3.8 BIOLOGICAL RESOURCES

Biological resources include plant and animal species and the habitats or communities in which they occur. This section is divided into discussions of regulatory considerations, vegetation, wildlife species, sensitive or special status species, sensitive habitats, essential fish habitats, and wetlands. The ROI for biological resources includes Treasure Island and Yerba Buena Island and surrounding aquatic habitat within a half-mile (0.8-km) radius. This radius of the surrounding bay was selected because it includes potential sensitive species and habitats that could be affected by NSTI reuse activities, such as dredging and ferry service to and from NSTI.

Biological data were collected from numerous sources, including the California Department of Fish and Game (CDFG) Natural Diversity Database (CDFG 2001), the California Native Plant Society (CNPS), and environmental documents cited in this section. Data from a November 1996 plant survey of Yerba Buena Island also is included in this section (DON 1996r). Field surveys were conducted on April 12, 22, and 30, May 13 and 28, June 17, and October 4, 18, and 20, 1996, and September 14, 2001, to identify the natural resources at NSTI and to check for the presence of sensitive species. Sensitive species are those that the U.S. Fish and Wildlife Service (USFWS) has proposed for listing as endangered, threatened, or candidates for listing or as species of special concern. USFWS and the National Oceanic and Atmospheric Administration (NOAA)'s National Marine Fisheries Service (NMFS, also referred to as NOAA Fisheries) personnel were consulted regarding the likelihood of finding listed species at NSTI (see Appendix C for copies of correspondence).

3.8.1 Regulatory Considerations

Natural resources in the project area were evaluated in accordance with the applicable provisions of the following statutes, executive orders, and permit requirements.

Endangered Species Act

The Endangered Species Act of 1973 (ESA) (16 U.S.C. §§ 1531-1534) protects plant and animal species (and their designated critical habitats) that are listed under the act as threatened or endangered. Species are listed as endangered if found to be in danger of extinction throughout all or a significant portion of their ranges. Threatened species are those likely to become endangered within the foreseeable future. The ESA also protects designated critical habitat for listed species. This consists of specific geographic areas which are essential to the conservation of the species, which may require special management considerations. ESA-listed species of marine invertebrates, marine and anadromous fishes, marine reptiles, and marine mammals with the exception of the sea otter are under the jurisdiction of NMFS. Remaining ESA-listed species, including the sea otter, are under the jurisdiction of the USFWS. The ESA requires federal agencies to consult with the USFWS or NMFS, as applicable to the species in question, before initiating any action that may adversely affect a listed species.

Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703-712) is domestic legislation implementing international agreements made among the United States and England, Mexico, the former Soviet Union, and Japan to protect migratory bird populations. It protects

indigenous species of birds that live, reproduce, or migrate within or across international borders at some point during their life cycles from unauthorized take (possession, injury, or mortality). Executive Order 13186, issued by President Clinton in 2001, provides additional mechanisms for federal agencies to protect migratory birds and promote their conservation.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) (16 U.S.C. §§ 1361-1421h) protects and conserves marine mammal species by prohibiting harm or harassment of any marine mammal unless specifically authorized by NOAA Fisheries. If a project proponent determines that an action could harm harass marine mammals, the proponent shall consult with either the USFWS or NMFS to determine if a permit to take a marine mammal is required.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) (amended by the Sustainable Fisheries Act of 1996, Pub. L. 104-267, as codified in scattered sections of 16 U.S.C. § 1801 et seq.) applies to fisheries resources and fishing activities in federal waters that extend to 200 miles (322 km) offshore. It addresses conserving and managing U.S. fisheries, developing domestic fisheries, and phasing out foreign fishing activities. It also establishes regional fisheries management councils that set fishing quotas and restrictions in U.S. waters in the form of fish management plans (FMPs). All fish included in a FMP are assigned essential fish habitat (EFH)—those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. Federal agencies must consult with the NMFS on proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. The act sets forth the enforcement actions that authorized officers may take, including making arrests, boarding, searching, and inspecting fishing vessels and seizing fishing vessels, fish, and other evidence. For more detailed information on FMPs and EFH, refer to section 3.8.6.

Clean Water Act/Federal Water Pollution Control Act

The CWA/Federal Water Pollution Control Act (33 U.S.C. §§ 1251-1387) sets the basic structure for regulating discharges of pollutants to waters of the U.S. This includes those waters used for navigation or those leading to navigable rivers or waters used for interstate commerce (including lakes) and wetlands bordering streams or other waterbodies. The CWA states that it is unlawful for any person to discharge any pollutant from a point source into navigable waters in the absence of a permit. Section 404 of the Clean Water Act (33 U.S.C. § 1344) requires a permit from the COE for the placement of dredged or fill material into the waters of the United States.

Waters of the United States include all waters that are, have been, or are likely to be, important to interstate commerce, including tidal waters, freshwater lakes, rivers and streams, and wetlands that are adjacent to these bodies of water. The landward regulatory limit for nontidal waters (in the absence of adjacent wetlands) is the "ordinary high water mark," which is the line on the shores established by the fluctuations of water and indicated by physical characteristics. Wetlands are defined under the CWA regulations as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically

adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 C.F.R. 328.3). Jurisdictional wetlands exist when the following three criteria are present: wetlands hydrology, hydric soils, and hydrophytic vegetation (COE 1987).

Water quality on and around Treasure Island is regulated by the San Francisco Regional Water Quality Control Board (RWQCB), which operates under authority delegated to it by the EPA and the State Water Resources Control Board (SWRCB). The RWQCB is the local agency that implements the CWA and (the State Porter-Cologne Water Quality Act (Cal. Water Code §§ 13000-13999.19). The RWQCB regulates discharges under the National Pollutant Discharge Elimination System (NPDES) permit regulations. NPDES permitting requirements cover runoff discharged from point sources (e.g., industrial outfall discharges) and specific nonpoint sources (e.g., stormwater runoff), including construction and industrial sites. The RWQCB implements the NPDES program by issuing construction and industrial discharge permits.

The RWQCB, EPA, COE, and BCDC also participate in the San Francisco Bay Long Term Management Strategy (LTMS) for dredging in San Francisco Bay (information at www.epa.gov/region09/water/ltms/ltms.html). The LTMS is intended to identify long-term solutions for dredging and dredged material disposal for a 50-year planning period. An estimated average of approximately 300 million cubic yards (229 million m^3) per year of dredge materials will require disposal through the planning period (1995 to 2045). The LTMS agencies have established a Dredged Material Management Office (DMMO) which provides guidance on sediment testing for new dredging programs, and for disposing of, rehandling, and reusing dredge material in both construction and fill activities.

Rivers and Harbors Appropriations Act of 1899

Section 10 of the Federal Rivers and Harbors Appropriations Act of 1899 (RHA) (30 Stat. 1151, codified at 33 U.S.C. §§ 401, 403) prohibits the unauthorized obstruction or alteration of any navigable water (33 U.S.C. § 403). Navigable waters under the RHA are those "subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 C.F.R. § 3294). Typical activities requiring Section 10 permits are construction of piers, wharves, bulkheads, marinas, ramps, floats, intake structures, cable or pipeline crossings, and dredging and excavation.

National Environmental Policy Act

NEPA requires federal agencies to evaluate the environmental impacts of proposed projects, programs, and policies that could significantly affect the quality of the human environment.

California Endangered Species Act

Under the California Endangered Species Act (CESA) (Cal. Fish & Game Code §§ 2050-2116), CDFG maintains a list of threatened and endangered species at the state level and a list of candidate species, which are those under review for being added to the state list of endangered or threatened species. The CDFG also maintains watch lists of species of special concern. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species could be

present in the project area and must determine whether the proposed project will have a potentially significant impact on such a species. In addition, the CDFG encourages informal consultation on any proposed project that could affect a candidate species. The CESA applies to state and local government agencies only and not the federal government.

McAteer-Petris Act

The McAteer-Petris Act (Cal. Gov't Code §§ 66600-66682) created BCDC, which regulates dredging and filling and public access within 100 feet (30 m) of the mean high tide line within San Francisco Bay. Under the McAteer-Petris Act, BCDC has jurisdiction over all areas of the bay that are subject to tidal action, including subtidal areas, intertidal areas, and tidal marsh areas that are between mean high tide and five feet above mean sea level. In addition, BCDC has jurisdiction over a 100-foot (30-m) shoreline band surrounding the bay from the mean high tide line. BCDC's jurisdiction does not extend to federally owned areas, such as the Navy or US Coast Guard property on Yerba Buena Island, because they are excluded from state coastal zones pursuant to the Coastal Zone Management Act.

Coastal Zone Management Act

The CZMA (16 U.S.C. §§ 1451-1465) encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources, such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. To encourage states to participate, the CZMA makes federal financial assistance available to any coastal state or territory that is willing to develop and implement a comprehensive coastal management program. Federal agencies are required to carry out activities that affect any land or water use or natural resource of a state's coastal zone in a manner consistent with the enforceable policies of an approved state management plan.

Executive Order 11990

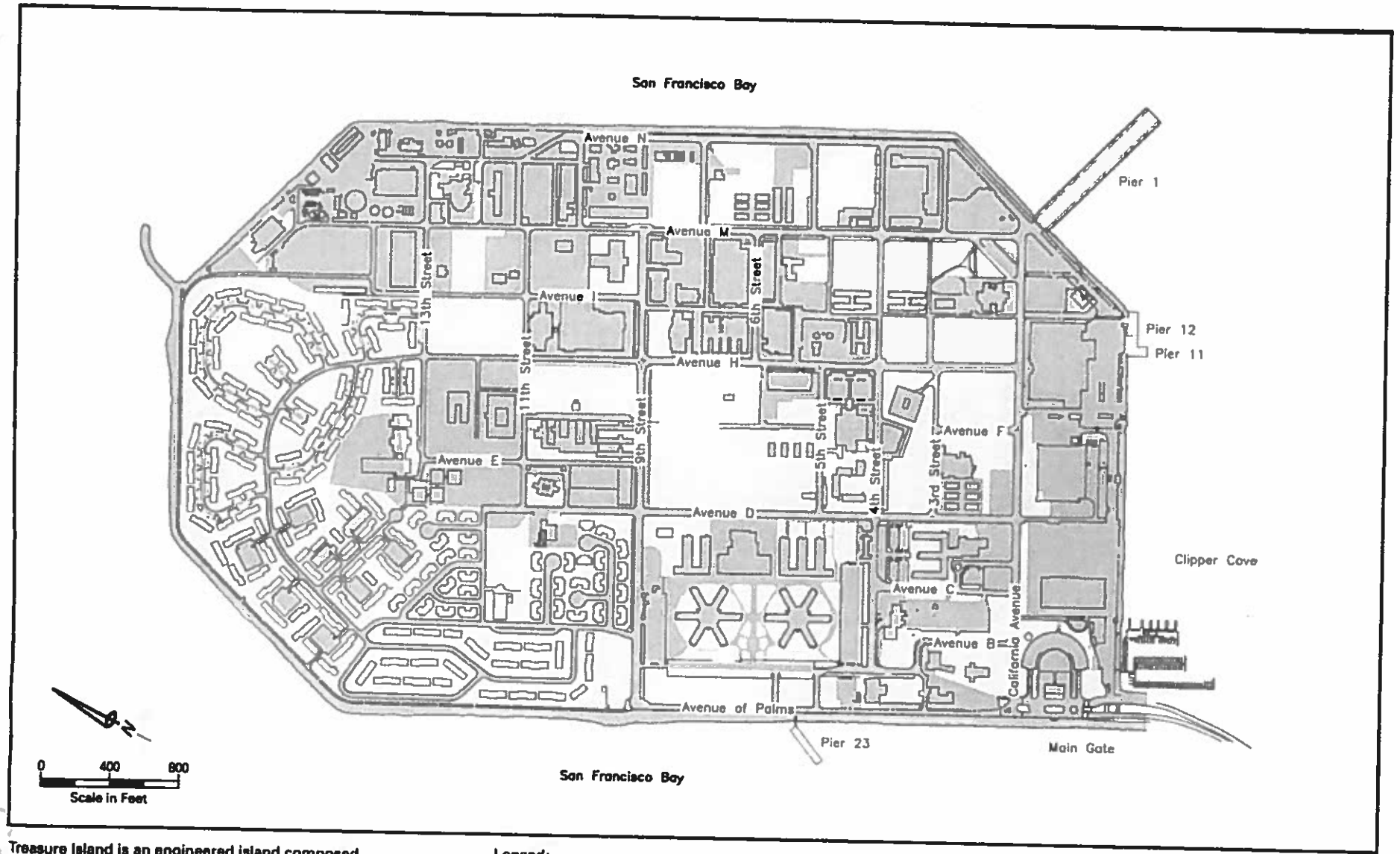
Executive Order 11990, Protection of Wetlands (42 Fed. Reg. 26961, May 24, 1977), was signed by President Carter in 1977 and directs federal agencies to avoid wherever feasible the adverse impacts associated with destroying or modifying wetlands.

US Coast Guard Aid to Navigation Permit

The US Coast Guard's primary responsibility is to preserve and enhance the navigability and safety of navigable waters of the U.S. Placing buoys in the bay to limit access to sensitive mudflat habitat at Clipper Cove (see section 4.8, Biological Resources) would require an aid to navigation permit from the US Coast Guard to ensure that the buoys do not interfere with safe navigation through these parts of the bay (14 U.S.C. § 83).

3.8.2 Vegetation/Habitat Types

Figures 3-11 and 3-12 illustrate the location of the terrestrial habitats on Treasure Island and Yerba Buena Island. Treasure Island is an engineered island and contains little native habitat. Habitat types on Treasure Island are landscaped and developed areas. Landscaped areas include mature ornamental trees, shrubs, and grasses (Figure 3-11). The only undeveloped



Treasure Island is an engineered island composed of artificial fill. Habitat types on Treasure Island are landscaped areas and developed areas. These areas correspond with "landscaped" and "developed" areas, respectively, on the terrestrial habitat type map of Yerba Buena Island.

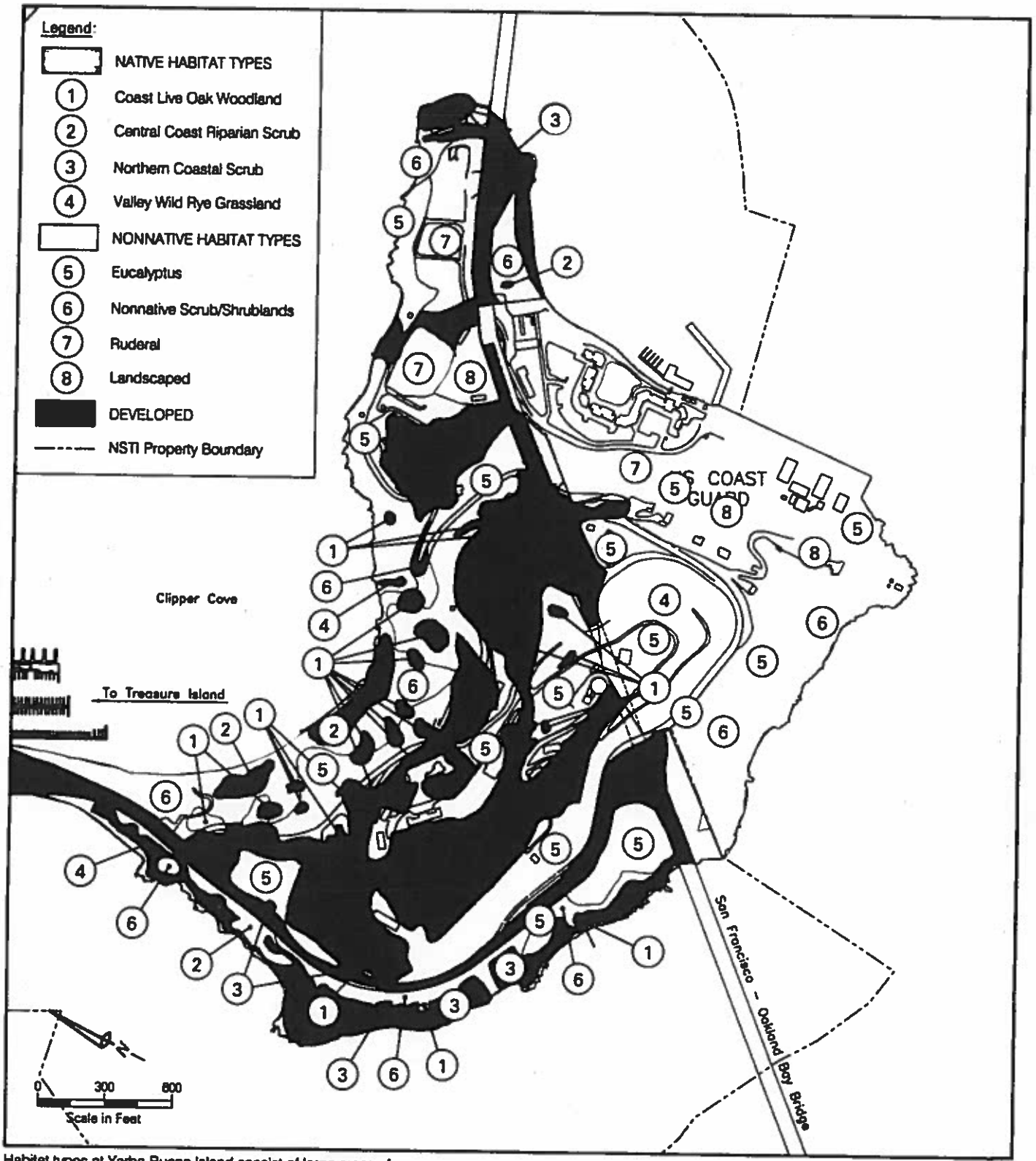
Legend:

- Non-native Habitat Types - Landscaped
- Developed

Terrestrial Habitat Types Treasure Island

Sources: DON 1997; 1998c

Figure 3-11



Habitat types at Yerba Buena Island consist of large areas of nonnative plant communities and developed areas with smaller areas dominated by native vegetation. This figure reflects habitats identified during a series of focused special status plant surveys at the portion of Yerba Buena Island controlled by the Navy.

Terrestrial Habitat Types Yerba Buena Island

Source: US Navy 1987; 1996c; Wood 1996

Figure 3-12

areas on NSTI are on Yerba Buena Island, where eucalyptus woodlands represent the largest habitat. Yerba Buena Island has a mix of five habitat types of predominantly native species, four habitat types of predominantly nonnative species, and developed areas with little or no vegetation, forming a mosaic pattern of habitat types (Figure 3-12) (San Francisco 1995a). The native habitat types are coast live oak woodland, northern coastal scrub, valley wild-rye grassland, central coast riparian scrub, and northern coastal salt marsh. The nonnative habitat types are eucalyptus woodland, nonnative scrub-shrub land (i.e., nonnative invading garden species), ruderal (i.e., weedy), and landscaped (San Francisco 1995a).

Eelgrass beds (*Zostera marina*), common to sheltered areas of water, such as harbors and coves, are located within the project area along the north shore of Yerba Buena Island at Clipper Cove and the east shore of Yerba Buena Island. Eelgrass habitat is described in detail in the Estuarine Habitat section below.

Terrestrial Habitats

Coast Live Oak Woodland

This habitat type is dominated by coast live oak *(Quercus agrifolia)* and consists almost exclusively of closed canopy forests. Coast live oak communities are frequently found on shady clay hillsides and may form a buffer between grasslands and mixed evergreen forests (Zeiner et al. 1990). Coast live oak woodland differs from other oak woodland subclasses in the relative rarity of annual grasses in its understory. The most frequent dominant plant found beneath coast live oak canopies is poison oak *(Toxicodendron diversilobum)*, but other species, such as California blackberry *(Rubus ursinus)* and creeping snowberry *(Symphoricarpus mollis)*, are frequently found there as well.

Coast live oak woodland may offer habitat to such wildlife species as pocket gopher *(Thomomys bottae)*, western gray squirrel *(Sciurus griseus)*, western fence lizard *(Sceloporus occidentalis)*, and Steller's jay *(Cyanocitta stelleri)*. The black-crowned night heron *(Nycticorax nycticorax)* roosts and nests on Yerba Buena Island oak woodland (FHWA 2001). The black-crowned night heron is protected under the MBTA.

Northern Coastal Scrub

Northern coastal scrub is a dense shrub-dominated community that commonly occurs as a buffer between northern oak woodland and southern oak woodland. This habitat type is composed of low-growing shrubs that are able to grow where tree growth is prevented by strong onshore winds and is therefore frequently found on steep slopes with strong prevailing winds (Heady et al. 1977). Coyote brush *(Baccharis pilularis)* is the dominant shrub species, with others being sticky monkey flower *(Mimulus aurantiacus)*, coffeeberry *(Rhamnus californica)*, and poison oak.

The most representative stand of northern coastal scrub on Yerba Buena Island is found in a continuous band along the steep bluffs on the islands western edge, mostly west of Treasure Island Road. Northern coastal scrub habitat often hosts such wildlife species as song sparrow *(Melospiza melodia)*, Bewick's wren *(Thryomanes bewickii)*, and vagrant shrew *(Sorex vagrans)*.

Central Coast Riparian Scrub

Central coast riparian scrub typically consists of a scrubby, streamside, open to impenetrable thicket composed of any of several species of willow. This habitat type is dominated by arroyo willow (*Salix lasiolepis*), with lesser amounts of red willow. Together, these species form a complete canopy supporting virtually no understory.

The most representative growth of central coast riparian scrub on Yerba Buena Island is found at lower elevations of the steep north-facing slope adjacent to Clipper Cove where the water table nears the surface. There is also a single stand on the western side of the island. Wildlife species that may be found in this habitat include white-crowned sparrow (*Zonotrichia leucophrys*) and Steller's jay (*Cyanocitta stellari*).

Valley Wild Rye Grassland

Valley wild rye grassland typically forms dense patches dominated by creeping ryegrass (*Leymus triticoides*). This plant community typically occurs on moist sites at low elevations, often adjacent to riparian or freshwater marsh habitat.

On Yerba Buena Island, valley wildrye grassland can be found above the western shoreline near the causeway connecting Yerba Buena Island and Treasure Island (Figure 3-12). This habitat forms a dense band on the bluffs above the northern coastal scrub and extends into the eucalyptus trees.

Ruderal

Ruderal vegetation is found in heavily disturbed areas, such as roadsides and abandoned dirt lots. Plant species found in these areas are generally weedy species, such as French broom (*Genista monspessuliana*), wild mustard (*Brassica kaber*), and wild radish (*Raphanus raphanistrum*). In general, this habitat is of little value from an ecological standpoint; however, it may provide temporary cover and foraging area for small animal species.

Ruderal habitat may be used on Yerba Buena Island by birds, such as the western sandpiper (*Calidris mauri*), killdeer (*Charadrius vociferous*), and dunlin (*Calidris alpina*), as they escape tidal inundation.

Nonnative, Landscaped

Much of the vegetation found on Treasure Island consists of introduced species, including trees such as blue gum eucalyptus (*Eucalyptus globulus*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpa*). Woodland comprised of blue gum eucalyptus occurs on Yerba Buena Island. These nonnative trees are of some value to wildlife, e.g., as foraging, perching, and nesting habitat for birds. Native plant species are not likely to be found in landscaped areas due to frequent disturbance, human control, and lack of proper soils. For these reasons, this habitat type is of little value to wildlife.

Estuarine Habitats

This section discusses habitat types that fall within the general classification of estuarine, as defined by Cowardin (U.S. Department of Interior 1979). Cowardin defines the estuarine system as "consisting of deepwater habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean and in which ocean water is at least occasionally diluted by freshwater runoff from the land." Subsystems of estuarine habitat are classified as subtidal, which is continuously submerged, and intertidal, which is alternately exposed and flooded by tides and includes the associated splash zone (U.S. Department of Interior 1979). NSTI and the ROI of the proposed action encompass all of these habitat types.

Estuaries are some of the most productive habitats on earth. Varying degrees of salinity, differences in current velocities, a gradient of depths and temperatures and a diversity of intertidal habitat types contribute to this productivity, making estuaries extremely important habitat. The San Francisco Bay is the largest estuary on the West Coast and is very important in terms of fisheries and other wildlife habitat values.

San Francisco Bay has a surface area of approximately 820 square miles (1,312 square km) (Cloern and Nichols 1985), and salt waters extend approximately 40 miles (64 km) inland at some times of the year. The bay is divided into four main sections: Suisun Bay, San Pablo Bay, the Central Bay, and the South Bay (Figure 3-13). Suisun Bay, which is the northeastern portion of San Francisco Bay, supports the prime mixing zone for fresh and salt waters and is lower in salinity than other parts of the bay such as the Central or South bays. NSTI is within the Central Bay.

The Central Bay, including NSTI, delineated in this report by Point Richmond in the north and Candlestick Point in the south, is largely deep bay and channel habitat. Deepwater habitat is found on the western side of NSTI, with water depths growing increasingly shallower to the east. Waters are cold and saline in this portion of the bay and are heavily influenced by tidal action. As the Central Bay is the entrance to the bay, all anadromous and pelagic fish species that occasionally visit the bay pass through the Central Bay.

The predominant aquatic habitat around Treasure Island and Yerba Buena Island is subtidal, with unconsolidated mud (silt and clay) bottom substrate. Water depths around NSTI range from about 7 to 33 feet (2 to 10 m), with the exception of the southeastern tip of the facility, where depth increases to more than 66 feet (20 m). There are no freshwater or wetland habitats on Treasure Island, although a small salt marsh is found on Yerba Buena Island (DON 1990a). There is rocky intertidal shoreline with mudflats on the western side of the cove between Yerba Buena Island and Treasure Island. There is limited intertidal habitat, consisting of concrete riprap and dock and pier pilings, along most of the shoreline surrounding Treasure Island. Yerba Buena Island has a rocky intertidal shoreline, with mudflats extending to the north between it and Treasure Island. Cobble gravel substrate is found off the southern and western edges of Yerba Buena Island (Figure 3-14).

Tidal Salt Marsh

Tidal marsh also once ringed San Francisco Bay but is now confined to a few large contiguous areas and remnant marshes in a variety of locations. This habitat type is generally found along the margins of bays, lagoons, and estuaries sheltered from excessive wave action (Macdonald and Barbour 1974). The existing bay habitat type (referred to by Cowardin as persistent emergent wetland) is typically dominated by pickleweed *(Salicornia virginica)*. Saltgrass *(Distichlis spicata)* is common at the upper edges, whereas cordgrass *(Spartina foliosa)* is typically found at the lower edges of this habitat. Nonnative species of cordgrass (*Spartina* spp.) are becoming increasingly established in San Francisco Bay and threaten to displace native cordgrass as well as mudflat habitat. The vegetative composition of tidal marsh varies depending on the part of the bay and the topography of the area in which it is found. Tidal marsh in brackish areas where salt water and freshwater meet, most notably in the Suisun Marsh, tend to be dominated by tules *(Scirpus* spp.*)* and cattails *(Typha* spp.*)*. There are about 40,000 acres (16,194 ha) of tidal marsh in San Francisco Bay (Goals Project 1999), although very little of this habitat exists in the project area. Non-tidal salt marsh vegetation remains in many diked areas of San Francisco Bay. No salt marsh is found on Treasure Island, but there is a narrow band of it on the eastern side of Clipper Cove on Yerba Buena Island (FHWA 2001).

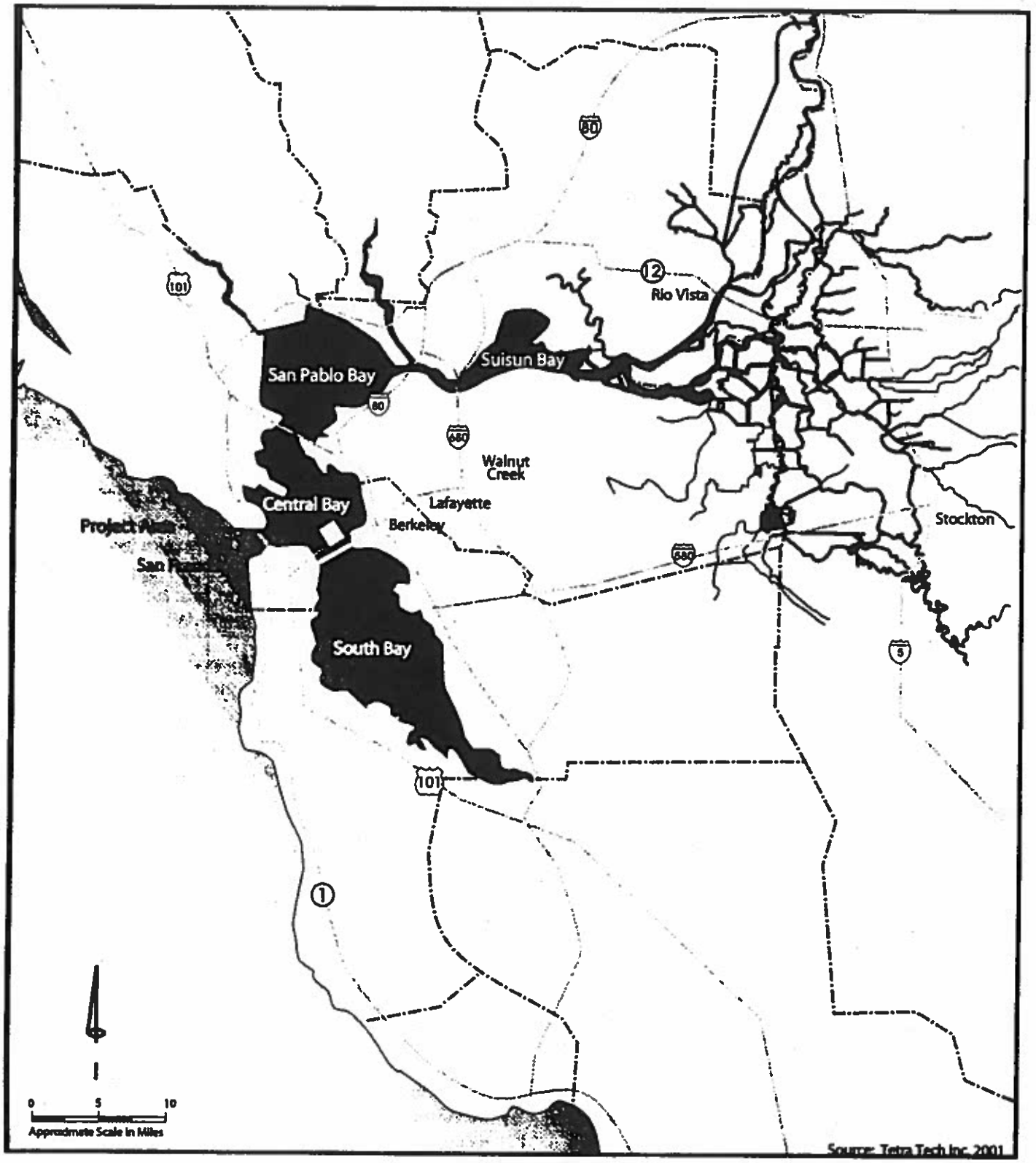
Common tidal salt marsh plants, such as pickleweed, glasswort *(Salicornia subterminalis)*, cordgrass, alkali heath *(Frankenia salina)*, and saltgrass *(Distichlis spicata)*, have differing tolerances for submergence and exposure, and, as a result, are found in distinct elevation zones along the shoreline. Wildlife species found in salt marshes in the bay may include the federally listed endangered California clapper rail *(Rallus longirostris)*, the state-listed threatened California black rail *(Laterallus jamaicensis)*, and the federally listed endangered salt marsh harvest mouse *(Reithrodontomys raviventris)*. None of these species are likely to occur at NSTI. Great blue herons *(Ardea herodius)*, great egrets *(Ardea alba)*, coots *(Gymnopgyps californicus)*, ducks, and many species of shorebirds are also found in tidal salt marshes.

Rocky Shore

The riprapped shoreline of Treasure Island and the natural rocky shoreline of Yerba Buena Island provide rocky intertidal to shallow subtidal habitat. Rocky shores are productive habitats that provide a substrate for algae and sessile invertebrates, which in turn provide food and shelter for mobile invertebrates, fishes, birds, and mammals. Most rocky shores in San Francisco Bay are artificial, being composed of riprap, pier pilings, and wharves, while natural rocky shores are limited to exposed headlands and islands.

Shallow Subtidal Areas and Tidal Flats

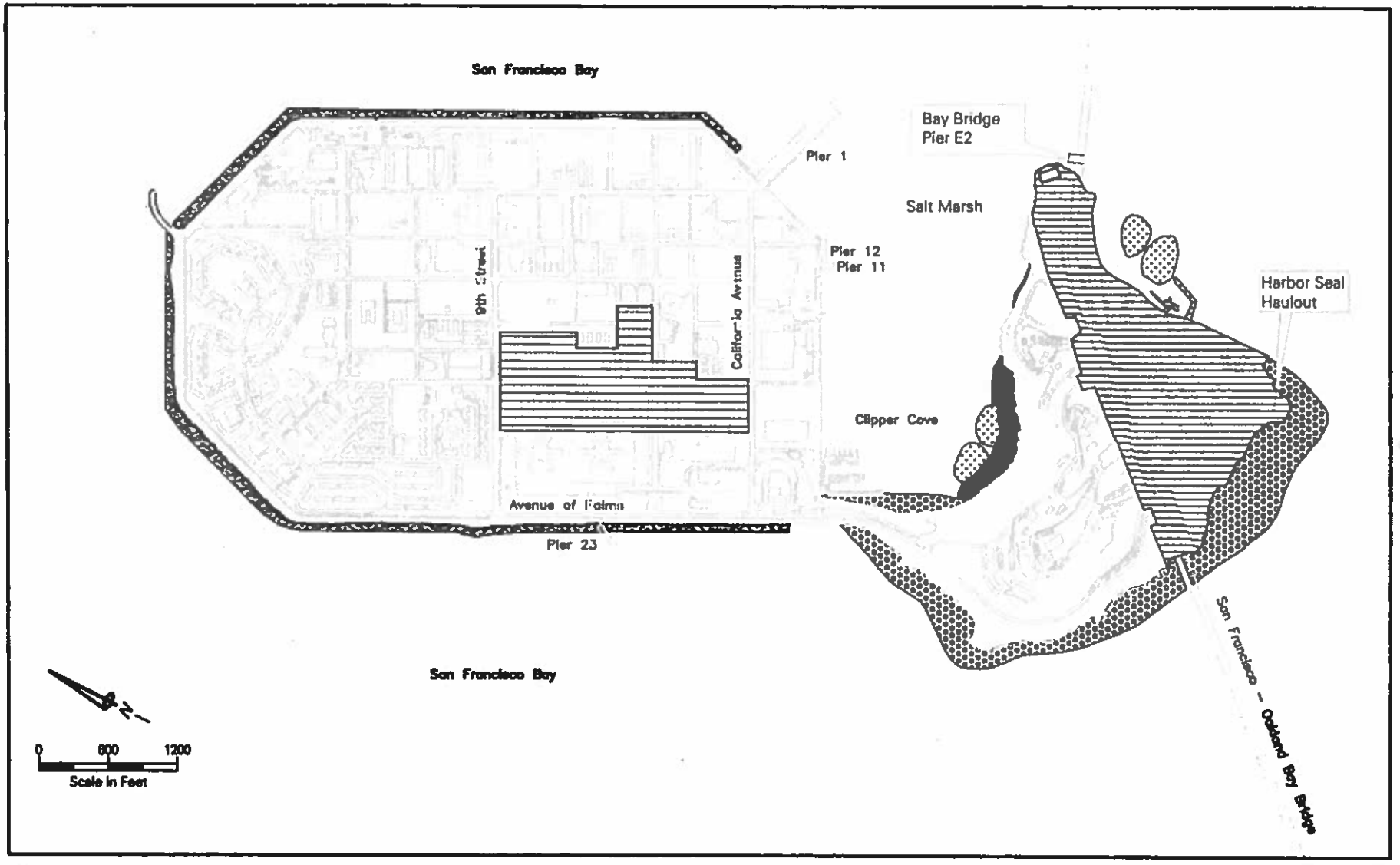
There are about 200,000 acres (80,980 ha) of shallow subtidal habitat and tidal flats in San Francisco Bay (Goals Project 2000). Shallow subtidal areas extend to depths of about 18 feet (5.2 m). Tidal flats generally occur between the mean tide level (MTL), or the lower elevation limit of cordgrass flats, to the lowest tide level, about 2.5 feet (0.7 m) below mean lower low water (MLLW). The semidiurnal (twice daily) tidal cycles that characterize San Francisco Bay submerge and expose tidal flats once or twice daily. There are approximately three acres (1.2 ha) of intertidal mudflats in the project area along the southeasterly edge of Clipper Cove (Figure 3-14).



Major Regions of San Francisco Bay

Naval Station Treasure Island, California

Figure 3-13



Yerba Buena Island has a variety of aquatic habitat types, whereas Treasure Island is limited to rocky areas. Harbor seals haul out on the southeastern shoreline of Yerba Buena Island under the SFOBB.

Legend:

- Eelgrass
- Mud flat, Mud bottom
- Cobble gravel bottom
- Rocky
- Areas Excluded from Proposed Navy Disposal

Aquatic Habitat Types

Naval Station Treasure Island, California

Sources: DON 1997; 1998c

Figure 3-14

Shallow subtidal areas and tidal flats of the bay support few plant communities, compared to other estuaries, such as Humboldt Bay and Tomales Bay. These plant communities include microalgae (such as diatoms), macroalgae (i.e., seaweed), and eelgrass *(Zostera marina)*. Microalgae form the basis for the estuarine food chain, providing a readily available food source for such organisms as worms and clams, which are then consumed by shorebirds and waterfowl. Macroalgae are found throughout the bay, primarily in the more saline areas, such as the Central Bay.

Eelgrass

Although often thought of as seaweed or grass, eelgrass is actually a flowering plant that has adapted to living submerged in the shallow waters of protected bays and estuaries in temperate regions of the world (Phillips and Menez 1988). Eelgrass is the only seagrass in the bay (Phillips and Menez 1998) and is found in intertidal zones that become exposed during the lower spring tides. It is also found in subtidal areas at depths of less than 7 feet (2 m). Eelgrass provides food, shelter, and spawning grounds for many fish and invertebrates, including the Pacific herring *(Clupea harengus)*, which prefers eelgrass beds for spawning (Spratt 1981). Eelgrass provides forage for the black brant *(Branta nigricans)*, which relies on it almost exclusively during migration along the Pacific flyway (Einarsen 1965). Eelgrass provides many important ecological functions, such as stabilizing unconsolidated sediments, providing shelter for many organisms, and improving water quality by reducing nutrients, sediments, and pollutant inputs from land (Williams and Davis 1996).

Surveys in 1999 and 2000 identified eelgrass beds in the project area, four near Yerba Buena Island (FHWA 2001). Two of these were within Clipper Cove on the north side of Yerba Buena Island and two within Coast Guard Cove on the east side of Yerba Buena Island (Figure 3-14). Eelgrass beds are highly dynamic and fluctuate in size, as such variables as light availability and nutrient load change. The most recent surveys indicated that total area of eelgrass beds in the project area is approximately 1.8 acres (0.75 ha) (FHWA 2001). Eelgrass beds in these areas occur along the edges of the shoreline and extend to areas no greater in depth than 4 to 6 feet (1.1 to 1.8 m) (FHWA 2001).

Open Waters

Open waters, also referred to as deep bay and channel habitat, are those parts of the bay that are deeper than 18 feet (5.2 m) below MLLW. Open waters are saline and, where they surround the project area, are strongly influenced by tidal currents. There are about 82,000 acres (33,198 ha) of this habitat in the bay (Goals Project 1999). Approximately 950 acres (384 ha) of open water habitat lies within the project area, mostly to the west of NSTI. Large aquatic invertebrates, such as crab and shrimp, and fish, such as sturgeon and rockfish, are found in this habitat. Anadromous fish, such as chinook salmon *(Oncorhynchus tshawytscha)* and steelhead *(Oncorhynchus mykiss)*, use open water habitat as migratory corridors. Resting and foraging habitat is found in the open water habitat for such species as the brown pelican, double-breasted cormorant *(Phalacrocorax auritus)*, and the Caspian tern *(Sterna caspia)*. Marine mammals, such as harbor seals *(Phoca vitulina richardsi)* and California sea lion *(Zalophus californianus)*, are also found in the open water habitat. The species that are likely to be found in the open water habitat surrounding the project area are discussed in detail below in the Sensitive Wildlife Species section.

3.8.3 Wildlife

Wildlife found in the region, including on NSTI, includes terrestrial and aquatic species of birds, mammals, invertebrates, amphibians, and reptiles. Treasure Island is developed and landscaped and provides little habitat for wildlife, while the habitats on Yerba Buena Island are more diverse and provide greater wildlife value. The entire Bay Area is a crucial resting and foraging area and wintering ground for thousands of birds in the Pacific Flyway, which extends from South America to the Arctic Circle (DON 1986).

Terrestrial Wildlife

Observed bird species on Yerba Buena Island include Lewis' woodpecker *(Melanerpes lewis)*, Steller's jay, white-breasted nuthatch *(Sitta carolinensis)*, and American robin *(Turdus migratorius)*. Birds known to inhabit the brushland habitats on Yerba Buena Island are California quail *(Callipepla californica)*, northern mockingbird *(Mimus polyglottos)*, savannah sparrow *(Passerculus sandwichensis)*, and white-crowned sparrow *(Zonotrichia leucophrys)*. More common bird species on the landscaped or developed regions of NSTI include European starling *(Sturnus vulgaris)*, pigeon *(Columba livia)*, American robin, house sparrow *(Passer domesticus)*, mourning dove *(Zenaida macroura)*, scrub jay *(Aphelocoma coerulescens)*, and flicker *(Colaptes auratus)*. Great blue heron *(Ardea herodias)*, black-crowned night heron, and great egret *(Casmerodius albus)* have been observed foraging along the riprapped shoreline (San Francisco 1995a). Other common species not observed but likely to be found include the California brown pelican and several grebe, cormorant, and gull species. Yerba Buena Island also provides habitat for two small mammal species; the pocket gopher (*Thomomys bottae*) and the California ground squirrel *(Citellus beecheyi)*.

Maritime Wildlife

Rocky shores, tidal marshes and mudflats occupy the intertidal zone, separating the adjacent developed lands from open waters. The mudflats in particular contain substantial surface and subsurface microalgal and macroalgal growth and diverse invertebrate fauna. These invertebrate faunas, consisting of worms, small mollusks, and arthropods, are an important food source for a variety of wintering shorebirds. When the mudflats are exposed at low tide, large congregations of shorebirds gather on them to feed. These feeding areas are important in the yearly migration and winter residence cycle of most of these bird species.

Benthic (those living in or on the floor of a waterbody) species most abundant in the nearshore environment include mollusks, such as the bay mussel *(Mytilus edulis)*, California mactra *(Mactra californica)*, and common littleneck *(Protothaca staminea)*, as well as crustaceans, such as amphipods, copepods, shrimp, graceful rock crab *(Cancer gracilis)*, and Dungeness crab *(C. magister)*. Most of the species of benthic organisms in San Francisco Bay are introduced species, such as the aforementioned bay mussel, the Amur River clam *(Potamocorbula amurensis)*, and the recently introduced Chinese mitten crab *(Eriocheir sinensis)*. Many of these exotic species have been released to the bay in water from cargo ship ballast.

Phytoplankton is found throughout the water column in the bay and is prey for such species as clams, mussels, and barnacles. Copepods, such as ghost shrimp and euphausiids, also known as krill, prey on phytoplankton and are in turn an important food source for juvenile fish. The

amount of phytoplankton in an area is influenced by such factors as water depth and transparency, river inflow and water salinity, or any other factors that influence the amount of light available for phytoplankton to use in photosynthesis. In the Central Bay, phytoplankton levels generally remain relatively low due to tidal mixing. Seasonal variation in degree of turbidity, changes in nutrient load, and filtering organisms influences the amount of phytoplankton.

A wide variety of fish species reside in and migrate through San Francisco Bay. Typical species include the staghorn sculpin *(Leptocottus armatus)*, chameleon goby *(Tridentiger trigonocephalus)*, topsmelt *(Atherinops affinis)*, bay pipefish *(Syngnathus leptorhynchus)*, and Pacific herring *(Clupea pallasii)*. Pacific herring is not listed under ESA, but it is the most important commercial species in the ROI. This species also has significant spawning grounds in the project area. Pacific herring swim in the middle to surface level of the water column. They spend most of their adult lives in coastal waters but use estuaries for spawning and rearing. The Pacific herring feeds on zooplankton and lives in schools.

Adult herring, age two or three, begin their migration into the bay in November (ABAG 1996), and spawning occurs mainly from January to March in intertidal and subtidal habitat (Miller and Schmidtke 1956; Hardwick 1973). Some documented Pacific herring spawning grounds include Angel Island, Alcatraz Island, and Treasure Island (Miller and Schmidtke 1956). Pacific herring are known to spawn in much of the project area, including the shallow water off NSTI. They deposit their eggs on eelgrass, algae, rocks, sand, and other submerged objects off these islands. In San Francisco Bay, the Pacific herring eggs have been shown to hatch in six to eleven days (Miller and Schmidtke 1956). The larvae tend to move out to the coast immediately, but some may remain for longer periods in the surface water of the bay (Eldridge et al. 1973; Wang 1986). Much of the larvae that remain inhabit the shallow waters of the South Bay as juveniles.

Marine mammals have been observed at or near NSTI. The harbor seal is routinely seen in the San Francisco Bay waters at NSTI. The San Francisco Bay harbor seal population of approximately 700 has remained constant since the early 1970s (San Francisco Estuary Project [SFEP] 1993). From December to April, several hundred harbor seals go ashore at "haulout" areas on the southeast shoreline of Yerba Buena Island, near the SFOBB. This area is within the ROI but not within the boundaries of the property for disposal (see Figure 3-14) (SFEP 1993; DON 1990a; Green 2001). Seals typically haul out to rest, sleep, or give birth (pup).

3.8.4 Sensitive Species

This section identifies special status, or sensitive, species that may occur in the project area. Sensitive species include those species that the USFWS or the CDFG lists or has proposed for listing as endangered, threatened, or candidate species. Plants that the CNPS lists as rare or threatened are also considered sensitive. Potential sensitive species at NSTI were identified from USFWS (USFWS 2001), CDFG (CDFG 2001), and the CNPS. USFWS personnel were consulted regarding the likelihood of finding listed species at NSTI (USFWS 2001).

Lists of all sensitive species and any critical habitat found in the region, according to USFWS and NOAA Fisheries, are provided in Appendix C. Critical habitat may be designated only for federally listed threatened and endangered species; no such designation is applicable to other species. As mentioned in the species accounts below, critical habitat designations for some of

the listed salmonids have been vacated (withdrawn) by NOAA Fisheries in response to a court ruling (NOAA Fisheries 2003). An assessment of the likelihood of a species occurring at NSTI was made based on the habitat requirements and geographic distribution of the species, existing on-site habitat quality, and the results of biological surveys of NSTI (DON 1993a, 1996b; FHWA 2001).

The following discussion includes a profile of only those sensitive or special status species that are known or considered likely to be found in the project area.

Sensitive Plant Species

All sensitive plant species listed as potentially occurring in the project area are listed in Table 3-8.1. Of these species, only marsh gumplant *(Grindelia stricta)* is confirmed to occur within the ROI. This species is considered a sensitive plant species because of its limited range and increasing destruction of its habitat. This species is found on the northern portion of Yerba Buena Island, outside of the proposed disposal area (FHWA 2001).

Marsh Gumplant. Although it has no federal or state status, marsh gumplant is considered locally significan: because of its association with wildlife species of concern and has been included in the CNPS list of species that have limited distribution. This species was observed during botanical surveys on the northern portion of Yerba Buena Island (FHWA 2001).

Marsh gumplant is a host species for the Alameda song sparrow, a federal species of concern. However, the portion of Yerba Buena Island in which it is found is not within the proposed disposal area.

Table 3.8-1
Sensitive Plant Species that may occur within the Project Area

Common Name *Scientific Name*	*Status*[1] *F/S/CNPS*	*Preferred Habitat*	*Likelihood of Occurrence in Project Area*[2]	*Comments*
Marsh gumplant *Grindelia stricta*	-/-/1B	Northern coastal salt marsh	C	Northern portion of Yerba Buena Island
San Francisco gumplant *Grindelia hirsutula* var. *maritima.*	-/-/1B	Coastal scrub, coastal bluff scrub, valley and foothill grassland	P	Potential habitat occurs on northwestern edge of Yerba Buena Island

Source: CDFG 2001; USFWS 2001; CNPS 2001; FHWA 2001.
[1]Status
F = Federal; S = State; CNPS = California Native Plant Society Listing; 1B = Plants, rare, threatened or endangered in California
[2]Likelihood of occurrence on the project site
C = Confirmed; P = Potentially may occur

San Francisco Gumplant (*Grindelia hirsutula* var. *maritima*). Suitable habitat for the San Francisco gumplant exists on Yerba Buena Island in proximity to marsh gumplant; however, this species was not reported on the island during field surveys.

Sensitive Wildlife Species

Several sensitive animal species may use or are known to use NSTI (USFWS 1994a; CDFG 1996a, 1996b). Numerous other wildlife species that the USFWS and NMFS classified as threatened or endangered are known to occur in the Bay Area and historically have been reported to intermittently forage or roost at NSTI (DON 1990a). These latter species include Sacramento winter-run and Central Valley spring-run chinook salmon, central California coast and Central Valley steelhead, and the California brown pelican.

Sensitive (ESA) Fish Species

Salmonids

Salmonids are members of the Salmonidae family and include trout and salmon. For salmonids, a population (or group of populations) is considered distinct (and may be given consideration for listing under the ESA) if it represents an evolutionarily significant unit (ESU) of the biological species. To be considered an ESU, a population must be reproductively isolated, such that evolutionarily important differences accrue, and it contributes substantially to the ecological and genetic diversity of the species as a whole. Table 3.8-2 lists special status fish species that may occur within the project area.

The salmonids that occur in the San Francisco Bay include chinook salmon, coho salmon, and steelhead trout. Salmonids are anadromous, meaning they are ocean dwellers that migrate to freshwater streams to spawn (lay and fertilize their eggs). There are four runs of chinook salmon that use San Francisco Bay: the Sacramento winter-run, Central Valley spring-run, Central Valley fall-run, and the Central Valley late fall-run chinook salmon. These runs are distinguished by the time of year that they spawn. The central California coast coho salmon, Central Valley steelhead, and the central California coast steelhead are also known to use San Francisco Bay for migrating and rearing. These salmonids share a similar life cycle and use of the bay. As discussed further in section 3.8.6, all of San Francisco Bay is considered Essential Fish Habitat (EFH) for West Coast salmon fisheries.

Adult salmonids leave the ocean and migrate to freshwater streams when they are two or three years old, though this varies according to the species. They follow a migratory route that takes them to deep pools along a river where they may wait several months until they are sexually mature. In order to successfully reproduce, salmon need clean cold water, flowing over a gravel bed. Females search out these conditions and will lay their eggs in a gravel depression they dig, called a redd. Adult chinook and coho salmon die within one to two weeks after spawning. Steelhead, however, do not necessarily die but may live to spawn another year. Salmonid eggs hatch in one to two months and remain in the stream, absorbing essential nutrients from their yolk. Once the hatchlings surface from their gravel covering, they are known as juveniles and feed on larvae and other planktonic (drifting) organisms in the river. The amount of time that juvenile salmonids remain in the bay varies, with some emigrating immediately and others remaining for several months or years. Steelhead juveniles, for example, rear in freshwater streams for up to three years, far longer than Pacific salmon. Once juvenile salmonids have migrated to the ocean they will remain there until they are two to four years of age, and then they will begin their spawning migration.

Table 3.8-2
Special Status Fish Species that may occur within the Project Area

Common Name *Scientific Name*	*Status*[1] *F/S*	*Preferred Habitat*	*Likelihood of Occurrence in Project Area*[2]	*Comments*
Central California coast coho salmon *Oncorhynchus kisutch*	T/E	Migrates from ocean through estuaries to freshwater streams	P	Migrates through bay
Central California coast steelhead trout *O. mykiss*	T/-	Migrates from ocean through estuaries to freshwater streams	P	Migrates through bay
Central Valley fall-run/late fall-run chinook salmon *O. tshawytscha*	C/-	Migrates from ocean through estuaries to freshwater streams	P	Migrates through bay
Central Valley spring-run chinook salmon *O. tshawytscha*	T/-	Migrates from ocean through estuaries to freshwater streams	P	Migrates through bay
Central Valley steelhead trout *O. mykiss*	T/-	Migrates from ocean through estuaries to freshwater streams	P	Migrates through bay
Green sturgeon *Acipenser medirostris*	SC/SC	Marine and estuarine environments	C	Anadromous, migrates into Central Bay
Longfin smelt *Spirinchus thaleichthys*	SC/SC	Open waters of the bay	P	Found throughout open water areas
Sacramento River winter-run chinook salmon *Oncorhynchus tshawytscha*	E/E	Migrates from ocean through estuaries to freshwater streams	P	Migrates through bay

Source: NMFS 2001; CDFG 2001; USFWS 2001; FHWA 2001.
[1]Status
F = Federal; S= State; E = listed as endangered; T = listed as threatened; SC = species of concern; C = candidate
[2]Likelihood of occurrence on the project site
C = Confirmed; P = Potentially may occur.

Sacramento River Winter-Run Chinook Salmon (*Oncorhynchus tshawytscha*). Sacramento River winter-run chinook salmon is federally and state-listed as endangered. Winter-run chinook salmon migrate and spawn from mid-December to September, along the Sacramento River, up to Keswick Dam in Shasta County.

Adult winter-run chinook salmon can be found in San Francisco Bay beginning November through December, with individuals remaining only a few days (Herbold et al. 1992). Juveniles emigrate from their initial upstream habitat to the bay in the fall. Although most individual juveniles remain in the bay only for 4 to 10 days (USFWS 1987) some may stay for several months (Myers et al. 1998), using the habitat for rearing (Healey 1991). Winter run chinook may occur in the Central Bay and in the project area in low numbers (Woodbury 2001).

The primary threats to winter-run chinook salmon are the changes to the Sacramento River basin, which include the presence of dams and other water diversions, increasing water temperatures, agricultural and industrial pollution, and drought conditions (CDFG 2001).

Winter-run chinook salmon designated critical habitat includes all waters of San Francisco Bay north of the SFOBB. The project area lies within this critical habitat area (National Marine Fisheries Service Northwest Region [NMFS NWR] 2000a).

Central Valley Spring-Run Chinook Salmon *(O. tshawytscha).* A federally listed threatened ESU, the spring-run chinook salmon has a similar life history to the winter-run salmon but begins its spawning migration to the Sacramento/San Joaquin Delta in late winter to spring. Adults are found in San Francisco Bay during the migratory period in the spring, and juveniles have the potential to inhabit the bay in the fall, winter, and spring. Spring-run chinook may occur in the Central Bay and in the project area in low numbers (Woodbury 2001).

The decline of spring-run chinook is mainly attributed to over fishing and to the degradation and loss of upstream habitat due to development and water diversion (CDFG 1995).

There is currently no critical habitat designated for the Central Valley spring-run chinook salmon; the previous critical habitat designation (NMFS NWR 2000a) has been vacated (NOOA Fisheries 2003).

Central Valley Fall-Run/Late Fall-Run Chinook Salmon *(O. tshawytscha).* The Central Valley fall-run/late fall-run chinook salmon is a federally and state-designated candidate ESU. This ESU constitutes the largest number of chinook salmon in San Francisco Bay (NMFS NWR 2000b).

Adult fall-run/late fall-run chinook salmon begin their migration toward their spawning grounds in June, with a peak in September. They spawn in the Sacramento/San Joaquin Delta during December and January (USFWS 1999). Juvenile salmon potentially occur in San Francisco Bay in the late winter through summer. This ESU can occur in the Central Bay, and in the project area, in low numbers (Woodbury 2001).

The primary threats to the fall-run/late fall-run chinook salmon are the impacts from high hatchery production and harvest levels and from the loss of 40 to 50 percent of spawning and rearing habitat (NMFS 1999).

There is currently no critical habitat designated for this ESU; the previous critical habitat designation has been vacated (NOAA Fisheries 2003).

Central California Coast Coho Salmon *(O. kisutch).* The Central California coast coho salmon is a federally listed threatened and state-listed endangered ESU. Adult coho migrate through San Francisco Bay after heavy late fall or winter rains to spawn in the Sacramento/San Joaquin Delta. Juvenile coho potentially occur in the San Francisco Bay in the spring, summer, and fall. Central California coast coho may occur in the Central Bay, and therefore in the project area, in low numbers (Woodbury 2001).

The primary threats to this ESU are habitat degradation and unfavorable climate conditions in the last few decades, such as droughts and floods (CDFG 2000).

Central California coast coho critical habitat includes all river reaches, including estuarine areas and tributaries accessible to listed coho salmon, from Punta Gorda in northern California south to the San Lorenzo River in central California (NMFS NWR 2000c). The project area lies partially within this critical habitat area, with the water surrounding NSTI north of SFOBB qualifying as Central California coast coho critical habitat (Bybee 2001).

Central California Coast Steelhead Trout *(O. mykiss).* The Central California coast steelhead trout is federally listed as a threatened ESU but has no state status. Steelhead are rare in most streams that are tributary to San Francisco Bay.

Central California coast steelhead migrate from the Pacific coast through San Francisco Bay to spawn in freshwater in the upper Sacramento River. They are also known to migrate to the South Bay, where they spawn in the Guadalupe River, Coyote Creek, and San Francisquito Creek (Woodbury 2001). Upstream migration occurs from December through May, and peak spawning occurs in April. Juveniles may spend a year or more in San Francisco Bay before moving on to the ocean. This ESU is known to occur in the Central Bay, and in the project area, in moderate numbers (Woodbury 2001). The Central California coast steelhead may be present in the ROI at any time of the year.

The primary threats to Central California coast steelhead are degradation and loss of critical spawning and rearing grounds, due to development and water diversions (CDFG 2000).

There is currently no critical habitat designated for this ESU; the previous critical habitat designation has been vacated (NMFS 2003).

Central Valley Steelhead Trout *(O. mykiss).* The Central Valley steelhead is federally listed as threatened ESU and has no state status. Central Valley steelhead migrate between the ocean and the Sacramento and San Joaquin rivers and their tributaries via the San Francisco and San Pablo bays. Upstream migration occurs in the winter, with peak spawning occurring December through April (McEwan and Jackson 1996). Historically, adults may have remained in the delta for several years after spawning, but recent changes to the hydrology of the delta has limited this time frame (Interagency Ecological Program [IEP] 1998). Most Central Valley steelhead juveniles rear in freshwater for one to two years. They can be found migrating downstream at any time of the year, with peak emigration occurring in the spring (IEP 1998). This ESU has the potential to occur in the Central Bay, and therefore in the project area, in low numbers (Woodbury 2001).

The primary threats to Central Valley steelhead are degradation and loss of critical spawning and rearing grounds due to development and water diversions (CDFG 2000).

There is currently no critical habitat designated for this ESU; the previous critical habitat designation has been vacated (NMFS 2003).

Other Fish Species

Green Sturgeon *(Acipenser medirostris).* The green sturgeon is a federal species of concern. Green sturgeon are bottom dwelling fish. Locally they are found in San Francisco Bay, San

Pablo Bay, the lower San Joaquin River, and the delta (Wang 1986). This species may occur in the ROI.

Although little is known about the green sturgeon's life history, it does differ from that of the salmonid species. Green sturgeon are characterized as slow growing and late maturing fish that spawn every 4 to 11 years (Pacific States Marine Fisheries Commission [PSMFC] 1996) and rely on streams, rivers, estuarine habitat, and marine waters during their lifecycle. They prefer to spawn in lower reaches of large rivers with swift currents and large cobble. Adults broadcast eggs into the water column. The fertilized eggs sink and attach to the bottom, where they hatch. Local spawning occurs in the upper Sacramento River (Fry 1973) in the spring to early summer (Moyle 1976). The green sturgeon spends limited time in freshwater, only while young and spawning. Juveniles migrate downstream before they are two years old. While young, green sturgeon feed on algae and small invertebrates (organisms without internal backbones). In general, juveniles remain in estuaries for a short time and migrate to the ocean as they grow larger. However, adult green sturgeon are known to inhabit or forage in estuaries (PSMFC 1996). Adult green sturgeon feed on benthic (bottom dwelling) invertebrates and small fish. Green sturgeon are potentially found in the Central Bay at any time of the year, but adults are more likely found in spring and summer, when they migrate to freshwater for spawning and then return to the ocean.

The primary threats to this species are over fishing, water diversions, and pollution (CDFG 2000).

Longfin Smelt *(Spirinchus thaleichthys).* A federal and state species of special concern, the longfin smelt is a pelagic (living in open ocean) estuarine fish known to inhabit San Francisco Bay, including the waters surrounding NSTI (IEP 2001; Hieb 2001). Longfin smelt feed primarily on planktonic crustaceans, such as the opossum shrimp (*Neomysis mercedis*). Mature adults, nearing the end of their second year, migrate in the fall from the brackish waters of the San Francisco and San Pablo bays to Suisun Bay and the lower delta (Wang 1986). Spawning occurs December through June in the freshwater portions of the delta, along areas with rocks and aquatic plants (Moyle 1976; Wang 1986). Most of the adults die after spawning, though some females survive for a second spawning season (Moyle 1976). Longfin smelt eggs are deposited and adhere to substrates, such as rocks and vegetation. Larvae live in the middle to surface portion of the water column and can be found from Carquinez Strait to the lower reaches of the delta (Wang 1986). Juveniles migrate downstream in the late spring and summer to Suisun, San Pablo, and San Francisco bays, where they spend most of their time in the middle to lower portion of the water column (McAllister 1963; Ganssle 1966). Longfin smelt may be found in the Central Bay at any time of the year. CDFG monitoring stations have detected the species within the project area (IEP 2001).

The primary threats to longfin smelt are low water levels due to water diversions, water pollution, climatic variation, and introduced species.

Delta Smelt *(Hypomesus transpacificus).* Delta smelt are state- and federally listed as threatened and are endemic to the upper Sacramento-San Joaquin estuary. They occur in the delta, primarily below Isleton on the Sacramento River, below Mossdale on the San Joaquin River, and in Suisun Bay. They move into freshwater when spawning. During high outflow periods, they may be washed into San Pablo Bay, but they do not establish permanent

populations there (USFWS 1996). Consequently, delta smelt are rare to the Central Bay and are unlikely to be found in the project area. The USFWS has listed this federally and state-listed threatened species as potentially occurring in the project area (USFWS 2001).

In the fall, adults congregate and begin their swim upstream to spawn in river channels and sloughs. Spawning occurs between January and July. Most spawning occurs in the dead-end sloughs and shallow edge waters of channels in the western delta, though it also has been recorded in Montezuma Slough near Suisun Bay and far upstream in the Sacramento River near Rio Vista (Radtke 1966; Wang 1986). With low levels of vegetation in the winter, it is likely that the eggs are deposited on submerged tree branches or on sandy and rocky substrate (Thelander et al. 1994). It takes 10 to 14 days for eggs to hatch, at which time the current carries the planktonic larvae downstream, where they feed on a steady supply of zooplankton. The final destination for most juvenile smelt is the null zone, an area where saltwater from the ocean meets freshwater from rivers (Thelander et al. 1994).

The primary threats to delta smelt include the decrease in water level in the delta due to water diversions and entrainment (when fish are drawn into hydroelectric turbines on dams or irrigation canals).

There is no critical habitat designated for this species in the project area.

Bird Species

Bird species are protected under the ESA or the MBTA. Information on these statutes and their implementing regulations can be found in section 3.1. Table 3.8-3 lists those bird species of concern that the USFWS states could occur within the project area. With the exception of the listed species (California least tern, the California clapper rail, and the western snowy plover), only those species considered likely to occur or known to occur in the project area are addressed below.

This section is divided into two parts, the first of which discusses ESA listed species or species of concern that could occur or are known to occur in the project area. The second part describes species covered only by the MBTA that are known to occur or have nesting habitat in the area. Because some birds are protected under both the ESA and the MBTA, there may be overlap between the sections.

Sensitive (ESA) Bird Species

American peregrine falcon *(Falco peregrinus anatum)*. This species is no longer federally listed but is state-listed as endangered. The peregrine falcon was fairly common in the state before 1947, with at least 100 nesting pairs counted (USFWS 1992). The peregrine falcon was placed on the federal endangered species list in 1970, when fewer than five pairs were believed to nest in all of California. Presently, an estimated 10 to 20 birds range over the San Francisco

Table 3.8-3
Special Status Bird Species that May Occur within the Project Area

Common Name *Scientific Name*	*Status*[1] *(F/S)*	*Habitat Requirements*	*Potential Occurrence within Project Area*[2]	*Comments*
Alameda song sparrow *Melospiza melodia pusillula*	SC/SC	Fresh, brackish, or salt marsh habitats.	C	May be an occasional visitor, breeding populations unlikely.
American peregrine falcon *Falco peregrinus anatum*	DL/E	Woodlands, coastal habitats, riparian areas, coastal and inland waters, human-made structures that may be used as nest or temporary perch sites.	C	Habitat in project area; nests adjacent to project area.
Black-Crowned Night Heron *Nycticorax nycticorax*	*	Lowlands and foothills. Nests and roosts in dense-foliaged trees and dense emergent wetlands.	C	Nests and roosts on YBI in woodland areas.
Black oystercatcher *Haematopus bachmani*	SC/SC	Rocky shores of marine habitats and adjacent islands.	C	Occurs in project area.
Brant's cormorant *Phalacrocorax pencillatus*	*	Yearlong resident of marine subtidal and pelagic zones of California. Nests on rocky headlands or islets.	C	Occurs in project area; nest known on YBI.
California brown pelican *Pelecanus occidentalis*	E/E	Open water, estuaries, beaches; roosts on various structures (e.g., pilings, boat docks, breakwaters, mudflats).	C	Habitat in project area.
California clapper rail *Rallus longirostris obsoletus*	E/E	Salt marshes traversed by tidal sloughs, tidal marshes, pickleweed marshes.	U	Little habitat in project area, unlikely to occur.
California least tern *Sterna antillarum browni*	E/E	Shallow areas of bays estuaries, lagoons, and at the joining points between rivers and estuaries.	U	Foraging habitat in project area offshore.
Double-crested cormorant *Phalacrocorax auritus*	-/SC	Open water, fresh and estuarine waters, near-shore.	C	Habitat in project area.
Pelagic cormorant *P. pelagicus*	*	Frequently in marine subtidal and uncommon to marine pelagic around rocky coasts. Nests on rocky cliffs.	C	Occurs in project area.
Western gull *Larus occidentalis*	*	Occupies coastal islands, cliffs, harbors, bays, river mouths and garbage dumps. Nests in a depression on ground, among vegetation or rocks in a variety of habitats.	C	Occurs in project area.
Western snowy plover *Charadrius alexandrinus nivosus*	T/SC	Sandy beaches, estuarine, inter-tidal mudflats, salt pond levees, alkali lakes, gravel areas near beaches and estuaries.	U	Little habitat in project area, unlikely to occur.

Source: CDFG 2001; USFWS 2001; FHWA 2001.
[1]Status
F = Federal; S = State; * = Protected under MBTA; E = listed as endangered; T = listed as threatened; SC = species of concern; C = candidate; DL = delisted
[2]Likelihood of occurrence on the project site
C = Confirmed; U = Unlikely to occur
Note:
YBI = Yerba Buena Island

Bay Area and delta region (FHWA 2001). Other bird species are prey for the peregrine falcon, including pigeons, terns, blackbirds, sparrows, and shorebirds. Peregrine falcons usually nest in depressions on protected ledges of high cliffs or on rock outcrops (Peterson 1990). They are also known to use tall buildings or bridges in urban areas. During the last few years, four pairs have begun nesting in the Central Bay. Two of these peregrine falcon nests occur on the SFOBB;

one on the support structure east of Yerba Buena Island and one on the central support structure, between the island and San Francisco (Bell 1996). They most likely forage within the project area.

California clapper rail *(Rallus longirostris obsoletus)*. Although the USFWS cites the federally and state-listed endangered California clapper rail as occurring in the area (USFWS 2001), very little of the salt marsh habitat preferred by this species exists in the project area. It is unlikely that the species is found in the project area.

California least tern *(Sterna antilarum browni)*. Listed as endangered both federally and by the state, this migratory species is found in California and Baja California from April to September (Thelander et al. 1994) and is believed to winter along the Pacific coast of South America (Massey 1971). During the breeding season, from May through September, the California least tern is found in the Central Bay at the former Alameda Naval Air Station and at Oakland International Airport (approximately 3 and 9 miles [5 and 9 km]) respectively, to the southeast of NSTI), where major nesting areas occur. The former Naval Air Station Alameda is the largest nesting spot for least terns in San Francisco Bay, and the terns have been observed occasionally in nearshore waters surrounding NSTI. No least tern nesting colonies have been recorded on Yerba Buena Island (DON 1990a), and the potential habitat for nesting on NSTI is unlikely. The California least tern is believed to be an infrequent visitor to Treasure or Yerba Buena islands and most likely does not occur in the project area. This species has declined in numbers because of coastal development, introduced predators, and human disturbance (USFWS 1992).

California brown pelican *(Pelecanus occidentalis californicus)*. A federally and state-listed endangered species, brown pelicans are found in estuarine, marine subtidal, and marine pelagic waters throughout coastal California (Thelander et al. 1994). Important habitat for pelicans during the nonbreeding season includes roosting and resting areas, such as offshore rocks, islands, sandbars, breakwaters, and pilings. Suitable areas need to be free of disturbance. They rest temporarily on the water or isolated rocks, but roosting requires a dry location near food and a buffer from predators and humans. California brown pelicans use open water areas for feeding and use rocks, jetties, and piers for roosting. Brown pelicans feed on small surface-schooling fish, primarily anchovy (Zeiner et al. 1990). Nesting normally begins in the spring but is highly variable, according to colony and year. Breeding occurs from March to early August, with eggs being laid from March to June.

California brown pelicans migrate from their breeding zones in the Channel Islands and Mexico as early as mid-May, to disperse throughout coastal California. Most pelicans return to breed by the following March. Brown pelicans are common in northern California from June to November, are rare to uncommon from December to February and May, and are very rare in March and April (Anderson and Anderson 1976; Cogswell 1977; McCaskie et al. 1979). The California brown pelican is a common post-breeding resident (May through November) of the open waters of the central San Francisco Bay and of San Pablo Bay (USFWS 1992). They can be found roosting at Breakwater Island, near the former Naval Air Station Alameda (Jacques-Strong 1994) and fishing throughout the bay. This species occurs at the project area and occasionally forages at the nearshore areas at NSTI. They are also known to rest on bridge footings and to forage by the SFOBB (FHWA 2001).

This species has been affected by numerous factors that have contributed to its decline, including disease outbreaks, low productivity, colony failure, its primary dependence on the northern anchovy for prey (which has declined), oil and other toxic spills, the presence of relatively high levels of pesticides in the tissues of some pelicans, human and nonnative mammal disturbance at central California coast post-breeding roosts, physical injury and mortality due to fish hooks, entanglement in abandoned fishing line, and El Niño events that cause prey fishes to move well offshore and away from pelican nesting islands.

There is no critical habitat designation for this species (USFWS 2001).

Western snowy plover *(Charadrius alexandrinus nivosus).* A federally listed threatened species and a state species of special concern, they typically occupy sandy beaches, salt ponds, and intertidal areas of marine and estuarine habitats but are known to occur in some inland areas (Thelander et al. 1994). Along the Pacific Coast, snowy plovers are distributed on the mainland and offshore islands, from southern Washington to southern Baja California, Mexico. Some populations, however, reside yearlong in California. Within California, plovers tend to winter along Bodega Bay in Sonoma County and to the south in the Los Angeles vicinity, with a large congregation around the San Francisco Bay Area (Zeiner et al. 1990). Nests are usually established in sparsely vegetated to nonvegetated areas of sandy beaches and estuaries. Western snowy plovers forage on insects and amphipods from the dry sand of upper beaches along the coast and occasionally forage for sand crabs and brine flies. This species is sensitive to human harassment, and direct destruction of nest sites and breeding habitat are some reasons for its decline.

Snowy plovers nest March though September at sandspits and open beaches near rivers and estuaries. The nests can sometimes be found in salt pond levees and dry salt ponds. Western snowy plovers are known to winter in the San Francisco Bay Area, and an estimated 250 individuals have been recorded in the bay during the breeding season (Goals Project 2000). Critical habitat for the western snowy plover falls outside of the project area. Although a small amount of potential foraging habitat exists for the snowy plover at NSTI, there is no nesting habitat. Any occurrences of this species at NSTI would be incidental, and the species is unlikely to be found there.

Alameda song sparrow *(Melospiza melodia pusillula).* A federal species of concern, the Alameda song sparrow is found in freshwater, brackish, and salt marsh habitats. This species occurs in coastal salt marsh habitat bordering South San Francisco Bay and can be found near NSTI, at the Emeryville Crescent, adjacent to the SFOBB toll plaza. The main range of the Alameda song sparrow extends from Coyote Creek, at the southern extremity of the bay, northward along the west shore of south San Francisco Bay to Belmont Slough, and along the east shore to San Lorenzo (Jurek 1974). Small populations also occur in marshes at the northeast shore of Richmond Inner Harbor in El Cerrito, along the shoreline from Emeryville to the SFOBB toll plaza, and at Arrowhead Marsh at the mouth of San Leandro Creek in the bay in San Leandro (Jurek 1974).

There is potential nesting habitat for this species at sites where marsh gumplant occurs, such as on Yerba Buena Island. The Alameda song sparrow has been observed perching on individual gumplants in these areas. The Alameda song sparrow could nest in the project area but has not been observed nesting at NSTI.

The song sparrow has been affected by urbanization and economic development throughout its range. Increasing salinity from diversion of freshwater streams has resulted in only limited areas of brackish marsh, the preferred habitat. Salt marshes have been filled or converted to salt ponds, so few remaining areas of complex salt marsh exist.

Migratory Bird Treaty Act Protected Species

Although numerous bird species covered by the MBTA are found in the project area, only the following species are confirmed as nesting on NSTI or Yerba Buena Island: black-crowned night heron, double-crested cormorant *(Phalacrocorax auritus)*, Brandt's cormorant *(Phalacrocorax pencillatus)*, the pelagic cormorant *(Phalacrocorax pelagicus)*, the western gull *(Larus occidentalis)*, and black oystercatcher *(Haematopus bachmani)* (USFWS 1995c).

Black-crowned night heron *(Nycticorax nycticorax)*. The black-crowned night heron is a fairly common yearlong resident in lowlands and foothills throughout most of California. This species usually nests between February and July. Nesting and roosting occurs in dense foliage trees and dense emergent wetlands. It feeds along the margins of lakes, large rivers, fresh and salt water wetlands and, rarely, on kelp beds in marine subtidal habitats. The black-crowned night heron both nests and roosts in woodland areas on Yerba Buena Island.

Double-crested cormorant *(Phalacrocorax auritus)*. A state species of special concern, the cormorant is a year-long resident along the entire coast of California and is known to frequent inland lakes and fresh, salt, and estuarine waters. Fish make up the bulk of the double-crested cormorant's diet, while crustaceans and amphibians are known to be taken as food items to a lesser degree. It feeds during the day and is known to roost beside water on offshore rocks, islands, steep cliffs, trees, or engineered structures (wharves, jetties, and bridges). Nests are built in habitats similar to those used for roosting, with the further requirements that the area be inaccessible to predators, that it be near a foraging area, and that it have a dependable food supply. Breeding cormorants are very sensitive to human disturbance (Goals Project 2000). Causes of decline include habitat destruction and human disturbance, particularly from boating (Ellison and Cleary 1978), eggshell thinning from DDT contamination, and human disturbance at nest sites.

Double-crested cormorants are fairly common within San Francisco Bay, especially during the winter. The largest colonies are on the SFOBB, where there is a large nesting colony, and on the Richmond-San Rafael Bridge. The species is known to occur within the project area.

Black oystercatcher (*Haematopus bachmani*). This species is a permanent resident on rocky shores of marine habitats along almost the entire California coast, as well as on adjacent islands. The state breeding population has been estimated at about 1,000 (Sowls et al. 1980).

The black oystercatcher is sensitive to human disturbance and is subject predation by native and nonnative predators, such as rats and feral cats. It may be either uncommon or locally fairly common in northern and central California (Cogswell 1977). It is rare on the mainland coast south of Point Conception (Santa Barbara County), and no recent California nesting records exist south of this locality (Garrett and Dunn 1981). This species tends to be distributed fairly evenly along the mainland where suitable habitat exists, with denser concentrations on offshore islands, such as the Farallons and the Channel Islands.

The black oystercatcher has nesting sites in the San Francisco Bay Area. The USFWS has documented one breeding black oystercatcher on Yerba Buena Island (USFWS 1995c) and it has been observed on Treasure Island (USFWS 1995c).

Western gull (*Larus occidentalis*). This species is quite common along the California coast. It is abundant year round, occurs in the project area, and nests locally. It forages often at low tide on mudflats.

Western gulls nest on the column footings of the SFOBB west span and could nest on the footings of the east span. The USFWS has documented 31 known nest sites for this species on Yerba Buena Island (USFWS 1995c).

Brandt's cormorant (*Phalacrocorax pencillatus*). This species is a common yearlong resident in marine subtidal and pelagic zones of California, especially near rocky shores. Perch sites are usually barren of vegetation. Brandt's cormorants roost communally and tend to nest on rocky headlands or islets along the coast and on islands. This species is common in outer parts of large estuaries but is only an occasional visitor in inner bay areas or on smaller estuaries. It dives for food in shallow or deep water and consumes mostly small saltwater fishes and also some crabs and shrimps. Brandt's cormorant requires a dependable food supply within commuting distance of a suitable roost or nest site, but it is known to commute a relatively great distance (Palmer 1962).

There are large numbers of this species that nest offshore (approximately 22,000 breed on South Farallon Island; DeSante and Ainley 1980). Large numbers have been seen migrating northward past Goleta Point, Santa Barbara County, in February and March (Garrett and Dunn 1981). The population increases south of Morro Bay in the winter, from migrants from the north, Baja California, and the Channel Islands. Many members of the population may be local or distant migrators. Many Southeast Farallon Island juveniles disperse northward as far as Vancouver Island, British Columbia (DeSante and Ainley 1980).

In San Francisco Bay, they rarely feed near their winter roosts and have been known to commute as much as 10 miles (16 km) daily from their roost to feeding areas (Bartholomew 1949). Brandt's cormorant occur in the project area, and the USFWS has documented four known nest sites for this species on Yerba Buena Island (USFWS 1995c). These are the only known nesting sites for this species in San Francisco Bay.

Pelagic cormorant (*Phalacrocorax pelagicus*). The pelagic cormorant is a yearlong resident of California. Pelagic cormorants inhabit marine subtidal areas along the rocky coasts of California and its islands, south to San Luis Obispo County. Less commonly they are found in marine pelagic habitats. Although most pelagic cormorants remain close to their breeding sites throughout the year, some populations migrate within California, heading south after nesting. Locally they are found at the outermost part of bays (Zeiner et al. 1990). The pelagic cormorant breeds on rocky cliffs beginning in April through August (Zeiner et al. 1990). Their diet consists of small fish and crustaceans, to a lesser degree. These cormorants prefer to feed in shallow rocky-bottomed areas (Robertson 1974).

Pelagic cormorants are known to inhabit San Francisco Bay, with a breeding colony on Alcatraz Island (Point Reyes Bird Observatory 2001), and are known to occur in the project area.

Mammals

No special status terrestrial mammal species are found in the project area, but several marine mammal species, all of which are of concern and/or sensitive insofar as they are protected under the ESA and/or MMPA, have been observed at or near NSTI. These commonly include the harbor seal, the California sea lion *(Zalophus californianus)*, and occasionally, the gray whale *(Eschrichtius robustus)*. On rare occasions, the following marine mammal species may occur in the bay as individual transients: humpback whale *(Megaptera novaengliae)*, minke whale *(Balaenoptera acutorostrata)*, steller sea lion *(Eumetopias jubatus)*, and southern sea otter *(Enhydra lutris nereis)*. Table 3.8-4 lists the marine mammal species that may occur within the project area. The marine mammal species considered likely to occur or known to occur are discussed below.

Table 3.8-4
Marine Mammal Species That May Occur Within the Project Area

Common Name *Scientific Name*	*Status[1] (F/S)*	*Habitat Requirements*	*Potential Occurrence within Project Area[2]*	*Comments*
Southern sea otter *Enhydra lutris nereis*	T*/	Coastal California waters	P	May occur in bay.
California sea lion *Zalophus californianus*	*	Coastal California waters	P	May occur in bay.
Gray whale *Eschrichtius robustus*	DL*/-	Coastal arctic and tropical waters	C	May occur in bay.
Harbor seal *Phoca vitulina richardsi*	*	Deep water with gently sloping terrestrial area nearby	C	Occurs throughout the bay.
Steller sea lion *Eumetopias jubatus*	T*/-	Pacific ocean, island and coastal rookeries	U	May occur rarely in bay.

Source: CDFG 2001; USFWS 2001; FHWA 2001.
[1]Status
F = Federal; S = State; T = listed as threatened; DL = delisted; * protected under MMPA
[2]Likelihood of occurrence on the project site
C = Confirmed; P = Potentially may occur; U = Unlikely to occur

The section is divided into two parts. The first part discusses ESA-listed species (which are also protected under the MMPA) and the second discusses species protected by the MMPA only.

ESA-Listed Species

Southern sea otter *(Enhydra lutris nereis)*. This mammal is federally listed as threatened under the ESA. It is not known if California sea otters are migrants or residents in certain areas of California. Southern sea otters in San Francisco Bay are probably not seasonal residents but are more likely to be isolated foragers that ranged north of their generally recognized territory. The northern edge of their range is usually considered to be Half Moon Bay (Allen 2001), although this range keeps extending. They are common at Point Reyes but are considered to occur rarely

in the waters off Treasure Island. One sea otter has been sighted in the waters off Yerba Buena Island (Green 2001)

Steller sea lion *(Eumetopias jubatus).* Federally listed as threatened under the ESA, this species is found in nearshore waters out to and beyond the continental shelf (Marine Mammal Center 2000a). They haul out at various locations, which have changed historically in the San Francisco Bay region. Historically they hauled out at the rocks near the Cliff House and also at Pier 39 in San Francisco, though not regularly (Allen 2001). They occur to the south at Año Nuevo Island, which is the southernmost breeding area for the species (Tetra Tech 1999), and on the Farallon Islands, much farther offshore.

They can occur in the waters off NSTI and Yerba Buena Island rarely as individual and intermittent transients, but their presence in the ROI is unlikely. They have never been sighted hauling out at either Treasure Island or Yerba Buena Island (Allen 2001). Any occurrences of this species in the ROI would most likely correspond to when the herring are running in the bay, as this is a prey species for Steller sea lions (Allen 2001). Typically, however, they are unlikely to occur in the waters of Treasure Island.

The project area is within designated critical habitat for this species, due to considerations other than the species' presence. The critical habitat for the Steller sea lion includes areas where its preferred prey occurs, such as San Francisco Bay, or areas that have been within its historic range. Steller sea lions are not currently found throughout much of their historic range and rarely occur in San Francisco Bay.

Additional Marine Mammal Species (Protected under the MMPA)

Harbor seal *(Phoca vitulina richardsi).* This species is a permanent resident in the San Francisco Bay and is routinely seen in waters at NSTI. They have been observed as far upstream as Sacramento, though their use of the habitat north of Suisun Bay is irregular (Goals Project 2000).

There are several harbor seal haulout sites in the Central Bay, located near feeding sites, including Yerba Buena Island, Sisters Island in Muzzi Marsh, Castro Rocks, Brooks Island, a floating abandoned dock near Sausalito, Angel Island, and a breakwater at the Oakland entrance to Alameda Harbor (Allen 1991; Harvey and Torok 1995). Haulout sites must have gently sloping terrain and deep water immediately nearby and must be free of disturbance (Allen 1991). Only three sites in the bay—Yerba Buena Island, Mowry Slough, and Castro Rocks—show greater than 40 individuals present during the breeding and molting seasons (Kopec and Harvey 1995).

Seals haul out year-round on Yerba Buena Island. The haulout area is within the ROI but not within the boundaries of the property for disposal. The Yerba Buena Island haulout site near the SFOBB is on the southeast side of the island (Figure 3-14), on US Coast Guard property. Individual seals may occasionally haul out farther to the west and southwest of the main haulout site on Yerba Buena Island, depending on space availability and conditions at the main haulout area (Figure 3-14).

Harbor seals feed in the deepest waters of the bay, and the areas from Golden Gate to Treasure Island and from the San Mateo Bridge south are the principle feeding sites (Kopec and Harvey 1995). Harbor seals feed on a variety of fish, such as perch, gobies, herring, and sculpin.

CDFG aerial surveys done since 1998 of the bay population reflect a conservative estimate of approximately 500 animals. Land-based censusing reflects a higher, and probably more accurate, number of approximately 700 animals (Richmond Bridge Harbor Seal Survey [RBHSS] 2001). This number has remained relatively constant since the early 1970s (SFEP 1993).

Several hundred harbor seals use the Yerba Buena Island site as a year-round haulout site, though highest counts occur in the winter, from December to April (SFEP 1993; DON 1990a; RBHSS 2001). This most likely corresponds to the period of high Pacific herring numbers in the bay, Pacific herring being a preferred prey. In January 1999, 296 animals were counted at Yerba Buena Island (Green et al. 2001), and in March 2001, the count was 277 (Green 2001).

Only the most undisturbed sites are used for pupping, which occurs in the spring. The area is not historically identified as a pupping site for harbor seals but pups are occasionally seen there (Kopec and Harvey 1995), as is afterbirth. One dead pup was documented as having been born there (Green 2001). The number of pups sighted on Yerba Buena Island, while still under 10 a year, has increased by one a year for each of the last four years. Males made up 83.1 percent of the seals whose gender could be determined on the haulout site at Yerba Buena Island in a study conducted in 1997 (Spencer 1997).

Harbor seals at Yerba Buena Island are subject to high levels of disturbance, primarily from recreational watercraft. This is particularly true during the summer, when numbers of small boats, jet skis, and kayaks on the bay increase. A minimum distance of 100 yards is recommended as a standard to boaters from the haulout area to avoid disturbing the seals (RBHSS 2001). Researchers have reported seals shifting from a predominantly diurnal (active during the day) hauling pattern to a nocturnal (active at night) pattern in response to human disturbance (Paulbitski 1975). Others have reported that increased disturbance can cause reduced reproductive success and site abandonment (Bartholomew 1949; Calambokidis et al. 1979).

California sea lion *(Zalophus californianus)*. The California sea lion occurs year-round in parts of San Francisco Bay though, as with the other seal species, they are most abundant in the winter, corresponding with the herring run. California sea lions are not listed under the ESA but are protected under the MMPA. The largest haulout site in the bay is at Pier 39 in San Francisco. Most of the sea lions hauled out at this site are males, and no pupping has been observed (Goals Project 2001).

Individual sea lions have been observed with some regularity in the shipping channel south of Yerba Buena Island. Individuals have also been sighted in the waters east of Yerba Buena Island (Green 2001). It is unlikely that these animals would occur within the defined ROI of the project.

Gray whale *(Eschrichtius robustus)*. Gray whales are found only in the Pacific Ocean, with the current northeastern Pacific population estimated at approximately 26,000 (NMFS 2001). Gray whale populations have begun to rebound, and the species was delisted under the ESA in 1994.

Protected under the MMPA, the gray whale is the most common cetacean along the central California coast during its annual spring migration to northern feeding grounds and during its late fall-winter return to Mexican calving and breeding lagoons (Monterey Bay National Marine Sanctuary 2001).

Gray whales may occur in the waters off Treasure Island. Gray whale populations have been increasing in San Francisco Bay over the last three years. In 1999, they were spotted in the bay on 39 days, in 2000 on 64 days, and in 2001 (to date) on 116 days (Oliver et al. 2001). They are usually sighted traveling alone, but also have been sighted in pairs. A single sighting at the Dumbarton Bridge consisted of a group of five whales (Oliver et al. 2001). Greater than 95 percent of the sightings occur during the northern migration, from February to May.

All age classes have been sighted, though the majority of animals sighted in San Francisco Bay have been juveniles, less than 37 feet (11 m) long. This overall sighting increase may represent an increase in habitat utilization by this species. They have been sighted from the extreme southern end of the bay to the extreme northern end. Behaviors observed in the bay include traveling, milling, socializing, and foraging. Numbers of strandings have also been increasing and range from 17 to 29 animals (Marine Mammal Center 2001b).

Sensitive Amphibian Species

Three amphibian species are listed by USFWS as potentially occurring within the project area. These are the California red-legged frog *(Rana aurora draytonii)*, the Alameda whipsnake *(Masticophis lateralis euryxanthus)*, and the giant garter snake *(Thamnophis gigas)*. No habitat for any of these species is found within the project area; therefore, they are considered unlikely to be present in the project area.

Sensitive Invertebrate Species

The USFWS lists three invertebrate species as potentially occurring within the project area: the Mission blue butterfly *(Icaricia icarioides missionensis)*, the San Bruno elfin butterfly *(Incisalia mossii bayensis)*, and the white abalone *(Haliotis sorensoni)*. However, no habitat for any of these species is found within the project area, and they are considered unlikely to be present in the project area.

Sensitive Reptile Species

Four species of sea turtles occur at least occasionally along the central California coast. These are the federally endangered leatherback turtle *(Dermochelys coriacea schlegelii)* and the federally threatened green turtle *(Chelonia mydas agassizi)*, the olive ridley turtle *(Lepidochelys olivacea)*, and the loggerhead turtle *(Caretta caretta gigas)*. These species are all unlikely to occur in the estuarine waters near NSTI and have no known occurrences in the project area.

3.8.5 Sensitive Habitats

Sensitive habitats are vegetation communities that federal, state, or local agencies or conservation organizations have assigned special status because of declining, restricted, or threatened populations or areas. Habitat areas or vegetation communities that are unique or that offer particular value to wildlife also are considered sensitive.

The mudflats, which may contain eelgrass beds, on the western side of the cove between Treasure Island and Yerba Buena Island are a sensitive habitat at NSTI (DON 1996a). The soft bay mud substrate provides habitat for many invertebrates, including oligochaetes, polychaetes, crustaceans, isopods, gastropods, and bivalves. These species, which typically reside in the top few inches of the substrate, are preyed upon by shorebird species, such as western sandpipers *(Calidris mauri)*, sanderling *(Calidris alba)*, spotted sandpiper *(Actitis macularia)*, and killdeer *(Charadrius vociferus)*, which forage in the area during low tide. Research on stomach contents has shown that the gem clam, the polychaete *Neanthes succina*, and the mud snail are the most common prey species among many shorebirds (USFWS 1992).

Critical Habitat

Areas of habitat considered essential to the conservation of a listed endangered or threatened species may be designated as critical habitat, which is protected under the ESA. Although critical habitat may be designated on private or government land, activities on these lands are not restricted unless there is federal involvement in the activities or direct harm to listed wildlife.

The ROI of the project area contains critical habitat for the following species, as designated by NMFS on the dates shown:

- Sacramento River winter-run chinook salmon, June 16, 1993; and
- Steller sea lion, March 23, 1999.

As mentioned above, previous designations of critical habitat for salmonid ESUs have been withdrawn (NMFS 2003).

3.8.6 Essential Fish Habitat

The MSA defines EFH as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The MSA set forth a number of new mandates for NMFS, regional fishery management councils, and federal action agencies to identify EFH and to protect important marine and anadromous fish habitat. The MSA provided NMFS with legislative authority to regulate fisheries in the U.S., in the area between 3 miles (5 km) and 200 miles (320 km) offshore and established eight regional fishery management councils that manage the harvest of the fish and shellfish resources in these waters. The councils, with assistance from NMFS, are required to delineate EFH in FMPs or FMP amendments for all managed species. A FMP is a plan to achieve specified management goals for a fishery and is composed of data, analyses, and management measures for a fishery. EFH that is sanctioned for an FMP includes all fish managed by the plan. Federal agency actions that fund, permit, or carry out activities that may adversely affect EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH and to respond in writing to NMFS' recommendations. In addition, NMFS is required to comment on any state agency activity that will affect EFH (NMFS 2000).

The MSA requires that EFH be identified for all species that are federally managed. This includes species managed by the councils' FMPs, as well as those managed by NMFS under FMPs developed by the Secretary of Commerce.

The project area is designated as EFH for fish managed under three FMPs—Pacific groundfish, coastal pelagics, and Pacific coast salmon (National Marine Fisheries Service Southwest Region [NMFS SWR] 2001). All species for which EFH exists in the project area and that are found in the project area are listed in Table 3.8-5. For a comprehensive list of all species included in these three FMPs, refer to Appendix G. A description of the relevant FMPs follows.

West Coast Groundfish FMP

There are 83 species of groundfish that are managed under this FMP. (For a listing of species that are found in the project area, refer to Table 3.8-5; for a comprehensive list of all species included in the west coast groundfish FMP, refer to Appendix G.) The EFH for west coast groundfish includes saltwater from the mean higher high waterline and the upriver extent of saltwater intrusion in river mouths along the coast of California (NMFS 1998). Therefore, the whole project area lies within the west coast groundfish EFH.

Coastal Pelagic FMP

Species managed under this plan include northern anchovy *(Engraulis mordax)*, Pacific sardine *(Sardinops sagax)*, Pacific (chub) mackerel *(Scomber japonicus)*, jack mackerel *(Trachurus symmetricus)*, and market squid *(Loligo opalescens)* (Coastal Pelagic Species Fish Management Plan 1998). San Francisco Bay, including the project area, qualifies as EFH for all species managed under this FMP.

Pacific Coast Salmon FMP

The Pacific coast salmon FMP includes coho, chinook, and Puget Sound pink salmon (Pacific Fishery Management Council [PFMC] 1999). Variation in the timing of migration and spawning of chinook salmon has led to the designation of ESUs, a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout. Four ESUs of chinook and a coho salmon ESU are found in the project area. They are fall, late-fall, winter-run, and spring-run chinook and central California coast coho salmon (Vogel and Marine 1991). The EFH associated with the Pacific coast salmon FMP encompasses all of the project area (PFMC 1999).

3.8.7 Special Aquatic Sites

Under the section 404(b)(1) guidelines of the CWA, the EPA identifies six categories of special aquatic sites: sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes. Discharges of dredged or fill material in special aquatic sites are not authorized under section 404 unless there is no less damaging practicable alternative.

Special aquatic sites in the project area include the mudflats and shallow water habitat in Clipper Cove, sand flats on the eastern side of Yerba Buena Island, and vegetated shallows around the perimeter of the island. The only delineated wetland in the ROI is a small band of northern coastal salt marsh that occurs on the north side of Yerba Buena Island, adjacent to Clipper Cove (FHWA 2001). This salt marsh is not within the proposed disposal area.

1

Table 3.8-5
FMP Species Abundance in the Central Bay

Common Name *Scientific Name*	*Fish Management Plan (FMP)*	*Abundance*
Big skate *Raja binoculata*	GF	Present
Bocaccio *Sebastes paucispinis*	GF	Rare
Brown rockfish *S. auriculatus*	GF	Abundant
Cabezon *Scorpaenichthys marmoratus*	GF	Few
Chinook salmon *Oncorhynchus tshawytscha*	PCSP	*
Coho salmon *O. kisutch*	PCSP	*
Curlfin turbot *Pleuronichthys decurrens*	GF	Present
English sole *Parophrys vetulus*	GF	Abundant
Jack mackerel *Trachurus symmetricus*	CP	Present
Kelp greenling *Hexagrammos decagrammus*	GF	Present
Leopard shark *Triakis semifasciata*	GF	Present
Lingcod *Ophiodon elongates*	GF	Present
Market squid *Loligo opalescens*	CP	*
Northern anchovy *Engraulis mordax*	CP	Abundant
Pacific sanddab *Citharichthys sordidus*	GF	Present
Pacific sardine *Sardinops sagax*	CP	Rare
Pacific whiting (hake) *Merluccius productus*	GF	Present
Sand sole *Psettichthys melanostictus*	GF	Present
Soupfin shark *Galeorhinus galeus*	GF	Rare
Spiny dogfish *Squalus acanthias*	GF	Present
Starry flounder *Platichthys stellatus*	GF	Abundant

Source: NMFS SWR 2001.
*Abundance not known
GF = Groundfish Fishery Management Plan; CP = Coastal Pelagics Fishery Management Plan; PCSP = Pacific Coast Salmon Plan

2
3