resulting from Phase 2 activities may impact sensitive species and their habitats. In the places where the "core" public access components would be added, similar extents of impacts from recreational trail use on wildlife would be present in Alternative Eden C as in Eden B, but notably, in Alternative Eden C, both the Inland Ponds and Southern Ponds would be retained and enhanced as managed ponds to provide habitat for pond-associated birds. Pond-associated species are more sensitive to human disturbance than are dabbling ducks that prefer marsh areas, where there may be cover or forage. Pond-associated species may use habitat further from trails and seek high tide roosting and nesting habitat along levees. Roosting and nesting pond-associated species may be subjected to potential disturbance from trail users.

Due to the importance of maintaining large areas of undisturbed potential nesting and roosting sites within the project area, trails would be limited to relatively narrow corridors along the edges of the ponds. Islands for roosting and nesting birds would be constructed from the remnant levees and would be located throughout southern Eden Landing away from proposed trails to further reduce the potential for disturbance. Further, these effects would be monitored and managed, and informed by activities supporting the AMP. In particular, under Alternative Eden C, the locations that are most likely to experience disturbance by recreational use of public access features are along the perimeter levees of southern Eden Landing, where the new public access trails and bridges would be added.

Use of these newly added features are not expected to lead to a significant impact on sensitive wildlife species, though there is potential for adverse impacts. Potential impacts identified from any studies would be addressed, as needed. As in Alternative Eden B, the benefits of public access which result in public support and funding for restoration would be expected with the new recreation features. With monitoring and implementation of the AMP, the impact of recreation would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Though there are differences in the restoration and flood risk management aspects of Alternative Eden B and Alternative Eden D, the public access and recreation components of these two alternatives include the same trail routes and the same viewing platform. However, even though the trail routes and extents would be the same between these two alternatives, there are important potential differences because of the different restoration outcomes of the Inland Ponds and Southern Ponds. In Alternative Eden B, these ponds would become tidal marsh, but in Alternative Eden D, they would be enhanced managed ponds for a decade or more before being opened to tides and restoration toward tidal marsh. During that initial period, the potential impacts of recreational trail use would be similar to those described in Alternative Eden C for pond-associated birds and other wildlife species. Following that, the potential impacts of recreational trail use on wildlife would gradually transition from affecting pond-associated species and guilds to affecting marsh species (as in Alternative Eden B).

Increased recreational access resulting from Phase 2 activities may impact sensitive species and their habitats. In the places where the "core" public access components would be added, similar extents of impacts from recreational trail use on wildlife would be present in Alternative Eden D as in Eden B, with the aforementioned temporal changes in the types of wildlife that would be affected.

Use of these newly added features are not expected to lead to a significant impact on sensitive wildlife species, though there is potential for adverse impacts. Potential impacts identified from any studies would be addressed, as needed. As in Alternative Eden B, the benefits of public access which result in public support and funding for restoration would be expected with the new recreation features. With monitoring and implementation of the AMP, the impact of recreation would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-19: Potential Impacts to special-status plants.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

As shown in Table 3.5-1, no threatened or endangered plant species[5] are known or have high potential to occur in the Eden Landing Phase 2 project area. No special-status plants have been documented within the boundaries of the Eden Landing Ecological Reserve (CDFW 2016b). Potential suitable habitat for one federally listed species, California seablite (*Suaeda californica*), occurs within and adjacent to southern Eden Landing; however, this species has not been documented with 5 miles of the project area. As shown in Table 3.5-1, documented occurrences are present, and potentially suitable habitat for a number of special-status plant species is present in or near the southern Eden Landing. These species include Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*), Point Reyes bird's beak (*Chloropyron marittimum* ssp. *palustre*), saline clover (*Trifolium hydrophilum*), and small (dwarf) spikerush (*Eleocharis parvula*). Given the open water nature of the Bay Ponds and the active management of the Southern Ponds and Inland Ponds, suitable terrestrial habitat for these species is limited. These special-status plant species thus have limited potential to occur. If these species are present, then project activities could have potential to result in adverse impacts on the CNPS-listed special status species.

Preconstruction surveys would be conducted, as appropriate and necessary prior, to project implementation. In the event that special-status plant species are discovered during surveys, the following avoidance and minimization measures would be implemented to eliminate any significant impact of the project on these plant species: (1) special-status plant species would be avoided to the maximum extent feasible, and all special-status plant populations would be clearly marked and avoided during construction; (2) if avoidance of special-status plant species populations is not feasible, several different actions could take place. For areas that would be temporarily affected, the plants and the surrounding soil

[5] As noted in Table 3.5-3, Impact 3.5-19 is specific to species that are listed under or that are candidates for listing under the Federal or California Endangered Species Act or those that appear on the California Native Plant Society's California Rare Plant Ranking list, which must be considered under CEQA. This impact does not include pickleweed, cordgrass, or other marsh plants which are part of important habitats and receive some protection as part of that ecological function but that are not themselves endangered or threatened.

would be collected, re-deposited in a nearby area, and replaced following construction. For areas that would be permanently impacted, the plants and the surrounding soil would be collected and relocated adjacent to impacted areas in suitable habitat. Whether special-status plants would colonize restored tidal and transitional habitats on their own or would have to be introduced to these areas is unknown, but the overall project impacts on special-status plants have the potential to be beneficial (2007 Final EIS/R).

In the long term, the SBSP Restoration Project is expected to improve conditions for most of the special-status plants with potential to occur in the area, including those listed above and others that occur primarily in upper tidal marsh habitat. Habitat transition zones would be created at the upper edge of some marshes by importing fill to produce broad, gently sloping areas adjacent to levees or adjoining upland habitat. These unique marsh-associated habitats, including the habitat transition zones and natural salt panne areas within upper salt marshes may become established with special status plant species or and would be incorporated, to the extent practicable, in the tidal restoration design. These habitat transition zones represent an important habitat type largely absent from the South Bay and would provide the opportunity for the re-introduction and establishment of special-status plant species. Also, tidal habitat restoration could eventually include the development of mature tidal marsh features (e.g., shell ridges, microtopographic differences) that could support special-status plant species (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no action would be taken. Southern Eden Landing would continue to function and be managed as a mix of seasonal and managed ponds with different pond bottom elevations and depths. No threatened or endangered plants species are known to occur in the vicinity of southern Eden Landing. Therefore, no impacts to existing special-status plants would be expected to occur from the No Action Alternative.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and otherwise connect all of southern Eden Landing to regular tidal flows to facilitate their conversion to tidal marsh habitat with islands and habitat transition zones. The changes to the existing levees, marshes, and pond interiors would have potential to directly affect individual special-status plants if they were present. However, none of those are known to be present in southern Eden Landing (as listed in Table 3.5-1 and shown on Figure 3.5-3). Use of information from preconstruction surveys and avoidance or relocation of any individual special-status plants identified would ensure no impacts to these species would occur, if present.

Alternative Eden B Level of Significance: No Impact

Alternative Eden C. Alternative Eden C would raise bottom elevations, breach, and otherwise connect the Bay Ponds to tidal flows to facilitate their conversion to tidal marsh habitat. A mid-complex levee would be built to separate them from the rest of southern Eden Landing, which would be enhanced managed ponds fitted with water control structures to allow more complete and timely control over water levels and quality in the Inland and Southern Ponds. The habitat transition zone would extend westward into the Bay Ponds, and there would again be remnant levees that would form islands. The changes to the existing levees, marshes, and pond interiors would have potential to directly affect individual special-status plants if they were present. However, none of those are thought to be present in southern Eden Landing (as listed in Table 3.5-1 and shown on Figure 3.5-3). With the use of preconstruction surveys and relocation of any individual special-status plants identified, there would be no impacts to these species, in the unlikely event they are present.

Alternative Eden C Level of Significance: No Impact

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and Inland Ponds and Southern Ponds would initially become enhanced managed ponds, as described for Alternative Eden C. Later, the water control structures could be removed, the mid-complex levee breached, and these ponds opened to tidal flows. In the short term, Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh). The same potential threats to special-status plant species, avoidance and minimization measures, and ability to relocate individual plants that may be present would be available under Alternative Eden D as in Alternative Eden C in the early years and as in Alternative Eden B in the later years. However, none of those are thought to be present in southern Eden Landing (as listed in Table 3.5-1 and shown on Figure 3.5-3). With the use of preconstruction surveys and relocation of any individual special-status plants identified, there would be no impacts to these species in the unlikely event they are present.

Alternative Eden D Level of Significance: No Impact

Phase 2 Impact 3.5-20: Colonization of mudflats and marsh plain by non-native Spartina and its hybrids.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

The tidal restoration of southern Eden Landing could provide new areas for the spread of smooth cordgrass, a highly invasive plant species, and its hybrids formed with native Pacific cordgrass. Smooth cordgrass hybrids are considered one of the three most significant invasive-species threats to San Francisco Bay (Grossinger et al. 1998). Restoration sites in salt ponds provide suitable elevations of unvegetated areas where seedlings can establish unhindered by competition and often in conditions sheltered from wave action. Given these ideal circumstances for establishment, smooth cordgrass and its hybrids could rapidly colonize restored salt ponds (Ayres et al. 2004) and become a dominant plant species in the restored tidal marshes if it is not controlled (2007 Final EIS/R). Since 2005, the Invasive Spartina Project has nearly eradicated invasive *Spartina* from the San Francisco Bay. The Invasive Spartina Project has effectively implemented ongoing monitoring to identify locations where invasive Spartina and its hybrids have become established, studied the establishment and genetics of hybrids, and treated identified areas. Today, *Spartina* is far less a concern than it was 10 years ago, prior to these aggressive eradication efforts. Since 2006, northern Eden Landing tidal restoration sites, including the Phase 1 actions, have been successfully managed by CDFW and treated by the Invasive Spartina Project, such that little, if any, invasive *Spartina* remains. Since 2010, the Invasive Spartina Project has been actively planting and successfully establishing native *Spartina foliosa* in restored marshes.

Intentional and unintentional breaching of levees and subsequent increases in tidal habitat could incidentally spread non-native *Spartina*. The SBSP Restoration Project expects that invasive *Spartina* will be successfully eradicated by the Invasive Spartina Project. The Invasive Spartina Project has been successful in reducing the total extent of patches of established invasive *Spartina* in the San Francisco Bay from over 800 acres to fewer than 30 acres. The size of the infestation in each of the remaining sites

has also been diminishing. By 2014, 41 sites had less than 1 square meter of coverage by the non-native and the hybrid, and 49 sites were between 1 square meter and 1 acre. Ongoing control and eradication efforts have been shown to be possible and effective as long as adequate funding and staffing for the program are provided. Due to the regulatory requirement in the USFWS BO, that requires Ridgway's rail numbers above the baseline, total eradication of invasive Spartina has not been completed at the few remaining un-treated sites. Review of recent population indices supports allowing treatment to begin in the remaining untreated sites. This emphasizes the critical importance of the Invasive Spartina Project and its ongoing funding and support for staffing and other operations.

Thus, impacts under all alternatives are expected to be less than significant, even while acknowledging that invasive plants may not yet be completely and permanently eradicated in all locations. The SBSP Restoration Project is using the Invasive Spartina Project's 2010 BMPs document (SCC and USFWS 2010) to inform restoration and management efforts. The list of practices is as follows:

1. Do not plant non-native Spartina at any time
2. Verify genetics of native Spartina plantings
3. Do not plant native Spartina where it may become pollinated by hybrid Spartina
4. Monitor and remove
5. "Success" = "No non-native Spartina"
6. Do not open a new marsh (i.e., make the tidal connection) too near *Spartina alterniflora* or *S. alterniflora* hybrids
7. Clean equipment
8. Avoid potentially contaminated dredged material

The most relevant of these to the SBSP Restoration Project are numbers 4, 6, 7, and 8, because these would minimize the risk of spreading invasive *Spartina* and its hybrids into the restoration areas.

At a minimum, the 2007 Final EIS/R stated that the project would clean equipment and supplies to prevent the spread of seeds and plant material of non-native *Spartina* and other invasive plants during construction, restoration, and maintenance activities (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no action would be taken. The ponds at southern Eden Landing would continue to function as a mix of managed and seasonal ponds. Land managers would continue to regularly coordinate with the Invasive Spartina Project and use best practices with support from results of studies and the AMP. The SBSP Restoration Project has successfully restored tidal areas without increasing areas impacted by invasive *Spartina*. Rather, invasive Spartina and its hybrids have been nearly eradicated and would continue to be monitored, studied and eradicated. Therefore, with continued coordination with the Invasive Spartina Project and information provided by studies and the AMP, the impact of Alternative A would be less than significant.

Alternative Eden A Level of Significance: Less than Significant

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and otherwise connect all of southern Eden Landing to regular tidal flows to facilitate their conversion to tidal marsh habitat with islands and habitat transition zones. Deposition of dredged material and construction of associated infrastructure, breaching and lowering of the levees, installing water control structures, and excavating channels for connectivity, and the subsequent creation of mudflats as marsh forms would increase the potential area for invasive *Spartina* to colonize, which would be a significant impact if it occurred. Compared with the other alternatives, Alternative Eden B would bring the largest and most rapid changes from current habitat conditions, which would increase the potential area for invasive *Spartina* to colonize. However, the project would implement the AMP and continue to collaborate with the Invasive Spartina Project to monitor and control smooth cordgrass and its hybrids. With these practices in place, colonization of mudflats and marsh plain by non-native *Spartina* would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C would raise bottom elevations, breach, and otherwise connect the Bay Ponds to tidal flows to facilitate their conversion to tidal marsh habitat. A mid-complex levee would be built to separate them from the rest of southern Eden Landing, which would be enhanced managed ponds fitted with water control structures to allow more complete and timely control over water levels and quality in the Inland and Southern Ponds. The habitat transition zone would extend westward into the Bay Ponds, and there would again be remnant levees that would form islands. As in Alternative Eden B, the deposition of dredged material and construction of associated infrastructure and breaching of the levees and subsequent creation of mudflats in the Bay Ponds would increase the potential area for invasive *Spartina* to colonize, if it occurred. In the Inland and Southern Ponds, in Alternative Eden D, however, there would be enhanced pond management with more static water levels, which reduce the likelihood of invasive *Spartina* establishment within ponds. In addition, as above, the project would implement the AMP and continue to collaborate with the Invasive Spartina Project to monitor and control smooth cordgrass and its hybrids. With these practices in place, colonization of mudflats and marsh plain by non-native *Spartina* would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and Inland Ponds and Southern Ponds would initially become enhanced managed ponds, as described for Alternative Eden C. Later, the water control structures could be removed, the mid-complex levee breached, and these ponds opened to tidal flows. In the short term, Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh). The same potential risks of invasive *Spartina* colonization, precautions to avoid it, and means and opportunities to address it occurs would be available under Alternative Eden D as in Alternative Eden C in the early years and as in Alternative Eden B in the later years. Therefore, the potential impacts would be similar to those in the other Action Alternatives and less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-21: Colonization by non-native Lepidium.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Because *Lepidium* colonization occurs primarily in infrequently flooded, brackish marshes, it competes for resources with native brackish-marsh species such as bulrushes (2007 Final EIS/R). Figure 3.5-4 illustrates the known distribution of *Lepidium latifolium* in the South Bay. *Lepidium* may have effects on the species composition within marsh areas. Without tidal restoration in the far South Bay (i.e., the Alviso pond complex), continued sedimentation may result in increased colonization by the non-native perennial pepperweed (*Lepidium latifolium*) as the tidal prism continues to decrease and brackish marsh expands.

Conversely, the breaching of levees and subsequent increases in tidal prism could reduce the amount of brackish marsh habitat available for colonization by *Lepidium*, and importance of eradication and control programs by the CDFW/ELER staff and project partners. This would be a benefit. Because *Lepidium* only grows in a narrow brackish band, the restored tidal marshes will almost entirely self-limit the areas where *Lepidium* could grow. This would be a second form of benefit.

However, the large areas of created habitat transition zone would also provide new areas for potential *Lepidium* colonization (2007 Final EIS/R). On these habitat transition zones, ongoing eradication and control will be critical, as will active revegetation with native plants immediately after construction to resist initial *Lepidium establishment*. There is a risk of extensive *Lepidium* establishment on these habitat features if not properly controlled. All of the habitat transition zones being considered for Phase 2 action alternatives are readily accessible to staff from shore, so it would be feasible to perform the necessary eradication and control.

The BMP of cleaning equipment and supplies to prevent the spread of seeds and plant material of non-native *Lepidium* and other invasive plants would be implemented during construction and restoration activities and during maintenance activities such as driving on levees and mowing (2007 Final EIS/R).

LEGEND

- *Lepidium latifolium* Occurence
- Eden Landing Phase 2 Project Area
- Southern Eden Landing Ponds

AECOM

South Bay Salt Pond Restoration Project

Figure 3.5-4

***Lepidium latifolium* Distribution**

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no action would be taken. The ponds at southern Eden Landing would continue to function as a mix of managed and seasonal ponds, and all of Eden Landing would continue to be managed to protect against *Lepidium*. Currently, *Lepidium* is visible on aerial images of tidal marsh areas adjacent to the Eden Landing pond complex. Under the No Action Alternative, no new construction or changes in management would occur; therefore, there would be no impact on existing populations of *Lepidium*.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and otherwise connect all of southern Eden Landing to regular tidal flows to facilitate their conversion to tidal marsh habitat with islands and habitat transition zones. The deposition of dredged material and construction of associated infrastructure and eventual opening of these ponds to tidal flows and marsh restoration could potentially open new areas for colonization by *Lepidium*. As pond bottom elevations are raised, and when new channels form, *Lepidium* could colonize the pond bottoms or channel margins. This colonization could be partially offset by the increased tidal prism, which could scour banks and reduce the potential for colonization. Later, as this reaches equilibrium, there would be places for *Lepidium* to establish. Alternative Eden B would also create upland habitat for *Lepidium* on the habitat transition zones, and on the remaining or improved levee sections. However, should *Lepidium* colonization take place in the new tidal or habitat transition zone areas, the AMP discussed in the 2007 Final EIS/R would be implemented to address the colonization. The implementation of the AMP would reduce this impact to a less-than-significant level.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C would raise bottom elevations, breach, and otherwise connect the Bay Ponds to tidal flows to facilitate their conversion to tidal marsh habitat. A mid-complex levee would be built to separate them from the rest of southern Eden Landing, which would be enhanced managed ponds fitted with water control structures to allow more complete and timely control over water levels and quality in the Inland and Southern Ponds. The habitat transition zone would extend westward into the Bay Ponds, and there would again be remnant levees that would form islands.

The raised pond bottoms and opening of the Bay Ponds could potentially open new areas for colonization there. As pond bottoms are raised and when new channels form, *Lepidium* could colonize the unvegetated pond bottoms and channel margins. This colonization could be partially offset by the increased tidal prism, which could scour banks and reduce the potential for colonization. This risk is somewhat reduced in the Inland Ponds and Southern Ponds because of the ability to manipulate water elevations to eliminate or control *Lepidium* if it begins to establish in these managed ponds. Alternative Eden C would also create upland habitat for *Lepidium* on the habitat islands, in the habitat transition zones, and on the improved mid-complex levee sections. However, should *Lepidium* colonization take place in the new tidal or upland areas, the AMP, discussed in the 2007 Final EIS/R, would be implemented to address the colonization. The implementation of the AMP would reduce this impact to a less-than-significant level.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, bottom elevations would be raised in the Bay and Inland Ponds through the import of dredge materials, the Bay Ponds would be opened to tidal action and transition to tidal marsh habitat, and Inland Ponds and Southern Ponds would initially become enhanced

managed ponds, as described for Alternative Eden C. Later, the water control structures could be removed, the mid-complex levee breached, and these ponds opened to tidal flows. In the short term, Alternative Eden D is similar to Alternative Eden C (Bay Ponds as tidal marsh and Inland Ponds and Southern Ponds as enhanced managed ponds), and in the long term is similar to Alternative Eden B (all ponds would be tidal marsh). The same potential risks of *Lepidium* colonization, precautions to avoid it, and means and opportunities to address it occurs would be available under Alternative Eden D as in Alternative Eden C in the early years and as in Alternative Eden B in the later years. Therefore, the potential impacts would be similar to those other Action Alternatives and less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-22: Increase in exposure of wildlife to avian botulism and other diseases.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

Of the wildlife diseases that could potentially affect species in the South Bay, those affecting birds are of greatest concern because of the ease with which they may be transmitted (due to birds' mobility) and the large numbers of individuals that can potentially be exposed to diseases in flocks or colonies. Avian botulism, the avian disease with the greatest potential to affect large numbers of birds, is caused by a toxin produced by the bacterium *Clostridium botulinum*. This pathogen requires a protein source, warm temperatures, and anoxic or low-oxygen conditions to reproduce and is generally harbored by soil in the environment (De La Cruz et al., in press). Warm, shallow water, fluctuating water levels, high ambient temperatures, the presence of vertebrate and invertebrate carcasses, high nutrient levels, and rotting vegetation can contribute to the presence of *C. botulinum* (Washburn 2013). Botulism is a neurological disease that results in paralysis, often leading affected birds to show symptoms that include an inability to fly or to hold their heads above water (2007 Final EIS/R).

Monitoring for botulism has occurred in the South Bay since at least 1982. Since then, avian botulism has been linked to six large waterbird die-offs and some smaller outbreaks. The largest recent outbreak was in 1998 when over 1,400 birds were affected in San Jose and Sunnyvale (SFBBO 2012). Permanently flooded marshes often have higher concentrations of botulism compared to seasonally flooded marshes. The presence of dead animals, pesticides, and other nutrient inputs that lead to algae blooms and warm, brackish water with low levels of dissolved oxygen increases the potential for botulism. Water pollution control plants have been identified as likely contributors to botulism outbreaks (SFBBO 2012). The 2007 Final EIS/R identified the following proposed mechanisms that facilitate outbreaks of avian botulism in the South Bay:

- The sludge-bed theory, which suggests that botulism outbreaks occur as a result of the warm and often anaerobic conditions created in the sludge ponds and lagoons associated with water treatment plant facilities;
- The microenvironment theory, which suggests that shallow ponds of water, formed from mudflats temporarily isolated from water exchange during low tide, facilitate outbreaks because they are associated with invertebrate die-offs, which are often consumed in large quantities by foraging birds; or

- The bird carcass theory, which suggests that botulism outbreaks are caused by the spread of bacteria through infected carcasses as maggots and invertebrates ingest the bacteria and are then ingested by foraging birds.

The SBSP Restoration Project could potentially exacerbate existing occurrences of diseases, particularly avian botulism, if the project were to increase the incidence of conditions such as warm water temperatures and anoxic or low-oxygen conditions. Such conditions may be present in shallow managed ponds with poor water circulation, necessitating careful management of water circulation; marshes that are poorly drained may also harbor such conditions. The AMP includes a description of monitoring and adaptive management activities concerning water quality. The project could also potentially increase the occurrence of disease outbreaks by concentrating larger numbers of birds into smaller areas (e.g., fewer ponds) (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The ponds at southern Eden Landing would continue to function as they do now and be managed as they are now. No changes in exposure to avian botulism are expected to occur at southern Eden Landing as part of the No Action Alternative. Under the current management regime, the different groups of ponds (Bay Ponds, Inland Ponds, and Southern Ponds) are managed for habitat purposes (e.g., drawing some down in advance of western snowy plover nesting season and keeping others full for dabbling ducks) and to avoid causing water quality problems within the ponds or discharging waters that are above salinity limits. These actions involve circulating water as needed to control dissolved oxygen per the existing AMP and to mix water from different ponds to achieve acceptable salinity levels. Under the No Action Alternative, there would be no increase in exposure of wildlife to avian botulism and other diseases.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and would excavate channels to them and within them to make them fully tidal. The Southern Ponds cannot be fully breached to tidal flows, but they would be fitted with more and better water control structures to connect them to the ACFCC than they have now, and will also have internal breaches and channels excavated within them. Levee lowering in some places and improvements in others will also increase circulation while maintaining de facto flood protection. Habitat transition zones and islands would also be emplaced. Treated wastewater from USD and brackish groundwater from ARP wells could be used to irrigate portions of the habitat transition zones. Wastewater from USD would be chlorinated to kill bacteria and other pathogens, and then dechlorinated prior to use at the Inland Pond.

The raising of the bottom elevation through deposition of slurry material would create conditions which may exacerbate existing occurrences of avian botulism. These conditions in the Bay and Inland Ponds may include warm water temperature, low dissolved oxygen, and poor water circulation. These conditions would be limited to the Bay and Inlands Ponds until settlement and consolidation is complete, and would not be expected to affect the Bay or other nearby managed ponds. Because the habitat value for the fish and other invertebrates would be eliminated in these areas, there would be minimal habitat value for wildlife, and avian use is expected to be minimal. Therefore, the potential for exposure to the disease would be limited. In addition, the Bay and Inland Ponds would not be permanently flooded, nor are they located within water treatment facilities where higher concentration of botulism are more prevalent in untreated water, and thus the potential for the disease would be less.

Breaching and excavating the pilot channels and also selectively locating the sections of lowered levees at historic slough meanders would encourage improved water circulation in all ponds, thus reducing conditions that are conducive to avian botulism. The restored tidal habitats are not expected to foster wildlife diseases. The AMP includes a description of monitoring and adaptive management activities concerning water quality and avian response to changing habitats that is intended to identify and then avoid or minimize potential adverse effects. As a result, the implementation of the AMP would reduce this impact to a less-than-significant level.

Alternative Eden B Level of Significance: Less than Significant

Alternative C. Alternative Eden C would raise pond bottom elevations and breach the Bay Ponds and would excavate channels to them and within them to make them fully tidal. However, in Alternative Eden C, Inland Ponds and the Southern Ponds would be fitted with more and better water control structures to connect them to the OAC and ACFCC, respectively. This would make them enhanced managed ponds. Currently, the ability of CDFW's management to circulate water through these ponds is limited by the number, location, quality, and invert elevation of the water control structures in the Inland Ponds and Southern Ponds. Alternative Eden C would add several more of these structures and improve the ability to manage ponds differently from each other and achieve better water quality conditions while doing so. The Southern Ponds and the Bay Ponds would also have internal breaches and channels excavated within them to improve the filling and draining of these ponds. Levee lowering in some places and improvements in others will also increase circulation while maintaining de facto flood protection.

The same impacts associated with deposition of the slurry material described in Alternative B would occur under Alternative Eden C, but would be limited to the Bay Ponds. Thus, the geographic area that is susceptible to conditions that favor avian botulism would be reduced under Alternative Eden C.

Breaching and excavating the pilot channels, adding water control structures, and also selectively locating the sections of lowered levees at historic slough meanders would encourage improved water circulation in all ponds, thus reducing conditions that are conducive to avian botulism. The restored tidal and enhanced managed pond habitats that would result are not expected to foster wildlife diseases. The AMP includes a description of monitoring and adaptive management activities concerning water quality and avian response to changing habitats that is intended to identify and then avoid or minimize potential adverse effects. As a result, the implementation of the AMP would reduce this impact to a less-than-significant level.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. With regard to impacts associated with avian botulism and other diseases, the outcomes of Alternative Eden D would be much like those of Alternative Eden B in the short and medium term due to the similar deposition of the dredge material and essentially identical to Alternative Eden B in the long run if (as planned) the Southern Ponds and Inland Ponds are opened to tidal flows. If the Inland Ponds and Southern Ponds are not opened to tidal flows in the future, the same water management options in Alternative Eden C would persist. The AMP includes a description of monitoring and adaptive management activities concerning water quality and avian response to changing habitats that is intended to identify and then avoid or minimize potential adverse effects. As a result, the implementation of the AMP would reduce this impact to a less than significant level.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-23: Potential impacts to bay shrimp populations.

Potential program-level impacts are addressed in Chapter 3.6 of the program-level evaluation found in the 2007 Final EIS/R. Here, the project-level impacts of the implementation of Eden Landing Phase 2 actions are assessed.

The epifaunal invertebrate community in the South Bay is dominated by several species of shrimps and crabs. Two native caridean shrimps, the California bay shrimp and the blacktail bay shrimp (*C nigricauda*), are common in tidal sloughs and in the Bay itself. The California bay shrimp supports the only commercial fishery remaining in the South Bay aside from the limited harvest of brine shrimp that occurs in salt ponds. The 2007 Final EIS/R cited unpublished data valuing the brine shrimp harvest of approximately 75,000 pounds at between $154,000 and $312,000 per year at that time. No additional data on this fishery was identified during the preparation of this document. A discussion of California bay shrimp life cycle details can be found in the 2007 Final EIS/R.

At a program level, the SBSP Restoration Project is expected to have a net benefit on bay shrimp by increasing (to Bay levels) the salinities in some freshwater sloughs and channels in the South Bay and increasing the amount of estuarine habitat. Such habitat is likely to be especially important to bay shrimp as nurseries for juveniles. However, some managed ponds (e.g., those managed specifically for small shorebirds) may have higher salinity and lower dissolved oxygen levels than some existing ponds. Releases of water from these ponds when conditions are not optimal could result in localized areas of low dissolved oxygen and high-salinity that may impair the health of, or cause mortality of, bay shrimp. Overall, the project has the potential to enhance the shrimp populations, which in turn could also provide economic benefits by revitalizing the shrimping industry. Although the effects of the SBSP Restoration Project on bay shrimp are expected to be beneficial overall, the AMP includes a description of monitoring and adaptive management activities concerning water quality and releases to the Bay (2007 Final EIS/R).

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Southern Eden Landing would continue to function as a mix of managed ponds of different depths, flow regimes, and salinities; levees would be maintained for inland flood risk management, as needed. No changes in bay shrimp populations would be anticipated at southern Eden Landing.

Low water quality in discharges could potentially adversely affect bay shrimp. Under the No Action Alternative, there would be no change to the current operation of these ponds and no change in the discharges from them compared to the baseline condition. Therefore, there would be no new impacts on bay shrimp as a result of Alternative Eden A.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would use an offloading facility, booster pumps, and pipelines to import dredge materials and raise bottom elevations in the Bay and Inland Ponds, and breach or otherwise connect all of the ponds at southern Eden Landing with the OAC or the ACFCC to connect them to tidal flows and facilitate their conversion to tidal marsh habitat. It would also and add habitat transition zones and islands, raise and improve levees in some places, and lower levees in others. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.) Shallow waters in some ponds and in the surrounding sloughs and Bay may provide some habitat for mysid shrimp.

The infrastructure placed in the Bay between the offloading facility and Pond E2 would have direct effects on benthic species on the mudflats along the pipeline route (those living at the sediment surface and in upper subsurface layer). Although effects to benthic species could occur during construction and operation of the dredge material placement infrastructure, intertidal mudflats are one of the most dominant habitats of the South Bay, and only a minimal percentage of the total mudflats area would be affected. In addition, effects from pipelines and booster pumps would only occur during a portion of the construction period, as the dredge material infrastructure would be removed prior to construction of the other restoration, flood risk management, and recreational components.

Although some shallow ponded mudflat habitat would be lost under Alternative Eden B, the conversion to tidal marsh and the development of tidal sloughs and smaller channels would be expected to have a net benefit on shrimp nursery habitat over the long-term. The selective breaching and other levee modifications along the lower portions of OAC and ACFCC would improve foraging habitat for juvenile shrimp migrating up to the brackish water of these tidally influenced waterways. Multiple breaches into and within the ponds would provide water circulation in the newly restored marshes, thus avoiding low-oxygen conditions. Tidal marsh habitat adjacent to sloughs would provide suitable low-salinity brackish estuarine habitat for juvenile shrimp migrating to summer foraging grounds.

The Action Alternatives for Phase 2 at Eden Landing are expected to benefit to bay shrimp by increasing the amount of tidal marsh habitat; Alternative Eden B has the greatest amount of added tidal marsh habitat. Such habitat is likely to be especially important as nurseries for juveniles. Therefore, the impact of Alternative Eden B would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden B Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden C. Alternative Eden C would raise pond bottom elevations and breach the Bay Ponds and convert them to tidal marsh, and add habitat transition zones at their eastern edge. However, Alternative Eden C would not open the Inland Ponds or Southern Ponds to tidal flows and would instead retain them as managed ponds while improving the ability of CDFW managers to operate the managed ponds to achieve better water quality outcomes. This would be accomplished through the addition of 11 water control structures and the retention of levees between the individual ponds in these groups. This would maximize flexibility of management and – while not directly adding habitat for mysid shrimp – would provide more control over potential problems with low dissolved oxygen or high salinity in the retained managed ponds. This would benefit the various mysid shrimp species by avoiding or reducing water quality conditions that impair them.

Shallow waters in some ponds and in the surrounding sloughs may provide some habitat for mysid shrimp. Although some shallow ponded mudflat habitat would be lost under Alternative Eden C, the conversion to tidal marsh and the development of tidal sloughs and smaller channels would be expected to have a net benefit on shrimp nursery habitat. The benefits of Alternative C are similar to those described for Alternative Eden B, except that the net benefit and amount of available tidal marsh habitat would be greater under Alternative Eden B. Therefore, the impact of Alternative Eden C would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden C Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Alternative Eden D. With regard to impacts on and benefits to mysid shrimp habitat and population levels, the outcomes of Alternative Eden D would be much like those of Alternative Eden C in the short and medium term and essentially identical to Alternative Eden B in the long run if (as planned) the Bay

Ponds and Inland Ponds are opened to tidal flows. If the Inland Ponds and Southern Ponds are not opened to tidal flows in the future, the benefits from Alternative Eden C would still be realized by these species. Overall, therefore, the impact of Alternative Eden D on mysid shrimp would be less than significant under CEQA and beneficial under NEPA.

Alternative Eden D Level of Significance: Less than Significant (CEQA); Beneficial (NEPA)

Phase 2 Impact 3.5-24: Potential impacts to jurisdictional wetlands or waters.

Jurisdictional wetlands and other waters occur in southern Eden Landing. Jurisdictional wetlands and other waters areas meet the regulatory definition of "Waters of the U.S." and are subject to the jurisdiction of the USACE under provisions of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. In San Francisco Bay, jurisdictional wetlands and other waters areas are also regulated by the BCDC. Jurisdictional wetlands and other waters are also subject to Section 401 of the Clean Water Act, administered in the State of California by the RWQCB; the project ponds are in the San Francisco RWQCB region.

Regionally, more than 90 percent of historic tidal wetlands in the Bay Area have been lost to diking, draining, and filling (Goals Project 1999). The jurisdictional wetland and water habitats included in the South Bay are open waters and subtidal habitats to the upper reaches of tidal action, the tidal and nontidal wetlands, and former salt evaporation ponds adjacent to the Bay. These habitats provide important wildlife habitat (as discussed in sections above), but also provide other services such as flood risk management, water quality improvements, and carbon sequestration.

The Eden Landing Phase 2 Action Alternatives involve levee breaching and lowering as well as channel excavation to open some ponds to tidal flows and adding water control structures to open others to enhance the ability to manage water quality and other conditions within some ponds retained as such. The overarching long-term mission of the SBSO Restoration Project is the restoration and enhancement of tidal marsh wetlands in the South Bay while providing for flood management and wildlife-oriented public access and recreation. To achieve these goals, the Phase 2 Action Alternatives would initially create adverse impacts to wetlands and other waters resulting from breaches, channel excavations, and other modifications to the levees and the surrounding fringing marshes. Additional fill-related impacts would come from building islands and habitat transition zones, and installing water control structures. However, the impacted acreage would be significantly smaller than the area of the restored wetlands.

The vast majority of conversion would be from jurisdictional other waters to wetlands, which the USACE considers special aquatic sites; special aquatic sites have increased value due to their increased ecological functions and values. The wetlands, in comparison to other waters, will provide higher-quality habitat for sensitive plant and animal species and refugia for many bird species.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. The southern Eden Landing ponds would continue to function as a mix of managed ponds with some ability control water depths and salinities. The existing levees would be retained as they are for wildlife and water quality control purposes, and they would continue to provide de facto flood protection. These actions would not have any impact on wetlands located in northern Eden Landing that were enhanced as part of the Phase 1. There would be no new impacts on jurisdictional wetlands or waters associated with Alternative Eden A.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would use an offloading facility, booster pumps, and pipelines to import dredge materials and raise pond bottom elevations in the Bay and Inland Ponds. These ponds would be breached to connect them to tidal flows from OAC, and water control structures would be added to connect the Southern Ponds with the ACFCC. Channels would be excavated within the ponds and outside of them to improve draining and filling of the ponds with each tidal cycle. An additional channel would be excavated through the existing marsh south of the Bay Ponds for fish habitat enhancement by connecting the ACFCC (a steelhead run) with those Ponds.

To retain or improve the current levels of flood risk management, the existing levees on the eastern end of the pond complex would be raised and improved, while other internal and external levees would be breached or lowered to allow more rapid drainage of peak stormwater flows. Alternative Eden B would also add habitat transition zones along the eastern border and build habitat islands on remnant levees throughout the ponds. All of these changes would require at least some fill (temporary or permanent) in jurisdictional wetlands and waters.

The breaching of the levees and the creation or enlargement of uplands at the tops of improved levees and habitat transition zones would impact wetlands, both temporarily (disturbance during construction) and permanently (loss of wetland habitat where levees are breached). Wetlands and other waters would be impacted during construction as fill is added for the creation of the habitat transition zones and island habitat and as levees are breached.

Similarly, the excavation of pilot channels is necessary to connect the ponds with the OAC and ACFCC. This would create channels (other waters) in what are currently wetlands, which is another form of impact. Within the ponds themselves, the channels would be excavated in the pond bottoms, and those jurisdictional waters would still be waters, though that would still be a form of impact to be assessed.

The details of the areas and volumes of fill in all jurisdictional wetlands and other waters as well as the areas of other waters converted to wetlands, and the total area of wetlands and other waters lost will be developed in a later design stage and presented in the permitting step of this project. However, a qualitative examination of the maps and the conceptual look at the designs indicate that adverse impacts would be in the tens of acres, while over two thousand acres of wetlands would be established by these activities.

Overall, however, the Phase 2 construction activities in Alternative Eden B would result in the creation of significantly larger areas of wetlands than would be impacted. Similarly, the ecological function and value of other waters would be improved via many more connections and habitat enhancements. The small losses of wetland and other waters habitat would be replaced by high-value wetland habitat. In sum, these impacts on jurisdictional wetlands and other waters would be considered less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative C. Alternative Eden C would use an offloading facility, booster pumps, and pipelines to import dredge materials and raise pond bottom elevations in the Bay Ponds, breach the Bay Ponds to connect them to tidal flows from OAC, and it would add water control structures to connect the Inland Ponds and the Southern Ponds to provide controlled connections with the OAC and ACFCC, respectively. The Bay Ponds would be restored to tidal marsh, and the Inland Ponds and Southern Ponds would be retained as enhanced managed ponds. Channels would be excavated within the ponds and outside of them

to improve draining and filling of the ponds with each tidal cycle (in the Bay Ponds) or when management objectives require it (in the Inland Ponds and Southern Ponds). An additional channel would be excavated through the J-Ponds for fish habitat enhancement by connecting the ACFCC (a potential steelhead run once upstream barriers to migration are removed and a viable run is restored) with the Bay Ponds.

To retain or improve the current levels of flood risk management and to create hydraulic separation between the Bay Ponds and the rest of southern Eden Landing, a permanent mid-complex levee would be constructed. The mid-complex levee would extend across a diked marsh portion of the J-Ponds. Other internal and external levees in the Bay Ponds would be breached or lowered to allow more rapid drainage of peak stormwater flows. Alternative Eden C would also add habitat transition zones along the mid-complex levee border and build habitat islands on remnant levees. A portion of the western levee of Pond E2 would be improved to reduce potential for overtopping and scour of the restoring marsh. All of these changes would require at least some fill in jurisdictional wetlands and waters. In addition, the water control structures in the Inland Ponds and Southern Ponds would replace some portion of the existing levee footprint, but would still constitute fill in jurisdictional wetlands and other waters.

The breaching of the levees and the creation or enlargement of uplands at the tops of improved levees and habitat transition zones would impact wetlands, both temporarily (disturbance during construction) and permanently (loss of wetland habitat along breached levees). Wetlands and other waters would be impacted during construction as fill is added for the creation of the habitat transition zones and island habitat and as levees are breached.

Similarly, the excavation of pilot channels is necessary to connect the ponds with the OAC and ACFCC. This would create channels (other waters) in what are currently wetlands, which is another form of impact. Within the ponds themselves, the channels would be excavated in the pond bottoms, and those jurisdictional waters would still be waters, though that would still be a form of impact to be assessed.

The details of the areas and volumes of fill in all jurisdictional wetlands and other waters as well as the areas of other waters converted to wetlands, and the total area of waters lost will be developed in a later design stage and presented in the permitting step of this project. However, a qualitative examination of the maps and the conceptual look at the designs indicate that adverse impacts would be in the tens of acres, while over one thousand acres of tidal wetlands would be established and another thousand acres of other waters would be improved by these activities.

Overall, the Phase 2 construction activities in Alternative Eden C would result in the creation of significantly larger areas of jurisdictional wetlands and improved other waters than would be impacted. Similarly, the ecological function and value of other waters would be improved via many more connections and habitat enhancements. The small losses of jurisdictional wetland and other waters habitat would be replaced by high-value wetland habitat. In sum, these impacts on jurisdictional wetlands and other waters would be considered less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Alternative Eden D would use an offloading facility, booster pumps, and pipelines to import dredge materials and raise bottom elevations in the Bay and Inland Ponds, breach the Bay Ponds to connect them to tidal flows from OAC, and in the short term, it would add water control structures to connect the Inland Ponds and the Southern Ponds to provide controlled connections with the OAC and ACFCC, respectively. The Bay Ponds would be restored to tidal marsh, and the Inland Ponds and the

Southern Ponds would be retained as enhanced managed ponds until the Bay Ponds had successfully established tidal marsh. At that time, if the results of AMP monitoring showed that managed ponds were no longer necessary for pond-dependent wildlife species, then water control structures would be removed to create new breaches, and the Inland and/or the Southern Ponds would also begin their conversion to tidal marsh. As in Alternative Eden C, Channels would be excavated within the ponds and outside of them to improve draining and filling of the ponds with each tidal cycle (in the Bay Ponds) or when management objective require it (in the Inland Ponds and Southern Ponds).

To retain or improve the current levels of flood risk management and to create hydraulic separation between the Bay Ponds and the rest of southern Eden Landing, a temporary mid-complex levee would be constructed. The existing backside levees along the eastern border of the pond complex would also be raised and improved for flood risk management. The mid-complex levee would extend across a currently marshy portion of the J-Ponds. Other internal and external levees in the Bay Ponds would be breached or lowered to allow more rapid drainage of peak stormwater flows. Alternative Eden D would also add a habitat transition zone along the westernmost levee of Ponds E1 and E2 and projecting into those ponds. That western levee of Ponds E1 and E2 would be improved to support the transition zone and provide other habitat benefits. As in the other Action Alternatives, there would be habitat islands formed on remnant levees. All of these changes would require at least some fill in jurisdictional wetlands and waters. In addition, the water control structures in the Inland Ponds and Southern Ponds would replace some portion of the existing levee footprint, but would still constitute fill in jurisdictional wetlands and other waters.

The breaching of the levees and the creation or enlargement of uplands at the tops of improved levees and habitat transition zones would impact wetlands, both temporarily (disturbance during construction) and permanently (loss of wetland habitat along breached levees). Wetlands and other waters would be impacted during construction as fill is added for the creation of the habitat transition zones and island habitat and as levees are breached.

Similarly, the excavation of pilot channels is necessary to connect the ponds with the OAC and ACFCC. This would create channels (other waters) in what are currently wetlands, which is another form of impact. Within the ponds themselves, the channels would be excavated in the pond bottoms, and those jurisdictional waters would still be waters, though that would still be a form of impact to be assessed.

The details of the areas and volumes of fill in all jurisdictional wetlands and other waters as well as the areas of other waters converted to wetlands, and the total area of waters lost will be developed in a later design stage and presented in the permitting step of this project. However, a qualitative examination of the maps and the conceptual look at the designs indicate that adverse impacts would be in the tens of acres, while over one thousand acres of tidal wetlands would be established and another thousand acres of other waters would be improved by these activities.

Overall, the Phase 2 construction activities in Alternative Eden D would result in the creation of significantly larger areas of jurisdictional wetlands and improved other waters than would be impacted. Similarly, the ecological function and value of other waters would be improved via many more connections and habitat enhancements. The small losses of jurisdictional wetland and other waters habitat would be replaced by high-value wetland habitat. In sum, these impacts on jurisdictional wetlands and other waters would be considered less than significant.

Alternative Eden D Level of Significance: Less than Significant

Phase 2 Impact 3.5-25: Potential construction-related loss of, or disturbance to, nesting raptors (including burrowing owls).

Raptors, including burrowing owls (*Athene cunicularia*), are known to occur in and near some of the SBSP Restoration Project ponds. The project ponds and the surrounding upland habitats may provide foraging, roosting, and nesting habitat. Suitable nesting habitat for many raptors can include trees, cliffs, and structures such as buildings or bridges; burrowing owls are ground nesters and use burrows (often created by ground squirrels or other rodents) in levees and open upland habitat for nesting. Northern harriers also nest on the ground in higher areas within marsh habitats, grasslands, or fields.

Burrowing owls are also present in ruderal habitats and grasslands (all now non-native) in scattered areas surrounding the salt ponds and marshes in the South Bay. Ruderal habitats, which are particularly extensive on former landfills, and grasslands, agricultural lands, and pastures in the Mountain View, Alviso, Fremont, and Newark areas provide foraging habitat for large numbers of diurnal raptors, such as red-tailed hawks, northern harriers, white-tailed kites (*Elanus caeruleus*), loggerhead shrikes (*Lanius ludovicianus*), peregrine falcons, and American kestrels (*Falco sparverius*). Many of these raptors are found foraging in wetlands, such as salt marshes and managed ponds as well. Burrowing owls are not known to be present in the Phase 2 project area at southern Eden Landing and the closest potential suitable habitat is at Coyote Hills Regional Park.

Once nests are established, raptors can be very sensitive to disturbance, such as from construction equipment. The availability of upland habitats for raptors would be reduced by a small amount at locations where levees are breached. Minimal impacts to tall nesting structures, such as electric line poles, or trees, are anticipated as part of the Phase 2 southern Eden Landing project, as only one short section of an obsolete power line would be removed. Some raptors may benefit from increased prey in the number of other nesting birds or small rodents that could be present on islands, habitat transition zones, or tidal marshes.

Raptors are protected under the federal Migratory Bird Treaty Act of 1918 and some are protected under the Endangered Species Act of 1973. Raptors, including burrowing owls, are also protected under state law (see Fish and Game Code Sections 3503, 3503.5, 3505, and 3513 and Title 14 California Code of Regulations Sections 251.1, 652, and 783–786.6). Burrowing owls are known to inhabit burrows within SBSP Restoration Project levees though not at southern Eden Landing; other raptors are known to nest in or roost on power poles proximate to the area of the SBSP Restoration Project that could be disturbed or removed by construction activity.

Alternative Eden A (No Action). Under Alternative Eden A (the No Action Alternative), no new action would be taken. Therefore, no impacts to nesting raptors would occur.

Alternative Eden A Level of Significance: No Impact

Alternative Eden B. Alternative Eden B would raise pond bottom elevations and breach the Bay and Inland Ponds, and excavate channels to connect the ponds to tidal flows and facilitate their conversion to tidal marsh habitat. This alternative would also raise and improve sections of levees for flood risk management, restoration purposes, or to support a recreational trail. Alternative Eden B would also create habitat islands and add habitat transition zones, add a long section of recreation trail and a viewing platform. (Construction impacts within the ponds and in the tidal marsh habitats adjacent to the ponds are described in more detail in Impacts 3.5-1 and 3.5-2.)

As noted above, (burrowing owls and harriers excluded) raptor habitat is generally trees, buildings, or other taller structures. Other than power lines and towers, these habitat elements are largely absent from the Phase 2 project area at southern Eden Landing, which reduces the potential for impacts on most raptors. There are two PG&E distribution lines that run through the project area and electrical towers to support them. One of these lines runs along the northern border of southern Eden Landing parallel to and south of the OAC. It would be removed because its only use was to power a pump that would be removed as part of the project. The other line cuts across the Southern Ponds and would remain with some improvements to the concrete foundations of the towers to keep the metal tower legs out of the water.

Implementation of the levee modifications, channel excavations, and other habitat or infrastructure improvements could potentially impact nesting raptors through noise and visual disturbance. The recreation trail could also impact nesting raptors because – depending on which of the three routes is chosen, it may run near grassy areas, uplands, or developed areas that are suitable raptor nesting and foraging habitat (see Impact 3.5-18 for full discussion on recreation and public access impacts).

There is no known burrowing owl habitat nearby, so this species is not likely to be affected, but there could be noise-related disturbances to raptors from general construction activities and also when fill material is driven into the project staging areas in haul trucks.

To minimize this impact, work would be done outside of the nesting season to the extent practicable. If work were to occur during the nesting season, pre-construction surveys would be conducted to identify any nesting raptors within 500 feet of the project construction areas (or an agency-approved distance); burrowing owl surveys would follow the CDFW protocol, as provided in *Staff Report on Burrowing Owl* (CDFG 2012). Should any nesting raptors be identified, nest locations would be recorded, and an agency-approved buffer would be established for working in the area. If construction cannot be timed to avoid nesting raptors and they are identified during pre-construction surveys, a biological monitor would be present to monitor disturbance to any nesting birds. With the implementation of these measures, the impact of Alternative Eden B to nesting raptors would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Alternative Eden C would raise pond bottom elevations and breach the Bay Ponds, and excavate channels to connect the Bay Ponds to tidal flows to facilitate their conversion to tidal marsh habitat. Meanwhile, the Inland and Southern Ponds would be retained and enhanced as managed ponds for a range of wildlife needs. This alternative would also raise and improve sections of levees for flood risk management, restoration purposes, or to support a recreational trail. Alternative Eden C would also create habitat islands and add habitat transition zones, and add the same long section of recreation trail and a viewing platform described above as well as a loop trail to the Alvarado Salt Works site and bridges over the OAC and ACFCC.

The impacts from habitat conversion, construction disturbance, and recreational trail use would be similar to those proposed under Alternative Eden B, except they would be in different locations, and those associated with trail use would greater due to the additional constructed elements (see Impact 3.5-18 for full discussion on recreation and public access impacts). The operation of water control structures is manual and done by a single staff member, which should provide little disturbance to any raptors nearby. Construction work on the PG&E infrastructure could disturb raptors.

The avoidance and minimization measures described for Alternative Eden B would be applied to reduce impacts to nesting raptors. With the implementation of these measures, the impacts to nesting raptors would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. With regard to potential impacts on nesting raptors or their habitat in the Phase 2 project area at southern Eden Landing, Alternative Eden D would be similar to Alternative Eden C in the short and medium term and similar to Alternative Eden B in the long term. With implementation of the avoidance and minimization measures described above, the impacts to nesting raptors would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Impact Summary

Phase 2 impacts and levels of significance are summarized in Table 3.5-4. The levels of significance are those remaining after implementation of program-level mitigation measures, project-level design features, the AMP, and other Reserve management documents and practices. The Biological Resources analysis required no project-level mitigation measures to reduce the impacts to a level that was less than significant.

Table 3.5-4 Phase 2 Summary of Impacts – Biological Resources

IMPACT	ALTERNATIVE EDEN A	ALTERNATIVE EDEN B	ALTERNATIVE EDEN C	ALTERNATIVE EDEN D
SBSP Impact 3.5-1: Potential construction-related loss of or disturbance to special-status, marsh-associated wildlife.	NI	LTS	LTS	LTS
SBSP Impact 3.5-2: Potential construction-related loss of or disturbance to nesting pond-associated birds.	NI	LTS	LTS	LTS
SBSP Impact 3.5-3: Potential reduction in numbers of small shorebirds using San Francisco Bay, resulting in substantial declines in flyway-level populations.	NI	LTS	LTS/B	LTS
SBSP Impact 3.5-4: Loss of intertidal mudflats and reduction of habitat for mudflat-associated wildlife species.	NI	LTS	LTS	LTS
SBSP Impact 3.5-5: Potential habitat conversion impacts to western snowy plovers.	NI	PS	LTS	LTS
SBSP Impact 3.5-6: Potential reduction in the numbers of breeding, pond-associated waterbirds (avocets, stilts, and terns) using the South Bay due to reduction in habitat, concentration effects, displacement by nesting California gulls, and other Project-related effects.	NI	LTS	LTS	LTS
SBSP Impact 3.5-7: Potential reduction in the numbers of non-breeding, salt-pond-associated birds (e.g., phalaropes, eared grebes, and Bonaparte's gulls) as a result of habitat loss.	NI	LTS	LTS	LTS

IMPACT	ALTERNATIVE EDEN A	ALTERNATIVE EDEN B	ALTERNATIVE EDEN C	ALTERNATIVE EDEN D
SBSP Impact 3.5-8: Potential reduction in foraging habitat for diving ducks, resulting in a substantial decline in flyway-level populations.	NI	LTS	LTS	LTS
SBSP Impact 3.5-9: Potential reduction in foraging habitat for ruddy ducks, resulting in a substantial decline in flyway-level populations.	NI	LTS	LTS	LTS
SBSP Impact 3.5-10: Potential habitat conversion impacts on California least terns.	NI	LTS	LTS	LTS
SBSP Impact 3.5-11: Potential loss of pickleweed-dominated tidal salt marsh habitat for the salt marsh harvest mouse and salt marsh wandering shrew and further isolation of these species' populations due to breaching activities and scour.	NI	LTS/B	LTS/B	LTS/B
SBSP Impact 3.5-12: Potential disturbance to or loss of sensitive wildlife species due to ongoing monitoring, maintenance, and management activities.	LTS	LTS	LTS	LTS
SBSP Impact 3.5-13: Potential effects of habitat conversion and pond management on steelhead.	LTS	LTS/B	LTS/B	LTS/B
SBSP Impact 3.5-14: Potential impacts to estuarine fish.	NI	LTS/B	LTS/B	LTS/B
SBSP Impact 3.5-15: Potential impacts to piscivorous birds.	NI	LTS	LTS	LTS
SBSP Impact 3.5-16: Potential impacts to dabbling ducks.	NI	LTS	LTS/B	LTS
SBSP Impact 3.5-17: Potential impacts to harbor seals.	NI	LTS/B	LTS/B	LTS/B
SBSP Impact 3.5-18: Potential recreation-oriented impacts to sensitive species and their habitats.	NI	LTS	LTS	LTS
SBSP Impact 3.5-19: Potential impacts to special-status plants.	NI	NI	NI	NI
SBSP Impact 3.5-20: Colonization of mudflats and marsh plain by non-native *Spartina* and its hybrids.	LTS	LTS	LTS	LTS
SBSP Impact 3.5-21: Colonization by non-native *Lepidium*.	NI	LTS	LTS	LTS
SBSP Impact 3.5-22: Increase in exposure of wildlife to avian botulism and other diseases.	NI	LTS	LTS	LTS
SBSP Impact 3.5-23: Potential impacts to bay shrimp populations.	NI	LTS/B	LTS/B	LTS/B
SBSP Impact 3.5-24: Potential impacts to jurisdictional wetlands or waters.	NI	LTS	LTS	LTS
SBSP Impact 3.5-25: Potential construction-related loss of, or disturbance to, nesting raptors (including burrowing owls).	NI	LTS	LTS	LTS

Note: Alternative A is the No Action (No Project Alternative under CEQA).

B = Beneficial (NEPA only)

LTS = Less than Significant

NI = No Impact

The levels of significance for the impacts listed above assume that the Adaptive Management Plan and all program-level mitigation measures are integral components of the project and that management responses would be implemented based on ongoing monitoring and applied studies.