Essential Fish Habitat Assessment
San Diego Shipyard Sediment Remediation Project
South Shipyard (NASSCO)
San Diego Bay, California

Introduction

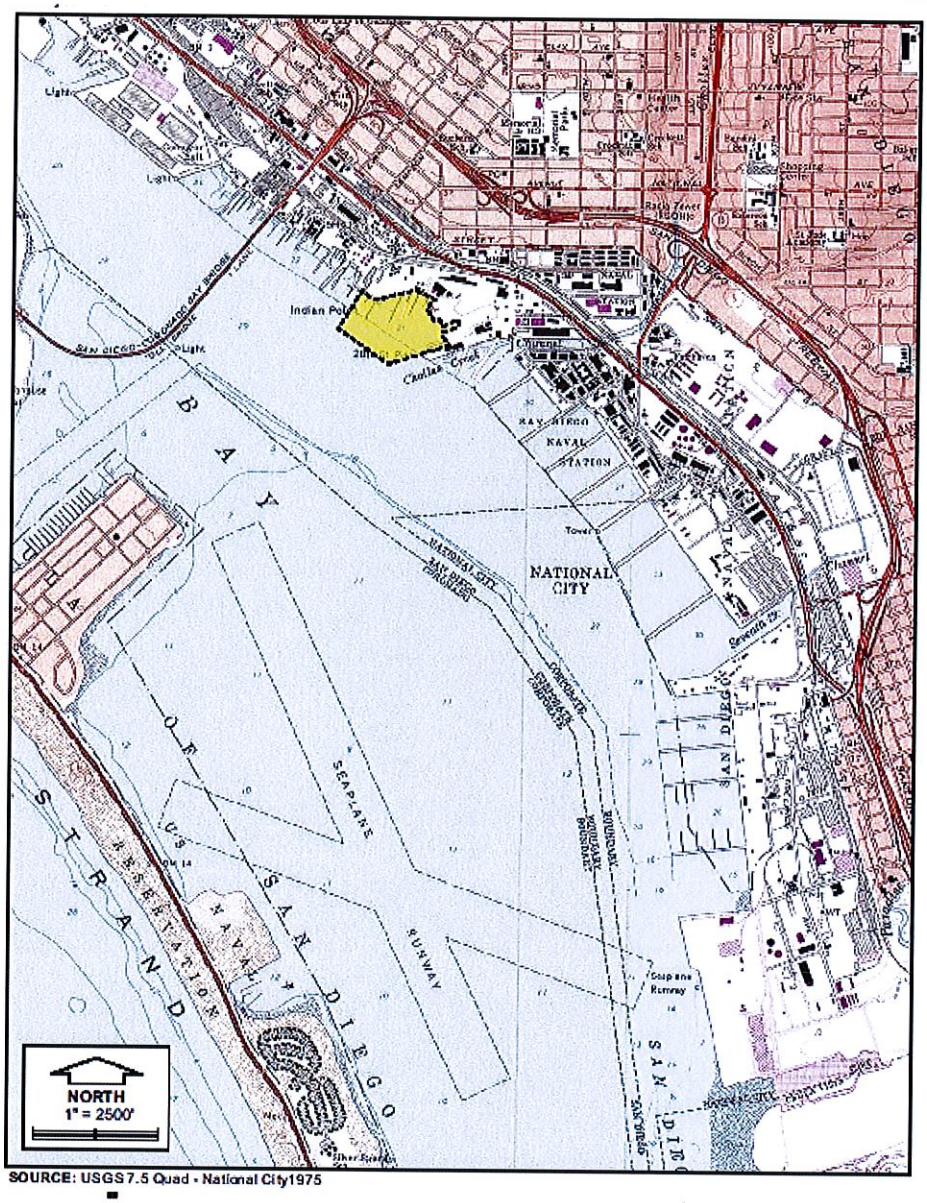
In support of a permit application to the U.S. Army Corps of Engineers, Los Angeles District, and consistent with the requirements of Section 305(b) (2) of the Magnuson-Stevens Fishery Conservation and Management Act, the following is an assessment of potential impacts to Essential Fish Habitat (EFH) resulting from the proposed in-water actions within the National Steel and Shipbuilding Company (South Shipyard). This assessment is prepared in accordance with 50 CFR 600.920(g) (2) and addresses the managed fish and invertebrate taxa that could occur within the project site.

EFH is defined as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". "Waters", as used in this definition, are defined as "aquatic areas and their associated physical, chemical, and biological properties that are used by fish". These may include "...areas historically used by fish where appropriate; 'substrate' to include sediment, hard bottom, structures underlying the waters, and associated biological communities". "Necessary" means, "the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem". EFH is described as a subset of all habitats occupied by a species (NOAA, 1998).

Proposed Action

The proposed San Diego Shipyard Sediment Remediation Project (Project) addresses the sediment cleanup within the South Shipyard as identified in Attachment 3 of Cleanup and Abatement Order (CAO) No. R9-2012-0024, dated March 2012. The Project is located within the planning jurisdiction of the San Diego Unified Port District (Port District) and is identified as District 4 in the certified Port Master Plan (Figure 1). The project location, which is along the eastern shore of central San Diego Bay, is between Schley Street on the north and Chollas Creek on the south, and from the shoreline to the San Diego Bay main shipping channel to the west. Bathymetry (water depth) at the project site varies substantially due to the presence of shipways, dry docks, and berths, and ranges from 2 feet, mean lower low water (MLLW) along the bulkheads to 60 feet MLLW at the South Shipyard's dry dock sump area.

The Project includes dredging of or applying a clean sand cover over the contaminated sediment; transport, dewatering, stockpiling, and testing of dredge materials and effluent (water) at a landside stockpiling/dewatering location; treatment (if needed) and discharge of the effluent; and truck transport of dredge materials to appropriate landfill disposal facilities. In addition, to facilitate dredging, an existing wooden pier will be removed. Following dredging in some areas, rock will be placed on slopes adjacent to existing bulkheads and piers to protect those structures.



SOURCE: USGS 7.5 Quad - National City 1975

Figure 1 South Shipyard Project Location

Site Characteristics

The bay bottom within the Project site is sedimentary, consisting of a one to two-ft. thick surficial layer of soft, unconsolidated clays and muds. Merkel and Associates (2011) completed a diver-biologist survey at the BAE Systems shipyard, immediately to the north of NASSCO's facilities, and indicated that the subtidal habitat supported barnacles (*Chthamalus* spp., *Balanus* sp.), which were the most common invertebrates on the bulkhead walls, and other invertebrates including colonial tunicates (e.g., *Botryllus* sp.), oysters (*Ostrea lurida*), sponges (*Leucilla nuttingi*), mussels (*Mytilus* sp.), feather duster worms (Sabillidae), colonial ascidians (*Botrylloides* sp.), solitary tunicates (e.g., *Ciona* sp., *Styela plicata*), and bryozoans (e.g. *Eurytomella* sp.) and the nonnative bryozoan *Zoobotryon verticillatum*. Historical surveys at NASSCO's facilities found a similar epibiota.

The surficial sediments of the project site are "bare mud" (LSA Associates, Inc., 2011) and the results of a 2010 assessment of marine biological resources and EFH conducted for another project within the BAE Systems' facilities, indicated that few invertebrates were observed on the mud although evidence of burrowing invertebrates, possibly tube dwelling anemones, arthropods (e.g., ghost shrimp, *Callianassa*), or bivalves, were observed. Although only the round stingray (*Urolophus halleri*) was observed, other fish species including barred and spotted sand bass (*Paralabrax nebulifer* and *P. maculatofasciatus*), California halibut (*Paralichthys californicus),* and midshipman (*Porichthys myriaster*) are likely to use this habitat (Merkel & Associates, 2011). Existing solid, high-relief structures comprise the pier and mooring/fender dolphin pilings, submerged portions of drydocks, and bulkhead and rip-rap along the shoreline.

Data on eelgrass distribution at the both of the shipyards was summarized in LSA Associates, Inc. (2011). Eelgrass was present in the shallowest water (-10 MLLW) near the shore at the east and west ends of the BAE facilities. Historical eelgrass surveys within portions of the South Shipyard found sparse eelgrass within the shallow water areas.

Managed Species of Interest

Distribution and habitat information available in Miller and Lea (1972) and Leet, *et al.* (2001) was used to estimate which of the species listed by National Marine Fisheries (NMFS) and the Pacific Fisheries Management Council could occur in the Project area. The format and content of this EFH is consistent with guidelines provided in NMFS (2004) and also considers Habitat Areas of Particular Concern (HAPC) (*i.e.* eelgrass beds within this area). The dominant marine seagrass occurring in San Diego Bay is eelgrass (*Zostera marina*). Table 1 lists the managed species that could occur in southern California bays and/or are associated with sedimentary habitat in water depths of less than 70 ft.

Table 1 List of Managed Taxa Potentially Occurring Within the Project Area

Common Name	Scientific Name	Common Name	Scientific Name
COASTAL PELAGICS			
Northern anchovy	*Engraulis mordax*	Pacific sardine	*Sardinops sagax*
Pacific mackerel	*Scomber japonicus*	Jack mackerel	*Trachurus symmetricus*
PACIFIC GROUNDFISH			
Pacific sanddab	*Citharichthys sordidus*	Leopard shark	*Triakis semifasciata*
Spiny dogfish	*Squalus acanthias*	Big skate	*Raja bioculata*
California scorpionfish	*Scorpaena gutatta*		

Impacts

As currently proposed, the effects of dredging on EFH and the managed species could include temporary and localized increases in turbidity and loss of existing sedimentary habitat. Turbidity may also increase if vessel propellers impact the bay bottom or prop wash stirs up sediments. Existing water depths within the proposed dredge area will increase by up to approximately 10 ft.

Dredging activities will also have a potential to release detectable levels of sediment-bound contaminants into the water column that could be redistributed through the tidally-induced movement of the turbidity plume. Organically enriched sediments resuspended into the water column during dredging could also cause a decrease in dissolved oxygen concentrations. Tidal currents are expected

to dissipate the affected water mass and replenish ambient oxygen levels within one to several tidal exchanges.

Accidental petroleum spills that could potentially occur during the proposed dredging operations could result in adverse effects on water quality, and subsequently the fish within that portion of San Diego Bay that is subjected to the spill. Such events, if they were to occur, would likely be spills of lighter, refined diesel fuels, gasoline, and lubricating oils that are more toxic to marine life than crude oil. The potential for the occurrence of petroleum-product leaks or spills would be low, but the potential for significant effects on marine resources if such spills occurred would be moderate to high.

Removing the piers will result in the loss of vertical, hard substrate however the managed species associated with that habitat are not expected to be significantly affected. No mortality of managed pelagic or demersal taxa is expected, and individuals would be expected to relocate away from the immediate work area during in-water activities. The placement of rock along the slopes of the dredge areas will provide new solid substrate that will support epibiota and provide suitable habitat for at least one managed species: *S. gutatta*.

Eelgrass is present within the Project area and would be adversely affected by the proposed activities through direct removal and/or from the effects of increased sedimentation or covering with sand/gravel or rock. Eelgrass bed habitat has been identified as a HAPC by federal and state resource agencies, and eelgrass serves as refuge habitat, foraging areas, and nursery habitats for various coastal and bay fishes and invertebrates.

The South Shipyard site is not within any designated fish or wildlife movement corridor. Mobile marine organisms such as fish, marine mammals, and sea turtles are anticipated to avoid the immediate vicinity of the dredging activities, and due to the site's location on the periphery of San Diego Bay, the Project activities are not expected to impede movement of marine species past the site or within the bay.

The slight increase in water depth within the dredge area is not expected to result in significant impacts to EFH or to the managed species and the resulting sedimentary habitat will be less contaminated than that which currently exists (a beneficial effect of the proposed Project).

Mitigations

- A pre-construction eelgrass habitat mapping survey for the South Shipyard site will be completed by the responsible parties within 120 days of the initiation of in-water activities of each project phase and a post-dredging project eelgrass survey will be completed by the responsible parties within 30 days of the completion of each dredging episode. Eelgrass mitigation requirements will be based on the results of those surveys and a mitigation plan, if required, will be prepared and submitted to the appropriate agencies for review and approval.

- The results of the pre-construction surveys shall be integrated into a Final Eelgrass Mitigation Plan prepared by the responsible parties for the project and used to calculate the amount of eelgrass to be mitigated. The Final Eelgrass Mitigation Plan will be in accordance with criteria specified in the Southern California Eelgrass Mitigation Policy (SCEMP). Implementation of a

mitigation plan that is approved by NMFS and the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board). As mitigated impacts to existing eelgrass resources will be reduced to less than significant.

- To protect eelgrass beds within the Project site, the project marine biologist will mark the positions of eelgrass beds with buoys prior to the initiation of any construction. The project marine biologist will also meet with the construction crews prior to dredging as well as periodically throughout the project to review pre-dredge survey areas of eelgrass beds.

- The contractor will ensure that throughout the duration of dredging and clean sand cover placement activities; Project-related barges and work vessels operating in areas where eelgrass beds exist will be operated in a manner to ensure that eelgrass beds are not impacted through grounding, propeller damage, or other activities that may disturb the bay bottom. The measures will include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels. The project marine biologist will periodically confirm that these measures are implemented and will submit a monthly monitoring report to the San Diego Water Board.

- Implementation of Best Management Practices (BMPs), which are proposed to prevent the spread of any turbidity plume or release of sediment-bound contaminants out of the dredging area, and thereby reduce potential adverse impacts to marine resources, including managed species and EFH. BMPs include use of an environmental dredge bucket, installation of silt curtains, operational controls, and water quality monitoring. The measures also require the inclusion and implementation of a Dredging Management Plan (DMP) for the project, which will assist in preventing accidental spills and providing the necessary guidelines to follow in case of an oil or fuel spill, and is expected reduce the potential for a significant long-term impact to biological resources to less than significant.

As proposed and mitigated, no significant impacts to EFH or the managed taxa that could occur within the Project site are expected.

References

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Biological Assessment
San Diego Shipyard Sediment Remediation Project
South Shipyard (National Steel and Shipbuilding Company)
San Diego, California

Introduction

The proposed San Diego Shipyard Sediment Remediation Project (Project) addresses the sediment cleanup within the National Steel and Shipbuilding Company's water area (Remedial Site South) as identified in Attachment 3 of the Cleanup and Abatement Order (CAO) No. R9-2012-0024, dated March 2012. The Project is located within the planning jurisdiction of the San Diego Unified Port District (Port District) and is identified as District 4 in the certified Port Master Plan (Figure 1). The project location, which is along the eastern shore of central San Diego Bay, is between Schley Street on the north and Chollas Creek on the south, and from the shoreline to the San Diego Bay main shipping channel to the west. Bathymetry (water depth) at the project site varies substantially due to the presence of shipways, dry docks, and berths, and ranges from 2 feet, mean lower low water (MLLW) along the bulkheads to 60 feet MLLW at the South Shipyard's dry dock sump area.

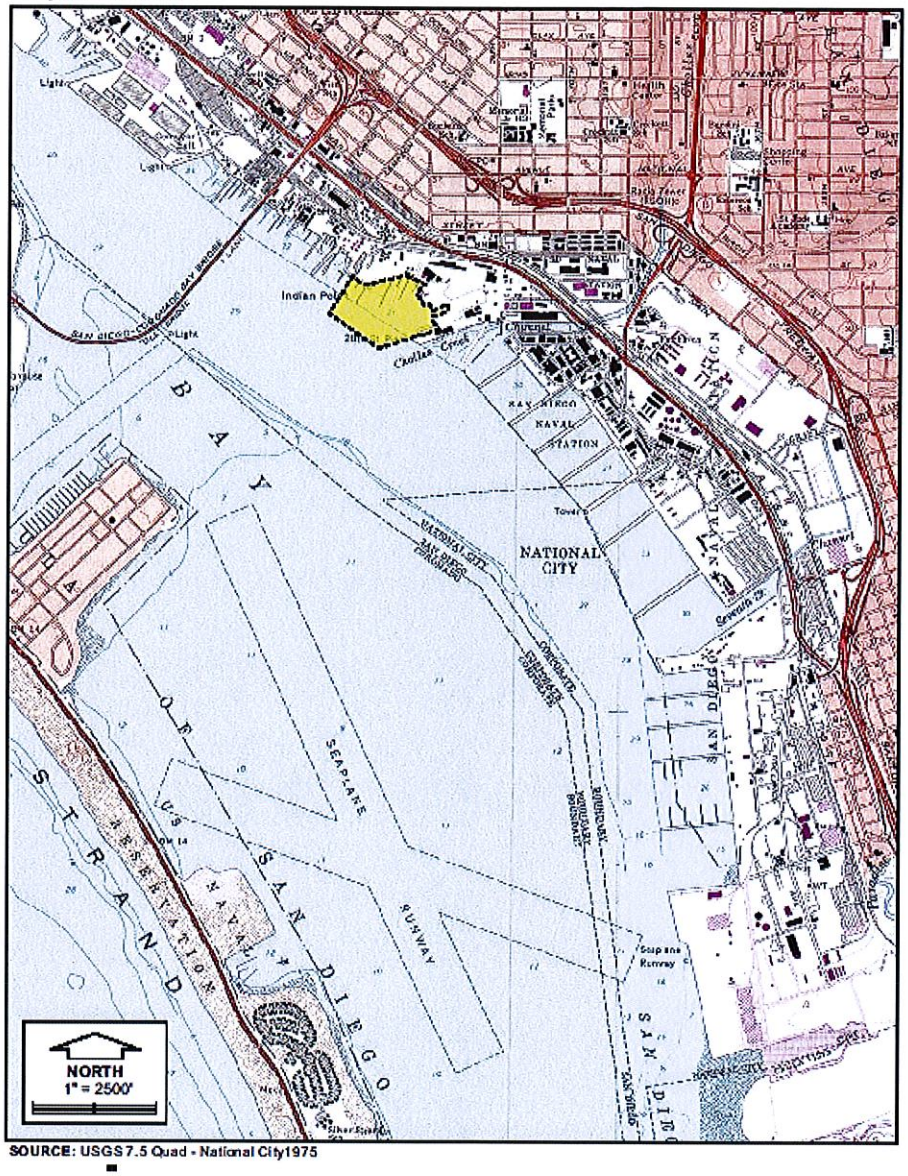
The Project includes dredging of or applying a clean sand cover over the contaminated sediment; transport, dewatering, stockpiling, and testing of dredge materials and effluent (water) at a landside stockpiling/dewatering location; treatment (if needed) and discharge of the effluent; and truck transport of dredge materials to appropriate landfill disposal facilities. In addition, to facilitate dredging, one existing wooden pier will be removed. Following dredging in some areas, rock will be placed on slopes adjacent to existing bulkheads and piers to protect those structures.

Regulatory Basis

The Federal Endangered Species Act (FESA) protects species, including selected marine taxa that are found off the coast of California, and makes it unlawful to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a "listed" species, or to attempt to engage in any such conduct. Violators of the FESA and regulations are subject to a fine and imprisonment. An "endangered species" is defined by the Secretaries of the Departments of the Interior and/or Commerce as any species which is in danger of extinction throughout all or a portion of its range. A "threatened species" is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) are responsible for administration and implementation of the FESA for marine taxa.

Special-Status Marine Species

Based on zoogeographic data, six federally threatened or endangered species, comprising two fish, one marine reptile (turtle), and three birds, could occur within the region of San Diego Bay (Table 1). Of those, two, the green turtle and the California least tern (shown in bold and underline print in Table 1) could occur within the Project area.



SOURCE: USGS 7.5 Quad - National City1975

Figure 1. South Shipyard Project Location

Table 1. Special-Status and Protected Species Within or Near the Project Area

Common Name	Scientific Name	Status
Steelhead trout (Southern California Distinct Population Unit [DPS])	*Oncorhynchus mykiss*	Endangered
Tidewater goby	*Eucyclogobius newberryi*	Endangered
Green sea turtle	*Chelonia mydas*	Endangered
California least tern	*Sterna antillarum browni*	Endangered
Western snowy plover	*Charadrius alexandrines nivosus*	Threatened
Light-footed clapper rail	*Rallus longirostris levipes*	Endangered

Mitigations that have been incorporated into the proposed project and that are designed to reduce or eliminate potential impacts are also listed. The following analysis is provided to assist the federal resource agencies in determining the likelihood of impacts to listed species that could occur within the project area. Additional details on the biology of and potential impacts to those two taxa are provided below.

Probable Taxa

Green Sea Turtle (*Chelonia mydas*)

Status. The breeding populations of the green turtle off Florida and along the Pacific coast of Mexico were listed as federally-endangered in 1978. Populations in other areas were listed as federally-threatened in that same year. The most recent minimum population estimates for green sea turtles indicate that at least 1,000 individuals are known to occur, and this population is believed to be increasing (NOAA, 1999).

Range and Habitat. Green sea turtles generally occur worldwide in waters with temperatures above 20° C (MFS Globenet Corp/WorldCom Network Services, 2000). Green sea turtles have been reported as far north as Redwood Creek in Humboldt County and off the coasts of Washington, Oregon, and British Columbia (Channel Islands National Marine Sanctuary, 2000; MFS Globenet Corp/WorldCom Network Services, 2000). Green sea turtles are sighted year-round in marine waters off the southern California coast, with the highest concentrations occurring during July through September.

Potential habitat for Pacific green sea turtles within San Diego Bay may be utilized during foraging, but is not considered suitable for nesting. Foraging by Pacific green sea turtles is concentrated within eelgrass beds and to a lesser extent on invertebrate communities in south and south central bay, as the majority of habitat is located within those areas.

Natural History. The NOAA Fisheries' website (b) states that the green sea turtle is the largest of the hard-shelled turtles and that the adults are herbivorous feeding on sea grasses and algae. The two largest nesting populations are found at Tortuguero, on the Caribbean coast of Costa Rica, and Raine Island, on the Great Barrier Reef in Australia, where an annual average of 22,500 and 18,000 females nest per season, respectively. In the U.S., green sea turtles nest primarily along the central and southeast coast of Florida; present estimates range from 200 to 1,100 females nesting annually.

Occurrence Probability. *High (foraging only)*. Habitat for green sea turtles within San Diego Bay is suitable for foraging but is not considered suitable for nesting. Foraging by green sea turtles is concentrated in eelgrass beds and to lesser extent invertebrate communities in south and south central bay (LSA Associates, Inc., 2011).

California Least Tern (*Sterna antillarum browni*)

Status. The California least tern was listed as a federally-endangered species in 1970. No critical habitat has been identified for the California least tern.

Range and Habitat. California least terns live along the coast from San Francisco to northern Baja California and migrate from the southern portion of their range to the north. Least terns begin arriving in southern California as early as March and depart following the fledging of the young in September or October (USFWS, 2006).

Recently, least terns have nested at seven to nine locations around San Diego Bay. These are North Delta Beach, South Delta Beach, Naval Amphibious Base (NAB) ocean beaches, Naval Air Station North Island (NASNI), as well as Lindbergh Field, the South Bay National Wildlife Refuge (formerly Western Saltworks), Chula Vista Wildlife Reserve, D Street Fill/Sweetwater Marsh, and Silver Strand State Beach (a single record of a pair in 2004). The D Street Fill/Sweetwater Marsh is the closest known nesting site located approximately three nautical miles south of the shipyard sediment site (LSA Associates, Inc., 2011).

Natural History. This species nests in colonies and utilizes the upper portions of open beaches or inshore flat sandy areas that are free of vegetation. Most least terns begin breeding in their third year, and mating begins in April or May. The nest consists of a simple scrape in the sand or shell fragments and typically there are two eggs in a clutch; egg incubation and care for the young are accomplished by both parents. Least terns can re-nest up to two times if eggs or chicks are lost early in the breeding season.

The majority of current breeding sites are on developed or created lands that include airports, landfills, and other sites created for terns. This species is gregarious and forage, roost, nest and migrate in colonies. The typical colony size is 25 pairs. California least terns feed on small fish, crustaceans, and insects. They forage by hovering over shallow to deep waters and diving or dipping onto the surface of the water to catch prey. They require clear water to locate their prey (i.e., anchovies) that is found in the upper water column in the nearshore ocean waters. At colonies where feeding activities have been studied, the birds generally foraged within two miles of the breeding area and primarily in water less than 60 feet deep (USFWS, 2006).

Occurrence Probability. *High (foraging only).* This species is likely to forage in and near the project site. No suitable nesting habitat is present within the project site. This species is known to nest in the Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge (NWR) (LSA Associates, Inc., 2011).

Other Regional Taxa

Steelhead (*Oncorhynchus mykiss*)

Status. The southern California steelhead Distinct Population Segment (DPS) was listed as an endangered species in August 1997 (62 FR 43937). As discussed in the final listing determination, this ESU is considered to be at a high risk of extinction based on the results of the NOAA Fisheries' West Coast Steelhead Status Review (Busby et al., 1996). Its listing was based on dramatic declines in the number of returning spawning individuals in southern California and the degradation, simplification, and fragmentation of available aquatic habitats (NMFS, 2009). The NMFS estimates the southern steelhead population to be less than 1 percent of its historic population size (Stocker, et al., 2002).

Range and Habitat. The southern California steelhead DPS encompasses populations in watersheds from the Santa Maria River (just north of Point Conception) south to the Tijuana River at the U.S.-Mexico border. It includes those portions of coastal watersheds that are at least seasonally accessible to the anadromous *O. mykiss* that enters from the ocean, with the absence of manmade passage barriers. A total of 708 miles of stream habitat were designated as critical habitat from the 32 watersheds within the range of this DPS. Critical habitat for the

southern California steelhead DPS includes most, but not all occupied habitat from the Santa Maria River in southern San Luis Obispo County to San Mateo Creek in northern San Diego County, but excludes some occupied habitat based on economic considerations and all military lands with occupied habitat. Critical habitat was not designated for most of the watersheds south of Malibu Creek with the exception of San Juan Creek and San Mateo Creek (NMFS, 2009).

With exception to a small population in San Mateo Creek in northern San Diego County, steelhead appear to have been completely extirpated from nearly all systems in the southern portion of the range of the DPS from Malibu Creek to the U.S.-Mexico border (LSA Associates, Inc., 2011).

Natural History. Adult steelhead spawn in coastal watersheds and their progeny rear in freshwater or estuarine habitats prior to migrating to the sea. They require cool clear water and gravel where the eggs mature in three weeks to two months; the alevins (juvenile steelhead) emerge from the gravel two to six weeks after hatching (NMFS, 2009). Young steelhead remain in fresh water from less than one year to up to three years. Juveniles migrate to sea usually in spring, but throughout their range steelhead are entering the ocean during every month, where they spend one to four years before maturing and returning to their natal stream. Only winter steelhead are found in southern and south-central California. Winter steelhead enter their "home" streams from about November to April and spawning takes place from March to early May. In freshwater, steelhead feed primarily on insects and larvae, while in the ocean their primary food source is "baitfish" such as herring and anchovies.

Occurrence Probability. *Not Expected.* Nearest known occurrence of this species is in San Mateo Creek, north of the project site (LSA Associates, Inc., 2011).

Tidewater goby (*Eucyclogobius newberryi*)

Status. Tidewater goby is a federally-listed endangered fish that inhabits brackish water habitats along the California coast. On June 24, 1999, the USFWS proposed to delist the northern populations of the tidewater goby and to retain the endangered status in Orange and San Diego Counties. This proposal was based on the conclusion that the southern California populations are genetically distinct and represent a distinct population segment (USFWS, 2005a). The USFWS withdrew the proposed rule to remove the northern populations in November 2002 and the tidewater goby remains listed throughout its range as an endangered species. In November 2000, USFWS designated ten coastal stream segments, totaling approximately nine linear miles of rivers, streams, and estuaries in Orange and San Diego Counties as critical habitat for the tidewater goby. A recovery plan was issued in 2005 (USFWS, 2005a).

Range and Habitat. The tidewater goby historically occurred in lagoons, estuaries, backwater marshes, and freshwater tributaries from approximately three miles south of the California-Oregon border to 44 miles north of the U.S.-Mexico border. They occur in coastal streams that create deposition berms that dam the mouths of the estuaries for the majority of the year (USFWS, 2005a).

Natural History. Tidewater goby is a small fish rarely exceeding two inches in length with life stages most commonly found in waters with low salinities of less than 10 to 12 parts per

thousand (ppt); however, it has been collected in water with salinities as high as 63 ppt. Tidewater goby is a short-lived species; the lifespan of most individuals appears to be about one year. The tidewater goby has been documented to spawn in every month of the year except December with peak reproduction in late May to July. The tidewater goby feeds mainly on macroinvertebrates such as mysid shrimp, ostracods, and other aquatic insects such as midge larvae. The eggs of the tidewater goby are laid in burrows excavated by the male fish. The male tidewater goby remains in the burrow to guard the eggs that are attached to the burrow ceiling and walls. The male individual rarely leaves the burrow, if ever, to feed until after the eggs hatch in 9 to11 days.

USFWS determined the primary constituent elements (PCE), which are habitat characteristics that are required to sustain the species' life-history processes. For tidewater gobies, these PCEs include: (a) persistent, shallow (in the range of approximately 0.3 to 6.6 ft.), still-to-slow-moving lagoons, estuaries, and coastal streams ranging in salinity from 0.5 ppt to about 12 ppt; (b) substrates (sand, silt, mud) suitable for the construction of burrows for reproduction; (c) submerged and emergent aquatic vegetation that provides protection from predators and high flow events; or (d) the presence of a sandbar across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes the lagoon or estuary to provide stable water conditions (USFWS, 2008a).

Occurrence Probability. *Not Expected.* Habitat conducive to tidewater gobies, such as shallow and brackish water, is absent from the project site. Furthermore, the project site is not within the known range of this species. Therefore, the tidewater goby is not expected to occur at these sites (LSA Associates, Inc., 2011).

Western snowy plover (*Charadrius alexandrines nivosus)*

Status. The western snowy plover, which is one of 12 subspecies of the snowy plover, was listed as federally-threatened in 1973 and the Pacific coast population of this species, which includes all nesting birds on the mainland coast, peninsulas, offshore islands, adjacent bays, estuaries, and coastal rivers, was separately listed as federally-threatened in 1993 (USFWS, 1993). Final designation of critical habitat was published in 2005 (USFWS, 2005b)

Range and Habitat. The current known breeding range of this population extends from Damon Point, Washington to Bahia Magdalena, Baja California, Mexico (USFWS, 1999). Snowy plovers that nest at inland sites are not considered part of the Pacific Coast population, although they may migrate to coastal areas during winter months. Sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries are the preferred habitats for nesting.

Critical habitat for the western snowy plover was designated in 1999 (64 FR 68508-68544). Critical Habitat Unit (CHU) CA-19 is located to the southwest of the proposed project area, along Silver Strand/Delta Beach. Primary constituent elements of western snowy plover critical habitat include:, 1) sparsely vegetated areas above daily high tides (e.g., sandy beaches, dune systems immediately inland of an active beach face, salt flats, seasonally exposed gravel bars, dredge spoil sites, artificial salt ponds and adjoining levees) that are relatively undisturbed by the presence of humans, pets, vehicles or human-attracted predators; 2) sparsely vegetated sandy beach, mud flats, gravel bars or artificial salt ponds subject to daily tidal inundation but not currently under water, that support small invertebrates such as crabs, worms, flies, beetles,

sand hoppers, clams, and ostracods; and, 3) surf- or tide-cast organic debris such as seaweed or driftwood located on open substrates such as those mentioned above (essential to support small invertebrates for food, and to provide shelter from predators and weather for reproduction) (USFWS, 2005b).

Within the San Diego County, critical habitat for snowy plovers has been designated at Coronado Beach, Sweetwater Marsh National Wildlife Refuge/D Street Fill, Silver Strand State Beach, San Diego National Wildlife Refuge South Bay Unit, and Tijuana Estuary and Border Field State Park. Snowy plovers are known to nest in these areas (77 FR 36727) and forage both within the CHU's and other tidal areas in the Bay (USFWS, 2012).

Natural History. The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico (USFWS, 1999). The breeding season for western snowy plovers extends from early March to late September, with birds at more southerly locations beginning to nest earlier in the season than birds at more northerly locations. Females typically desert the brood shortly after hatching, leaving the chick-rearing duties to the male. Females may re-nest if another male is available and if time remains in the season to do so. Snowy plover chicks are precocial, leaving the nest within hours after hatching to search for food. Males attend the young until they fledge, which takes about a month. Adult plovers do not feed their chicks, rather they lead them to suitable feeding areas.

Occurrence Probability. *Not Expected.* Suitable habitat for this species does not occur within the project site. This species has been known to nest in the Sweetwater Marsh Unit of the San Diego Bay NWR, just south of potential Staging Area 5 (LSA Associates, Inc., 2011).

Light-footed clapper rail (*Rallus longirostris levipes*)

Status. The light-footed clapper rail was federally listed as endangered by the USFWS in 1970 (USFWS, 1970b).

Range and Habitat. The light-footed clapper rail is a non-migratory bird found in coastal freshwater and saltwater marshes in southern California and northern Baja California, Mexico. About 60 percent of the State breeding population resides in the Upper Newport Bay Ecological Reserve in Orange County (Zembal and Hoffman, 2000; USFWS, 2009).

Natural History. The light-footed clapper rail is a marsh bird that has long dull yellowish-gray legs and toes and is approximately one foot in length (USFWS, 2008b and 2009). It has a slightly curved beak and a short, upturned tail. Males and females are identical in plumage with a cinnamon breast contrasting their streaked back plumage of grayish-brown and barred flanks of gray and white (USFWS, 2008b). They nest from March to August and nests are placed to avoid flooding by tides, yet in dense enough cover to be hidden from predators and to support the relatively large nest. Females lay from four to eight eggs in a clutch which hatch in 18 to 27 days (USFWS, 2009).

Occurrence Probability. *Not Expected.* Suitable habitat for this species does not occur within the project site. CNDDB records this species in Paradise Marsh. This species is known to nest in the Sweetwater Marsh Unit of the San Diego Bay NWR, approximately three nautical miles south of the project site (LSA Associates, Inc., 2011).

Potential Impacts and Mitigation Measures

This Biological Assessment is designed to provide sufficient information for the Federal lead agencies, NMFS and the USFWS, to determine the potential of the project to affect threatened or endangered species, based on one of three possible findings for each species potentially affected:

No effect: The proposed action will not affect the listed species or critical habitat

Not likely to adversely affect: Effects of the listed species are expected to be discountable (extremely unlikely to occur), insignificant (minimal impact without take), or beneficial; and

Likely to adversely affect: Adverse effect may occur as a direct or indirect result of the proposed action, and the effect is not discountable, insignificant or beneficial.

Impacts include damage or disturbance to existing habitats (i.e. loss of eelgrass habitat and bay bottom sediment disturbance), increased water turbidity, vessel interaction, and the effects of an accidental discharge of petroleum products from construction vessels. Potential impacts are described below and mitigation measures that will be instituted prior to, during, or following the proposed activities are expected to result in a "not likely to adversely affect" assessment for the listed species that could occur within the project site.

Damage or Disturbance to Existing Habitats

Project activities have a potential to impact eelgrass through: (1) dredging or covering of bay sediments within eelgrass habitat; (2) grounding of the vessels over eelgrass habitat; and (3) propeller wash. These activities would create furrows and scars within the eelgrass vegetation, increase water depths beyond those known to support eelgrass within San Diego Bay, and/or temporarily increase turbidity that could potentially cause additional adverse losses of eelgrass habitat within the Project site. Eelgrass beds provide foraging habitat for both the California least tern and green sea turtles. It is estimated that between 0.5 to 0.8 acres of eelgrass will be impacted during the sediment remediation project (LSA Associates, Inc., 2011).

Special status species individuals are not expected to be significantly adversely affected as a result of the remedial dredging effort, since the Project site is a poor quality foraging site and higher quality foraging sites (i.e., eelgrass beds and shallow water habitat) that are not routinely subjected to ship traffic are available elsewhere within San Diego Bay. Irrespective, the loss of eelgrass is considered a potentially significant effect of the proposed project.

Pre- and post-construction surveys of eelgrass within the Project site will be conducted to determine the area of eelgrass that has been impacted. Mitigation for the actual losses will be based on post-construction eelgrass surveys and will be in accordance with requirements of the Southern California Eelgrass Mitigation Policy (SCEMP) (NMFS, 1991 as amended). Upon successful mitigation, the level of impact will be reduced to a less than significant impact.

In addition, a qualified biologist familiar with the California least tern and other special-status seabirds and waterfowl will be retained and will be on site to assess the roosting and foraging behavior of special-status seabirds and waterfowl at the project site and selected staging area(s) immediately prior to and during the initial start-up phase of dredging and clean sand cover placement activities. In the event of an imminent threat to California least tern and/or

other special-status species, the monitor shall immediately contact the contractor's construction manager.

Turbidity in Water Column

Construction activities may result in a temporary increase in turbidity and decrease in water clarity necessary for least tern foraging. The short-term increase in turbidity from dredging and sand placement activities is not expected to result in significant impacts to the water column or benthic biota. The effects of the turbidity generated during these activities will be local, short-term and less than significant, with water column clarity expected to return to pre-Project conditions within one to several tidal cycles of cessation of the dredging. Least tern foraging within turbid waters is unlikely, thus a small area of San Diego Bay will not be available to that species to forage during the dredging operations.

In addition, the use of silt curtains throughout the entire Project site, will reduce or prevent the spread of any turbidity plume or release of sediment-bound contaminants out of the dredging area, and will therefore reduce the potential of adverse impacts to marine resources, including sensitive species (i.e. least terns). During project activities Best Management Practices will include use of an environmental dredge bucket, installation of silt curtains, operational controls, and water quality monitoring. On-site least tern monitors will have the authority to stop dredging operations if turbidity effects are observed to substantially affect least tern foraging activities or if least terns or green turtles are within a pre-determined distance of dredging activities.

Therefore, the impacts due to dredging to the California least tern and other special status species that forage in the area will be less than significant due to the relatively small area that will be affected (in relation to the available foraging areas within San Diego Bay), the availability of adjacent foraging habitat, and the presence of sensitive species monitors who have the authority to stop the operations.

4.2 Vessel Interaction

Material barges transporting dredged sediment, sand/gravel, or rock within the project site would be traversing a short distance through areas where green sea turtles may occur. Therefore, there is a potential that green sea turtles may be within the vessel transit lanes when transport activities are occurring. The project vessels will be moving slowly and it is likely that green sea turtles would not be located within the project site and would, if present, be capable of avoiding a collision with a vessel.

Mitigation measures, including specification of maximum vessel speed, have been incorporated in a project-specific Communication Plan. In addition, a marine biologist will provide crew training, ensuring that operation of barges and work vessels is conducted in a manner to minimize potential harm to turtles, providing briefings of turtle occurrence probability, and coordinating with/notifying resource agencies. In addition, the contractor will ensure that all construction activity be temporarily stopped if a sea turtle or marine mammal is sighted within 330 ft. (100 meters) of the construction zone until the sea turtle or marine mammal is safely outside the outer perimeter of project activities. The project marine biologist will visit the site periodically to ensure that sea turtles and marine mammals are not injured or harassed through excessive vessel speed or propeller damage. Impacts to marine turtles (and mammals) are, therefore, expected be less than significant with the incorporation of the proposed mitigations.

4.3 Oil Spill Potential

The release of petroleum into the marine environment from any of the project vessels could result in potentially significant impacts to the marine biota, particularly avifauna. Marine birds can be affected by direct contact with oil in three ways: (1) thermal effects due to external oiling of plumage; (2) toxic effects of ingested oil as adults; and (3) effects on eggs, chicks, and reproductive abilities.

The loss of waterproofing is the primary external effect of oil on marine birds. Buoyancy is lost if the oiling is severe. A main issue with oil on marine birds is the damage oil does to the arrangement of feathers, which is responsible of water repellency (Fabricius, 1959). When this happens, the water can go through the dense layers of feathers to the skin causing a loss of body heat (Hartung, 1964). To survive, the bird must metabolize fat, sugar, and eventually skeletal muscle proteins to maintain body heat. The cause of oiled bird deaths can be the result from exposure and loss of these energy reserves as well as the toxic effects of ingested oil (Schultz et al., 1983).

The internal effect of oil on marine birds varies. Anemia can be the result of bleeding from inflamed intestinal walls. Oil passing into the trachea and bronchi could result in the development of pneumonia. A bird's liver, kidney, and pancreatic functions can be disturbed due to internal oil exposure. Ingested oil can inhibit a bird's mechanism for salt excretion that enables seabirds to obtain fresh water from salt water and could result in dehydration (Holmes and Cronshaw, 1975).

A bird's vulnerability to an oil spill depends on each individual species' behavioral and other attributes. Some of the more vulnerable species are alcids and sea ducks due to the large amount of time they spend on the ocean surface, the fact that they dive when disturbed, and their gregarious behavior. Also, alcids and other birds have low reproductive rates, which result in a lengthy population recovery time. A bird's vulnerability depends on the season as well. For example, colonial seabirds are most vulnerable between early spring through autumn because they tend to gather in breeding colonies during that period.

Oil spills are not considered a high cause for mortality for sea turtles, although recent reports from the Gulf of Mexico Deepwater Horizon spill indicate a possible increase in the number of strandings of oil-impacted turtles. Since sea turtles species have been listed as threatened or endangered under the FESA, there is very little direct experimental evidence about the toxicity of oil to sea turtles. Sea turtles are negatively affected by oil at all life stages: eggs on the beach, post hatchings, young sea turtles in nearshore habitats, migrating adults, and foraging grounds. Each life stage effects vary depending on the rate and severity of exposure.

The potential for the occurrence of petroleum-product leaks or spills would be low, but the potential for significant, long-term effect on marine resources would be moderate to high. The inclusion and implementation of a Dredging Management Plan (DMP) for the project will assist in preventing accidental spills and in providing the necessary guidelines in case of an oil or fuel spill, and reduce the potential for a significant long-term impact to biological marine resources to less than significant.

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