Appendix C2

Essential Fish Habitat Assessment

EFH ASSESSMENT: BERTHS 167-169 [SHELL] WHARF IMPROVEMENTS PROJECT

JANUARY 2018

Prepared for:

CDM Smith
111 Academy Way
Suite 150
Irvine, California 92617

Prepared by:

MBC Aquatic Sciences
3000 Red Hill Avenue
Costa Mesa, California 92626

PROJECT STAFF

CDM Smith

Dorothy Meyer, Principal Planner

MBC *Applied Environmental Sciences*

Shane Beck – Project Manager

Jennifer L. Rankin
David G. Vilas

Table of Contents

List of Figures and Tables

Appendix

Lists of EFH Species

- Coastal Pelagic Species
- Shared Ecosystem Component Species
- Pacific Groundfish Ecosystem Component Species
- Pacific Groundfish Species

EXECUTIVE SUMMARY

The purpose of the proposed Project is to meet Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) safety requirements for an existing marine oil terminal. The MOTEMS are comprehensive engineering standards for the analysis, design and inspection/maintenance of existing and new marine oil terminals, which were developed the California State Lands Commission (Marine Facilities Division). The Project site (Berths 167–169) is adjacent to Slip 1 near the Turning Basin in the Los Angeles Harbor. Essential Fish Habitat (EFH) is managed under the Magnuson-Stevens Fishery Conservation and Management Act, which is designed to protect waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. There are two Fishery Management Plans (FMPs) that include waters adjacent to the Project site: the Coastal Pelagics FMP and the Pacific Groundfish FMP. Although there are nearly 100 fish/invertebrate species covered under the Coastal Pelagics and Pacific Groundfish FMPs, not all occur near the proposed Project site. This EFH Assessment was prepared pursuant to the Magnuson-Stevens Act to analyze potential impacts to federally managed fishes and invertebrates from construction and operation of the proposed Project.

The primary Project elements that could affect the marine environment, including EFH, include:

- Demolition of the timber wharf, including removal and disposal of approximately 900 creosote-treated timber piles,
- Installation of steel pipe piles for the new wharf, and
- Installation of pipe piles and platforms for new mooring dolphins.

There may be a minor amount of dredging (up to 4,000 cubic yards of clean-up dredging; 2,000 for each operating berth) to remove sediment that might slump from the existing underwater slope during pile driving for the new replacement wharf. All of the dredged material will be disposed of at the Berths 243–245 confined disposal facility (CDF). No other dredging or disposal of dredged material is associated with the Project. The proposed Project would not increase the terminals capacity handling, storage, or pumping capacity, and would therefore not result in changes in terminal operations.

Impacts during construction would be localized and temporary. Potential impacts from wharf demolition, pile installation, construction runoff, accidental spills during construction, and shading would be less than significant. No habitat loss would occur. Acoustic impacts from pile driving could result in adverse effects to fish species and marine mammals in the immediate construction area. However, due to the limited potential impact area, this is not considered a substantial disruption. Additionally, with implementation of Mitigation Measure BIO-1, the pile-driving would initiate with a soft start, which would minimize potential impacts to fish and marine mammals, as they would likely leave the area as pile driving commenced. Avoidance of the area by aquatic species, including federally managed species, would be temporary; in-water activities, such as pile driving, would last for approximately 14 months, and occur mostly during daylight hours. There would be no physical barriers to movement, and the baseline condition for aquatic species would be essentially unchanged. Due to the limited potential impact area and with the implementation of Mitigation Measure BIO-1, this is not considered a substantial disruption.

Incidental spills are not likely to substantially disrupt EFH because they would likely be promptly contained and cleaned up. In addition, with compliance with existing federal, state, and local spill prevention and clean-up regulations, as well as the standard controls, the potential that such a spill could substantially disrupt EFH and/or managed species is very low.

Approximately 275 square meter (m^2) of eelgrass was present at the southern end of the Project site (beneath the Berth 169 mooring dolphin) in September 2013, and 364 m^2 was present in May 2014. This eelgrass could be affected during wharf demolition or reconstruction. Adverse impacts to eelgrass and/or eelgrass habitat must be minimized and/or mitigated according to the California Eelgrass Mitigation Policy and Implementing Guidelines. Implementation of Mitigation Measure BIO-2 would reduce potential impacts to eelgrass.

INTRODUCTION

Essential Fish Habitat (EFH) is managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). This act protects waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). Substrates include sediment, hard bottom, structures underlying waters, and associated biological communities (NMFS, 2002).

NMFS (2002) defines specific EFH terms as follows (50 CFR. 600.05–600.930):

- “Waters” include all aquatic areas and their associated biological, chemical, and physical properties that are used by fish and may include aquatic areas historically used by fish where appropriate.
- ”Substrate” includes 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; and “Spawning, breeding, feeding, or growth to maturity” covers a species’ full life cycle”.

The proposed Project would improve safety requirements (to meet Marine Oil Terminal Engineering and Maintenance Standards, or MOTEMS) at Berths 167–169 on Mormon Island within Los Angeles Harbor (the Harbor) (**Figure 1).** The Magnuson-Stevens Act is designed to protect waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). There are two Fishery Management Plans (FMPs) that include waters adjacent to the Project site: the Coastal Pelagics FMP (six managed groups and multiple Ecosystem Component Species) and the Pacific Groundfish FMP (85 species and multiple Ecosystem Component Species). Although there are nearly 100 fish/invertebrate species covered under the Coastal Pelagics and Pacific Groundfish FMPs, not all occur near the Project site. This EFH Assessment was prepared pursuant to the Magnuson-Stevens Act to analyze potential impacts to federally managed fishes and invertebrates from construction and operation of the proposed Project.

PROJECT DESCRIPTION

The marine terminal occupies a land area of approximately nine acres, has two berths (Berths 168 and 169), and has 11 storage tanks (**Figure 1**). Historically, the terminal was divided into three berths (Berths 167–169). However, due to increases in the size of ships using the terminal, the facility currently operates with two functional berths, which are referred to as Berths 168 and 169. The existing 1,240-foot-long timber wharf can accommodate two tankers. Berths 168 and 169 each have a maximum draft of approximately 40 feet (ft) and a length of 850 ft, allowing for vessels of up to 86,000 deadweight tons (dwt). While the berths allow for maximum cargo sizes of about 425,000 barrels, more typical cargo sizes range from 150,000 to 325,000 barrels. The terminal currently only handles refined petroleum liquids, including gasoline, diesel, ethanol, and jet fuel.

Figure 1. Location of the Berths 167–169 (Shell) MOTEMS Project site in Los Angeles Harbor. Inner Harbor aquatic areas marked with crosshatched pattern, and non-hatched aquatic area is classified as Outer Harbor. Fish sampling Stations LA6 and LA15 (MBC, 2016) marked with yellow squares.

The MOTEMS require each marine oil terminal to conduct an audit to determine the level of compliance and an evaluation of the continuing fitness-for-purpose of the facility. Depending on the results, terminal operators must then determine what actions are required to meet the standards, and provide a schedule for meeting the measures identified in the audit. The standards define criteria in the following areas:

- Audit and Inspection
- Structural Loading
- Seismic Analysis and Performance Based Structural Design
- Mooring and Berthing Analysis and Design
- Geotechnical Hazards and Foundations
- Structural Analysis and Design of Components
- Fire Prevention, Detection and Suppression

- Piping and Pipelines
- Electrical and Mechanical Equipment

The proposed Project would bring the existing marine oil terminal at Berths 167-169 into compliance with MOTEMS. By bringing the facility into compliance with MOTEMS, safety would increase while the potential for spills during operation would be reduced. In general, the proposed Project would demolish the existing timber wharf and replace the structure with new loading platforms, access trestles (to the platforms), mooring dolphins and catwalks, and construct supports for new pipelines and related facilities on the shore side portion of the terminal.

A summary of the Project components that would occur at the terminal include:

- Replacement piping and related foundation supports on the shore side of the terminal to meet seismic requirements;
- Demolishing the existing timber wharf, including removal and disposal of the timber deck and approximately 900 creosote-treated timber piles (which will be extracted or cut off at the mudline);
- Construction of new loading platforms, installation of new mooring dolphins, approach trestles, catwalks, land side connections and equipment (such as new topside equipment, pipe connections and mechanical systems, including valves) adjacent to the wharf; and
- Operating the terminal through approximately 2047 (the current lease ends in 2023).

Construction would occur in phases to allow continued terminal operations during construction.

DESCRIPTION OF THE STUDY AREA

Physical Features

Los Angeles Harbor consists of Inner and Outer Harbors. Just north of the breakwaters, the Outer Harbors consist of deeper, open water habitat, and channels that lead to basins and slips in the Inner Harbor. The channels, basins, and slips vary in size and distance from the harbor entrance. In Los Angeles Harbor, the navigation channels were recently dredged to -53 ft. The Project site is in the Inner Harbor at the mouth of Slip 1, approximately 5.0 kilometers (km) (3.1 miles) from the harbor entrance.

Water Quality Parameters

Waters within Los Angeles Harbor are primarily marine (saline), though there are fresh water inputs from regulated discharges, urban runoff, and flows from Dominguez Channel. The following is a summary of water quality parameters measured during monthly sampling between September and December 2014 at one station in Slip 1, adjacent to the Project site (LAHD, 2015):

- Mean station temperature was 19.4°C (67°F), with a range throughout the water column from 18°C to 21°C (65°F to 70°F);
- Salinity values ranged between 32.9 and 33.7 practical salinity units (psu), which is essentially equivalent to parts per thousand (ppt) in southern California;
- Mean pH ranged narrowly from 7.7 to 7.9; and
- Turbidity ranged between 1.1 and 1.4 Nephelometric Turbidity Units (NTUs).

Tides and Currents

Tides in southern California are classified as mixed, semi-diurnal, with two unequal high tides (lower high water and higher high water) and two unequal low tides (higher low water and lower low water) each lunar day (approximately 24.5 hours). Since 2005, the highest tide measured at the Los Angeles Harbor tide station (NOAA No. 9410660) is +7.71 ft (+2.35 meters [m]) Mean Lower Low Water (MLLW) (measured in December 2012), and the lowest was -2.34 ft (-0.71 m) MLLW, measured in January 2009 (NOAA, 2015).

To better understand circulation patterns and watershed inputs into Los Angeles Harbor, the Port of Los Angeles, in conjunction with the Port of Long Beach, undertook a program to develop a hydrodynamic and water quality model for Los Angeles and Long Beach Harbors (Port Complex) to improve their predictions of the effectiveness of current and future control measures (the WRAP Model) (POLA and POLB, 2009). Circulation patterns are established and maintained by tidal currents. Flood tides in the Port Complex flow into the Harbors and up the channels, while ebb tides flow down the channels and out of the Harbors (POLA and POLB, 2009). The Port Complex is protected from incoming waves by the Federal Breakwater. Due to the Federal Breakwater and port landforms the circulation regime within the Port Complex is very complex. Modeled current direction and velocity throughout the Port Complex during both ebb and flood tides is summarized in **Figure 2**.

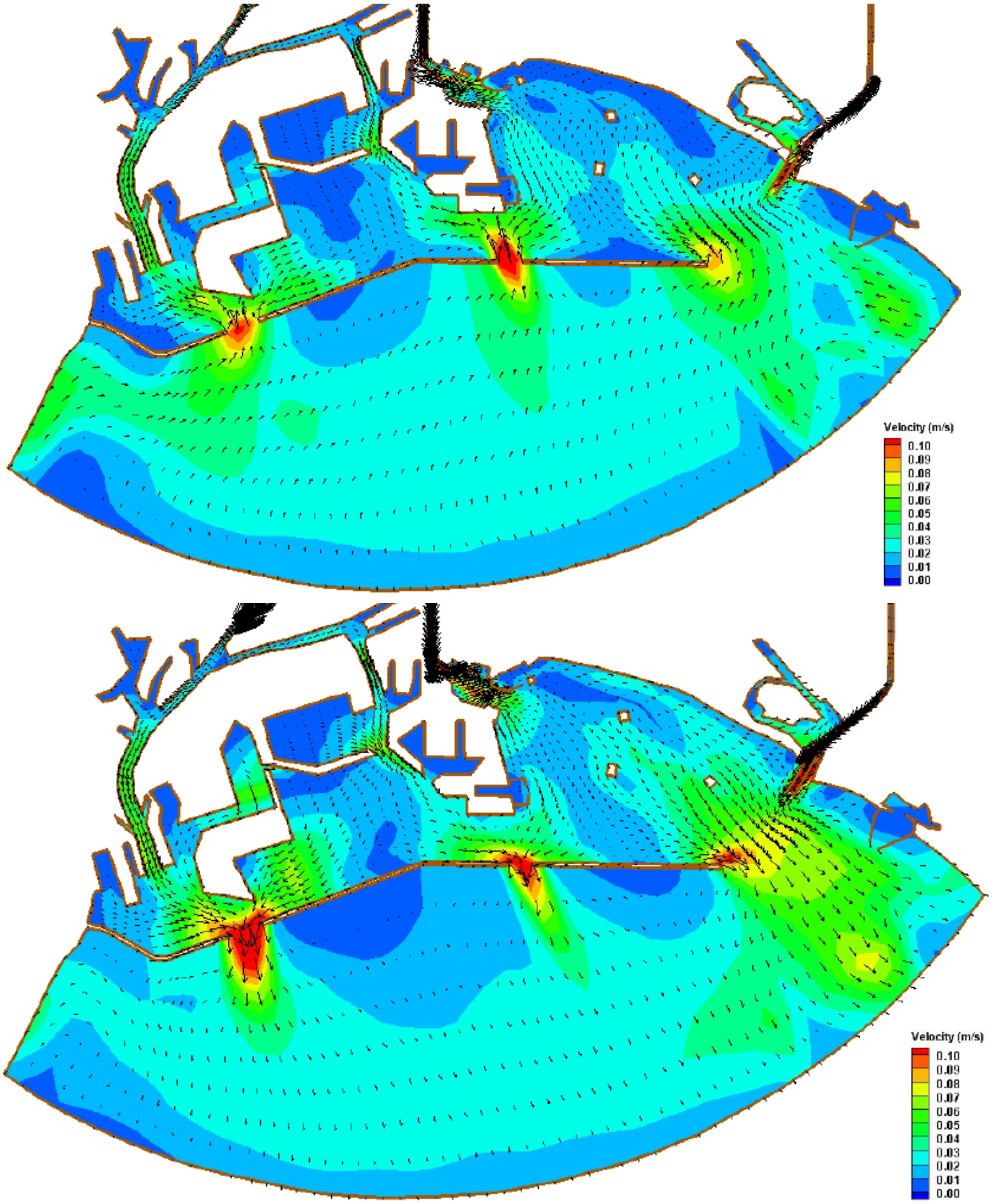

Figure 2. Current patterns in Los Angeles and Long Beach Harbors predicted by the WRAP Model (POLA and POLB, 2009). Top: Typical flood tide currents**. Bottom:** Typical ebb tide currents**.**

Sediment Characterization

A sediment characterization study was performed at Berths 167–169 in 2011 to determine the suitability of sediments from the proposed dredge footprint for unconfined aquatic disposal (AMEC, 2011). Sediments were collected and tested using standard U.S. Environmental Protection Agency (EPA)/U.S. Army Corps of Engineers (USACE) protocols according to an approved Sampling and Analysis Plan. Core samples were collected at five stations within the proposed dredge footprint and combined into to four samples (two dredged material composites and two Z-layer composites [Composite Areas A and B]).

Testing indicated that sediment contaminant levels from the dredge footprint were relatively low, but concentrations of some substances, such as polycyclic aromatic hydrocarbons (PAHs), were elevated. However, concentrations were still below levels that would prohibit placement within the Berth 243–245 CDF. Concentrations of some contaminants were higher in the Z-layer (that would be the exposed seafloor after maintenance dredging) than in the overlying sediments. However, supplemental testing determined contaminant concentrations were much lower below -42 ft MLLW.

Habitats at the Project Site

The following sections describe the aquatic biological habitats and communities in the vicinity of the proposed Project. During the 2011 sediment characterization study at Berths 167–169, sediments in Composite Areas A and B were mostly silt/clay (74 percent and 64 percent, respectively) (AMEC, 2011).

Pilings that support piers and wharves are prevalent along the edges of harbor channels, including at the proposed Project site. Many fish species are attracted to structures, such as surfperches and some rockfishes. Pier pilings support intertidal/subtidal invertebrate communities, such as algae, barnacles, and mussels that are prey items for fishes and other invertebrates. Riprap also supports diverse invertebrate communities, and provides habitat, shelter, and forage opportunities for fishes.

There is no giant kelp (*Macrocystis pyrifera*) near the proposed Project site. However, approximately 275 m^2 of eelgrass (*Zostera marina*) was present at the southern end of the Project site (beneath the Berth 169 mooring dolphin) in September 2013, and 364 m^2 was visible in May 2014 (**Figure 3**; MBC, 2016).

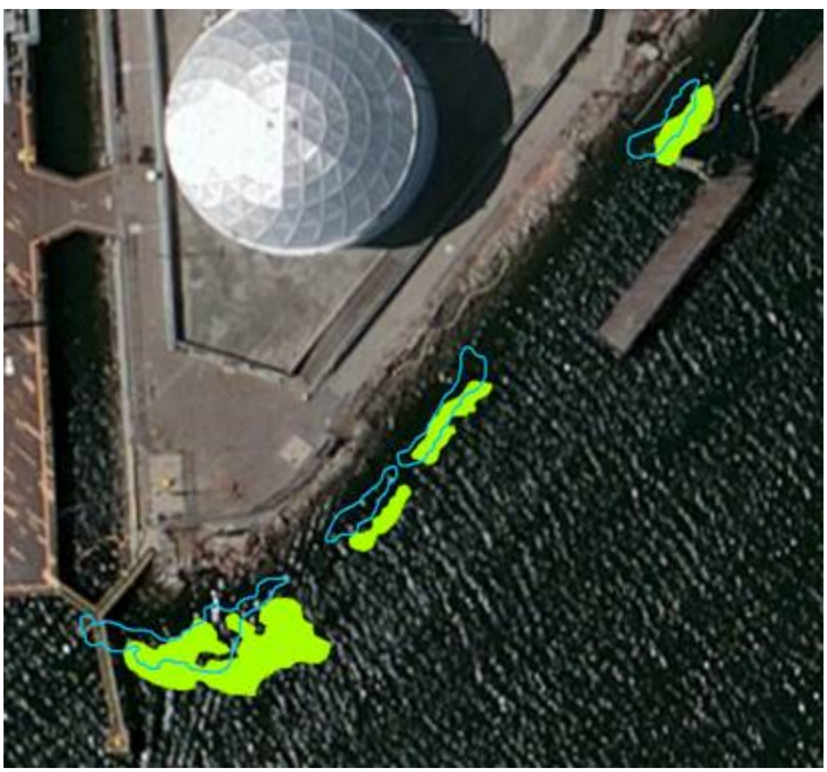

Figure 3. Eelgrass at the southern end of Berth 169 outlined in blue (September 2013) and green (May 2014).

FISH AND INVERTEBRATE COMMUNITIES

Fish Diversity

The 2000 Biological Baseline Study (MEC and Associates, 2002), the Biological Surveys of 2008 (SAIC, 2010) and 2013–2014 (MBC, 2016), as well as long-term monitoring data from West Basin in Los Angeles Harbor (MBC, 2015) have documented a fish community that appears to have changed little in decades. The 2000, 2008, and 2013–2014 surveys used several sampling gear types to adequately characterize different habitat types within the Port Complex. The long-term trawl surveys in Los Angeles and Long Beach Harbor used otter trawls, which target demersal (epibenthic) fish and invertebrates. In various biological studies, more than 130 fish species have been collected within the Port Complex, with 60 to 70 of those species commonly occurring (MEC, 1988; MEC and Associates, 2002; SAIC, 2010; MBC, 2016).

Ichthyoplankton

Three ichthyoplankton surveys were conducted at stations throughout the Port Complex in September 2013 (summer), February 2014 (winter), and May 2014 (spring) (MBC, 2016). Densities of fish eggs (average of 22,302/100 m^2) and larvae (average of 14,626/100 m^2) were highest during the winter 2014 survey, while mean egg densities were lowest (6,239/100 m^2) in spring 2014 and mean fish larvae densities were lowest (7,364/100 m^2) during summer 2013 (MBC, 2016). The most abundant larval fish taxa in 2013–2014 included CIQ gobies (gobies of the genus *Clevelandia*, *Ilypnus*, and *Quietula*), unidentified anchovies (Engraulidae), Combtooth Blennies (*Hypsoblennius* spp.), White Croaker (*Genyonemus lineatus*), Northern Anchovy (*Engraulis mordax*) and Bay Goby (*Lepidogobius lepidus*). Most of the fish eggs could not be identified during the study. In the water adjacent to the Project area, White Croaker comprised 31 percent of ichthyoplankton density collected over three seasons in 2013–2014, followed by unidentified anchovies (24 percent) and CIQ gobies (14 percent).

Juvenile and Adult Fishes

Pelagic fish surveys were conducted throughout the Port Complex in May (spring) and August 2014 (summer) (MBC, 2016). Consistent with similar studies conducted during 2000 and 2008, there was little variability in the abundance of pelagic fishes between Inner and Outer Harbor areas in 2014, and this was attributed to the highly mobile nature of most pelagic fishes. At Station LA15, located 0.4 miles west of the Project site at the entrance to West Basin, mean numbers of pelagic, or water column, fishes as sampled by lampara net[1] were 141 individuals during the day and 1,060 at night (MBC, 2016). At Station LA6, located 0.5 miles northeast of the Project site, mean numbers of pelagic fishes were 67 individuals during the day and 1,106 at night. For comparison, the harbor-wide station mean was 10,304 individuals during the day (although the mean was heavily skewed by a very large catch at one station) and 4,166 at night. The total numbers of species collected at Station LA15 were similar to the harbor-wide means: five species collected during the day and nine species at night (11 species overall), compared with harbor-wide means of four species during the day, nine at night and 11 overall throughout the Port Complex. At Station LA6, four species were collected during the day, and 10 were collected at night (10 species overall). The most abundant species collected by lampara off the Project site were Northern Anchovy and Topsmelt (*Atherinops affinis*).

Abundance of demersal fishes, those that live and feed on or near the bottom, sampled by a bottom-sampling net (otter trawl) in 2013–2014 at Station LA15 was relatively low, with means of 41 individuals during the day and 78 at night (MBC, 2016). At Station LA6, abundance of fishes was also relatively low, with means of 10 individuals during the day and 143 at night. For comparison, the harbor-wide station mean was 143 individuals during the day and 235 at night. The total number of species collected at Station LA15 (15 species during the day, 16 at night and 19 overall) was slightly higher than the harbor-wide mean during the day (12 species) and similar to the harbor-wide mean during night (17 species) and overall (19). At Station LA6, seven species were collected during the day, 13 were collected at night, and 14 species were collected overall. The most abundant species collected by otter trawl at Station LA15 was California Lizardfish (*Synodus lucioceps*), and the most abundant

[1] A spoon-shaped, surrounding net typically used on schooling fish found in large dense shoals.

species at Station LA6 was Northern Anchovy. The most abundant species throughout the Port Complex were White Croaker, California Lizardfish, Queenfish (*Seriphus politus*), and Northern Anchovy.

Long-term surveys of demersal fishes and invertebrates have been conducted in the West Basin of Los Angeles Harbor (MBC, 2015), which is 0.6–1.2 km from the proposed Project site, and habitat is similar between locations. A total of eight trawls was performed during most survey years. At least 44 species of fishes have been collected since 1978, although only about 15 species are collected annually on average. Abundance has been dominated by White Croaker, Northern Anchovy, Bay Goby, and Queenfish, which combined account for nearly 94 percent of the long-term abundance. The most abundant fish species collected in 2014 included California Lizardfish (31 percent of the total), Yellowchin Sculpin (*Icelinus quadriseriatus*; 29 percent), and White Croaker (15 percent).

Invertebrate Diversity

Juvenile/Adult Invertebrates

In 2013–2014, at total of 110 epibenthic macroinvertebrate taxa were collected throughout the Port Complex (MBC, 2016). Xantus swimming crab (*Portunus xantusii*) was the most abundant epifaunal invertebrate collected at Station LA15 during both day and night trawls in summer, and during night in spring (MBC, 2016). During daytime in spring, the most abundant species was tuberculate pear crab (*Pyromaia tuberculata*). At Station LA6, the most abundant species were blackspotted bay shrimp (*Crangon nigromaculata*), blacktail bay shrimp (*Crangon nigricauda*), and Xantus swimming crab. At both stations combined, the most abundant species were blackspotted bay shrimp (34 percent of total abundance), blacktail bay shrimp (24 percent) and Xantus swimming crab (24 percent). Throughout the Port Complex the most abundant invertebrates were: target shrimp (*Sicyonia penicillata*; 35 percent of total abundance), blackspotted bay shrimp (20 percent), Xantus swimming crab (10 percent), tuberculate pear crab (7 percent), and blacktail bay shrimp (7 percent). Xantus swimming crab was collected at 23 of the 26 stations in the Port Complex in summer 2013, and at all stations during spring 2014.

In West Basin of Los Angeles Harbor, trawl-caught invertebrate abundance since 1978 has been dominated by bay shrimp (*Crangon* spp.; 53 percent), tuberculate pear crab (seven percent), New Zealand bubble snail (*Philine auriformis;* two percent), and yellow crab (*Metacarcinus anthonyi*; less than one percent). The most abundant macroinvertebrates collected in 2014 included Xantus swimming crab (36 percent), Alaska bay shrimp (*Crangon alaskensis*; 32 percent) and target shrimp (11 percent) (MBC, 2015).

EFH AND MANAGED SPECIES

A description of the fish and invertebrate communities of the study area is provided in the previous section. Under the Magnuson-Stevens Act, the federal government has jurisdiction to manage fisheries in the U. S. Exclusive Economic Zone (EEZ), which extends from the outer boundary of state waters (3 nautical miles [5.6 km]) from shore) to a distance of 200 nautical miles (370 km) from shore. Fishery Management Plans (FMPs) are extensive documents that are regularly revised and updated. The goals of the management plans include, but are not limited to: the promotion of efficient and profitable fisheries, achievement of optimal yield, provision of adequate forage for dependent species, prevention of overfishing, and development of long-term research plans (PFMC 2011, 2014). There are two FMPs that include waters adjacent to the Project site: the Coastal Pelagics FMP (6 groups [5 species plus Euphausiids]) and the Pacific Groundfish FMP (85 species) (**Appendix**).

Coastal Pelagics FMP

Until 2008, the Coastal Pelagics FMP covered one invertebrate (market squid, *Doryteuthis opalescens*) and four fish species (Northern Anchovy, Jack Mackerel [*Trachurus symmetricus*], Pacific [Chub] Mackerel [*Scomber japonicus*], and Pacific Sardine [*Sardinops sagax*]). Amendment 12 to the FMP was finalized in 2009 "to ensure the preservation of a key trophic relationship between fished and unfished elements in the California Current ecosystem by protecting krill resources off the U. S. West Coast" (PFMC 2011; FR 74[132]33372-3). Krill (euphausiids) are small, shrimp-like crustaceans that serve as the basis of the marine food chain. They are eaten by many species of fish, whales, and seabirds. Although there was no fishery for krill off the U.S. West Coast, krill are fished in Antarctica, Japan, and off the west coast of Canada. They are used in aquaculture and livestock feed and for fish bait and pet foods.

In 2010, Jacksmelt (*Atherinopsis californiensis*) and Pacific Herring (*Clupea pallasii pallasii*) were added as "Ecosystem Component Species" to the Coastal Pelagics FMP (PFMC, 2011a). Ecosystem Component Species must: (1) be a non-target stock/species; (2) not be subject to overfishing, approaching overfished, or overfished and not likely to become subject to overfishing or overfished in the absence of conservation and management measures; and (3) not generally retained for sale or personal use, although "occasional" retention is not by itself a reason for excluding a species from the Ecosystem Component category. The incidental catch of these two species would continue to be monitored by the Pacific Fishery Management Council (PFMC). The Port Complex is near the southern extent for Pacific Herring (Miller and Lea, 1972), and it has not been collected during harbor-wide fish studies (MEC, 1988; MEC and Associates, 2002; SAIC, 2010; MBC, 2016).

In 2016, additional species were added to the Coastal Pelagics and Pacific Groundfish FMPs as Ecosystem Component Species (PFMC, 2016). However, the only additional group that are known to occur in or near the Port Complex are silversides (Atherinopsidae). Some species that were previously covered under the Pacific Groundfish FMP were removed from the list of managed species and designated as Ecosystem Component Species. These included some species that occur in southern California, such as Big Skate (*Raja binoculata*), California Skate (*R. inornata*), Pacific Grenadier (*Coryphaenoides acrolepis*), Ratfish (*Hydrolagus colliei*), and Soupfin Shark (*Galeorhinus zyopterus*). Amendments to the Coastal Pelagics and Pacific Groundfish FMPs prohibit the development of commercial fisheries for these additional species until and unless the PFMC has had time to study and assess the scientific information related to any proposed fishery directed at that species, and assess potential impacts of the proposed fishery on existing fisheries, fishing communities, and the marine ecosystem.

EFH for Coastal Pelagics is defined as all marine and estuarine waters from the shoreline of the coasts of California, Oregon, and Washington offshore to the limits of the EEZ and above the thermocline. The thermocline is the portion of the water column where water temperature changes rapidly, usually warmer surface waters transitioning to cooler subsurface waters. The habitat for the Coastal Pelagics is primarily above the thermocline.

Pacific Groundfish FMP

There are 85 fish species covered under the Pacific Groundfish FMP, including: two sharks; one skate; six species of roundfish; 64 species of rockfishes; and 12 species of flatfishes. For Pacific Groundfish, EFH includes all waters off southern California between Mean Higher High Water (MHHW) and depths less than or equal to 11,483 ft (3,500 m). The FMP also considers EFH to include areas of the upriver extent of saltwater intrusion. Lastly, specific Habitat Areas of Particular Concern (HAPCs) have been identified as: estuaries, canopy kelp, seagrass, rocky reefs, and other specific areas (such as seamounts).

Relevant Species

Although there are nearly 100 fish/invertebrate species covered under the Coastal Pelagics and Pacific Groundfish FMPs, not all occur near the Project site. **Table 1** lists species that have been collected or observed during studies in the Port Complex. **Table 2** summarizes the occurrence of these species near the proposed Project site in 2008 and 2013–2014, at other Inner Los Angeles Harbor stations in 2013–2014, and in West Basin of Los Angeles Harbor from 2008–2013.

Coastal Pelagics

All of the Coastal Pelagics species could potentially occur at the site of the proposed Project. However, only one coastal pelagic fish—Northern Anchovy—is likely to occur in the Project vicinity. Northern Anchovy is among the most common and abundant fish species in the Port Complex. In 2006, anchovy larvae were present in the Port Complex during two seasonal periods: a greater peak in March–July and a lesser peak in October–December (MBC et al., 2007). Juvenile and adult anchovies have consistently been collected during fish sampling near the Project site (MEC and Associates, 2002; SAIC, 2010; MBC, 2016).

Pacific Sardine is an epipelagic species (occurring in about the upper 200 meters of the ocean) that forms loosely aggregated schools mostly offshore (Wolf et al. 2001). Pacific Sardine larvae are uncommon in the Port; none were collected in the most recent survey (MBC 2016) and only occasional individuals have been collected in previous surveys, always in the Outer Harbor (e.g., MBC et al. 2007). Adult and juvenile Pacific Sardine are much less common than Northern Anchovy in the Port. Fewer than 200 were collected in lampara samples in 2013-2014, only eight of these at stations LA-6 and LA-16 (MBC 2016). However, in the past Pacific Sardine has been one of the ten most abundant pelagic species in the Harbor (MEC and Associates 2002; SAIC 2010), and therefore is considered common (Table 1). In past harbor-wide surveys, Jack Mackerel and Pacific Mackerel were collected much less frequently and in much lower numbers than Northern Anchovy and Pacific Sardine. However, in the 2013-2014 study, both species were among the ten most abundant pelagic (i.e., lampara-caught) species (MBC 2016), and therefore are currently considered common (Table 1).

Although no mature market squid have been reported in recent surveys near Berths 167–169, market squid paralarvae were collected in Inner and Outer Harbor areas in 2006 (MBC et al., 2007). All coastal pelagics are associated with the water column (as opposed to the seafloor like many of the groundfish); however, female squid also lay egg masses on sandy bottoms during spawning (at depths of about 16–180 feet [ft], with most occurring between 66 and 115 ft) (PFMC, 2011).

In 2005, krill (Euphausiids) were added as a managed unit under the Coastal Pelagic Species FMP, and their harvest is prohibited in U.S. waters (PFMC, 2011). This is intended to ensure that, to the extent practicable, fisheries would not develop that could put krill stocks at risk and impact other marine resources that depend on krill. EFH for krill varies by species, but the waters of the Port are considered EFH. Due to their small size, they are not typically identified during biological surveys within the Ports. Silversides, the Ecosystem Component Species that include Topsmelt, Jacksmelt, and California Grunion, were abundant in pelagic fish surveys in 2014, but not adjacent to the proposed Project site (MBC, 2016).

Table 1. Managed fish species found in Los Angeles Harbor based on past occurrences.

Species	Potential Habitat Use	Larval[1,2,4,6]	Juvenile/Adult[2,3,4,5]
Coastal Pelagics			
Northern Anchovy (*Engraulis mordax*)	Open water.	Abundant	Abundant
Pacific Sardine (*Sardinops sagax*)	Open water.	Uncommon	Common
Pacific (Chub) Mackerel (*Scomber japonicus*)	Open water, juveniles off sandy beaches and around kelp beds.	Absent	Common
Jack Mackerel (*Trachurus symmetricus*)	Open water, young fish over shallow banks and juveniles around kelp beds.	Rare	Common
Market Squid (*Doryteuthis opalescens)*	Open water; rare near bays, estuaries, and river mouths.	Rare	Rare
Pacific Groundfish			
English Sole (*Parophrys vetulus*)	Soft bottom habitats.	Rare	Uncommon
Pacific Sanddab (*Citharichthys sordidus*)	Soft bottom habitats.	Rare	Uncommon
Butter Sole (Isopsetta isolepis)	Soft bottom habitats.	Rare	N/A
Black Rockfish (*Sebastes melanops*)	Along breakwater, near deep piers and pilings. Associated with kelp, eelgrass, high relief reefs.	N/A	Rare
Bocaccio (*Sebastes paucispinis*)	Multiple habitat associations, including soft and hard bottom, kelp, eelgrass, etc.	N/A	Rare

Brown Rockfish (*Sebastes auriculatus)*	Multiple habitat associations but prefer hard substrata and rocky interfaces.	N/A	Rare
Calico Rockfish (*Sebastes dallii*)	Multiple habitat associations but prefer hard substrata and rocky interfaces.	N/A	Rare
California Scorpionfish (*Scorpaena guttata*)	Benthic, on soft and hard bottoms, as well as around structures.	N/A	Uncommon
Grass Rockfish (*Sebastes rastrelliger*)	Common on hard substrate, kelp, and eelgrass habitats.	N/A	Rare
Kelp Rockfish (*Sebastes atrovirens*	Common on hard substrate, kelp; reported along breakwater.	N/A	Rare
Olive Rockfish (*Sebastes serranoides*)	Common around hard substrate, kelp; reported along breakwater.	N/A	Rare
Vermilion Rockfish (*Sebastes miniatus*)	Juveniles over soft-bottom and kelp, adults associated with hard substrate.	N/A	Uncommon
Lingcod (*Ophiodon elongatus*)	Multiple habitat associations but prefer hard substrata and rocky interfaces.	N/A	Rare
Cabezon (*Scorpaenichthys marmoratus*)	Multiple habitat associations but prefer hard substrata and rocky interfaces.	Rare	Rare
Pacific Hake (*Merluccius productus)*	Common offshore, juveniles in open water	Rare	N/A
Leopard Shark (*Triakis semifasciata*)	Multiple habitat associations, including soft bottoms, and near structure, kelp, and eelgrass.	N/A	Rare
Spiny Dogfish (*Squalus acanthias)*	Pelagic and on muddy bottoms.	N/A	Rare
Big Skate* (*Raja binoculata*)	Soft bottom habitat.	N/A	Uncommon
California Skate* (*Raja inornata*)	Soft bottom habitat.	N/A	Uncommon

Sources: 1 – MBC et al. (2007), 2 – MEC and Associates (2002), 3 – MBC (2013), 4 – SAIC (2010), 5 – MEC (1999). 6 – MBC (2016) N/A = Not applicable, internal fertilization. Abundant>Common>Uncommon>Rare.

*Ecosystem Component Species

Note - Most rockfish larvae not identifiable to species

Table 2. Occurrence of managed fish species (1) near the proposed Project site and (2) at other Inner Harbor locations, 2008–2013.

	Stations LA6 or LA15 (2014)[3]	Stations LA6 or LA15 (2008)[1]	Other Inner Los Angeles Harbor Stations (2013–2014)[3]	West Basin, Inner Los Angeles Harbor Stations (2008-13)[2]
Coastal Pelagics				
Northern anchovy (*Engraulis mordax*)	X	X	X	-
Pacific Sardine (*Sardinops sagax*)	X	X	X	-
Pacific (Chub) Mackerel (*Scomber japonicus*)	X	-	-	-

Jack Mackerel (*Trachurus symmetricus*)	-	X	X	-
Market Squid (*Doryteuthis opalescens)*	-	-	-	-
Pacific Groundfish				
English Sole (*Parophrys vetulus*)	-	X	X	X
Pacific Sanddab (*Citharichthys sordidus*)	-	-	-	-
Butter Sole (*Isopsetta isolepis*)	-	-	-	-
Black Rockfish (*Sebastes melanops*)	-	-	-	-
Pacific Hake (*Merluccius productus)*	-	-	-	-
Bocaccio (*Sebastes paucispinis*)	-	-	-	-
Calico Rockfish (*Sebastes dallii*)	-	-	-	-
California Scorpionfish (*Scorpaena guttata*)	-	-	-	-
Grass Rockfish (*Sebastes rastrelliger*)	-	-	-	-
Kelp Rockfish (*Sebastes atrovirens*	-	-	-	-
Olive Rockfish (*Sebastes serranoides*)	-	-	-	-
Vermilion Rockfish (*Sebastes miniatus*)	X	-	X	-
Lingcod (*Ophiodon elongatus*)	-	-	-	-
Cabezon (*Scorpaenichthys marmoratus*)	-	-	-	-
Leopard Shark (*Triakis semifasciata*)	-	-	-	-
Spiny Dogfish (*Squalus acanthias)*	-	-	-	-
Big Skate (*Raja binoculata*)	-	-	-	X
California Skate (*Raja inornata*)	X	X	X	X
Sources: 1 –SAIC (2010), 2 – MBC (2013), 3 – MBC (2016)				

Pacific Groundfish

None of the species covered under the Pacific Groundfish FMP are considered abundant in the proposed Project area. However, many are associated with hard substrate, kelp, and/or eelgrass, which are less frequently sampled habitats than soft bottoms. The only Pacific Groundfish species collected at Stations LA6 or LA15 (near the proposed Project site) in 2014 were Vermilion Rockfish (*Sebastes miniatus*) and California Skate. Two other Ecosystem Component Species (Big Skate and English Sole [*Parophrys vetulus*]) were collected during the last six years of trawl surveys in West Basin. English sole was also collected at another trawl station in Los Angeles Harbor in 2014 (MBC, 2016).

A 2010 review of bycatch species in Coastal Pelagic fisheries confirmed that incidental catch and bycatch in these fisheries is dominated by other Coastal Pelagics and that bycatch/incidental catch of non-Coastal Pelagics is extremely low. However, Jacksmelt and Pacific Herring are infrequently caught, and therefore were added to the FMP under Amendment 13 to ensure continued monitoring of incidental catch and bycatch of these species (PFMC, 2011). The distribution of Pacific Herring does not normally extend southward beyond San Francisco Bay (Fitch and Lavenberg, 1975). Jacksmelt are common in nearshore waters of southern California (Miller and Lea, 1972), and they were collected by lampara near the proposed Project site in 2014 (MBC, 2016).

English Sole was collected in prior Port-wide studies, and in West Basin during annual trawl surveys, but only two individuals were collected in 2014 (MBC, 2016). California Scorpionfish (*Scorpaena guttata*) was collected in all four harbor-wide surveys. Twenty-nine individuals were collected in 2014, but none were collected at Stations LA6 or LA15. Eleven Vermilion Rockfish were collected at Stations LA6 and LA15 in 2014 (MBC, 2016). Vermilion Rockfish occur between 20 and 1,440 ft (6 and 436 m), but are most common between 165 and 495 ft (50 and 50 m). Juveniles are common in shallower water (20 to 120 ft, or 6 to 36 m), where they hover over sand patches near alga or structures, including pier pilings (Love et al., 2002). The remaining species in Table 1 have only been collected sporadically and in low numbers.

Eight California Skate were collected by trawl at Stations LA6 and LA15 in 2014 (MBC, 2016). Although they have been collected in other studies of the Port Complex, no Big Skate were collected in 2014 (MBC, 2016). California Skate has been collected in all four harbor-wide biological surveys, whereas Big Skate was collected in 2000, and in West Basin during annual trawl surveys. Both species have been collected at West Basin in the last seven years (Table 2). Both Skate species prefer soft bottom habitat, although California Skate occurs in much deeper waters (60 to 2,200 ft [18 to 671 m]) than Big Skate (10 to 360 ft [10 to 110 m]) (Miller and Lea, 1972).

ASSESSMENT OF POTENTIAL IMPACTS

The following section includes a discussion of potential impacts resulting from both the construction and operation of the proposed Project. Potential effects to the marine environment could result from:

- Demolition and removal of the existing wharf, including the timber deck and approximately 900 creosote-treated timber piles,
- Installation of steel pipe piles to support the new loading platforms and access trestles;
- Installation of steel pipe piles to support concrete decks on the new mooring dolphins;
- Minor dredging (i.e., clean-up dredging) to remove sediment that slumps during pile driving;
- Construction and operational noise; and
- Operation of the terminal through 2047.

The assessment of impacts is based on the assumption that the proposed Project or alternative (as applicable) would adhere to the following:

- Other relevant standard operating procedures and BMPs for Port construction projects will be followed. This includes adherence to a SWPPP during operation of the proposed Project or alternatives as part of the General Industrial Activities Stormwater Permit (GIASP).
- A Rivers and Harbors Act Section 10 permit will be required from the USACE for pile installation activities and dredging in waters of the United States. A previously approved Section 404 permit for the Port of Los Angeles Channel Deepening Project (Corps Permit No. SPL-2008-00662-AOA) allows for in-harbor disposal of dredged material at the Berths 243–245 CDF.

- A Clean Water Act (CWA) Section 401 Water Quality Certification from the Los Angeles RWQCB would be required for activities related to construction dredging, potentially pile driving, and any in-water disposal activities may require standard Waste Discharge Requirements (WDRs). The WDRs would include provisions that limit, among other things, the spread of turbidity or floating material outside the immediate area of operation.

- During dredging, water quality monitoring program would be implemented by LAHD's Construction Division in compliance with both USACE and RWQCB permit requirements, wherein dredging effects are measured *in situ*. The objective of the monitoring program is adaptive management of the dredging operation, whereby potential exceedances of water quality objectives are measured and dredging operations subsequently modified. If potential exceedance levels are approached, LAHD's Construction Division would immediately meet with the construction manager to discuss modifications of dredging operations to reduce turbidity and to keep it at acceptable levels. This could include alteration of dredging methods, and/or implementation of additional BMPs such as a silt curtain (which may be required by permit conditions).

- The LAHD and terminal operator will comply with Spill Prevention, Control, and Countermeasure Regulations (SPCC). The SPCC regulations require that LAHD (during construction) and the tenant (during operation) have in place measures that help ensure oil spills do not occur, but, if they do, that there are protocols in place to contain the spill and neutralize the potential harmful impacts. An SPCC plan would be prepared, and these plans would detail the spill prevention and control measures to be implemented.

Construction Impacts

In-water and over-water construction activities associated with the first platform (Berth 168) would occur first and take approximately two-years to complete, followed by a similar period for construction of a platform at Berth 169. Impacts on water quality could occur from wharf demolition, installation of steel pipe piles, minor clean-up dredging, and potential construction-related spills. Impacts to water quality could result from the suspension of sediments and/or the introduction of contaminants to the water column. Suspension is the dislodgement and dispersal of sediment into the water column (where finer sediments are subject to transport and dispersion by currents). Sediment suspension can also result in the short-term release of contaminants in the water column through release of pore water (water between individual sediment particles) and by desorption, or separation, from suspended particles. The potential water quality effects from construction of each of the major Project components are described separately below.

The types of water quality impacts from proposed Project construction could include:

- Increased turbidity (sediment suspension resulting in reduced water clarity and light transmittance),

- Increased dissolved or particulate contaminants (that were previously bound to dredged sediments or in pore water),

- Reduced dissolved oxygen (from suspension of sediments with low oxygen), and

- Reduced pH.

There are no projected effects to salinity or temperature from construction and operation of the proposed Project.

Effects to Water Quality during Clean-up Dredging, Pile Removal, and Steel Pile Installation

Clean-up dredging and pile removal would resuspend some bottom sediments and create localized and temporary turbidity plumes over a relatively small area. The extent of disturbance would depend on the method of dredging. Resuspension of sediments during clamshell dredging occurs during bucket impact, penetration, and removal of the bucket from the sediment, as well as during bucket retrieval through the water column. During cutterhead dredging, suspended sediments are limited to the immediate vicinity of the dredge.

Due to the relatively low volume of sediment that may need to be removed, elevated turbidity would occur in the immediate vicinity of the dredge for a few days. The majority of suspended sediments settle within one hour of dredging (Palermo et al., 2008). Transport of suspended particles by tidal currents would result in some redistribution of sediment contaminants. The amount of contaminants redistributed in this manner would be small, and the distribution would be localized in the channel adjacent to the work area. Monitoring efforts associated with previous dredging projects in the Harbor have shown that resuspension followed by settling of sediments is low (generally 2 percent or less) (Anchor Environmental, 2003). This is a measure of how much of the dredged sediment is available for movement and transport through the water column.

Dredging sediments would likely generate a relatively small turbidity plume. Receiving water monitoring studies at other dredge sites in the Harbor and other water bodies have documented a relatively small, turbid dredge plume that dissipates rapidly with distance from dredging operations (MBC, 2001; USACE and LAHD, 2008; POLA, 2009a–i, 2010a–d). Water quality parameters measured during dredging at Berths 212–215 in 2001 (MBC, 2001) indicated that light transmittance was reduced by about 15 percent in the bottom half of the water column 300 ft downcurrent from the dredge. Similar effects are expected during dredging for the proposed Project due to similarity in sediment character, dredging depths, and currents.

During dredging, water quality monitoring program would be implemented by LAHD's Construction Division in compliance with both USACE and RWQCB permit requirements, wherein dredging effects would be measured in situ. The objective of the monitoring program would be adaptive management of the dredging operation, whereby potential exceedances of water quality objectives would be measured and dredging operations subsequently modified. If potential exceedance levels are approached, LAHD's Construction Division would immediately meet with the construction manager to discuss modifications of dredging operations to reduce turbidity and to keep it at acceptable levels. This could include alteration of dredging methods, and/or implementation of additional BMPs, such as a silt curtain (which may be required by permit conditions).

Steel piles would be lowered through the water column, and then driven into the seafloor by both vibratory and impact driving methods. Some sediment would be resuspended during this process, but over a much smaller area than during clean-up dredging, and any turbidity would be limited to waters near the seafloor. In general, sediment resuspension during pile driving represents only about 30 percent of the resuspension that occurs during dredging (Hayes, 2012).

Within areas of sediment resuspension, DO and pH could be slightly reduced. Reductions in DO concentrations, however, would be brief and are not expected to persist or cause detrimental effects to biological resources. During dredging at Berths 212–215 in 2001, there was little difference in DO and pH between Station C (300 ft downcurrent of dredging) and Station D (the control station, located at Berth 195 in East Basin) (MBC, 2001). Contaminants, including metals and organics, could be released into the water column during the dredging and pile installation. However, any increase in contaminant levels in the water is expected to be localized and of short duration. The magnitude of contaminant releases would be related to the sediment particle sizes, sediment organic content, and contaminant concentrations associated with the disturbed sediments. Similar effects are expected during clean-up dredging for the proposed Project due to similarity in sediment character, dredging depths, and currents.

Pile removal could resuspend some bottom sediments and create localized and temporary turbidity plumes over a relatively small area. Steel piles would be lowered through the water column, and then driven into the seafloor by both vibratory and impact driving methods. Some sediment would be suspended during this process, but over a much smaller area than during the clean-up dredging, and any turbidity would be limited to waters near the seafloor. Overall, effects to water quality are expected to be temporary and localized at the area(s) of construction. There would be low potential for violations of water quality standards or adverse effects to beneficial uses.

Underwater Sound during Dredging and Pile Installation

Sound pressure waves in the water from pile driving can affect fish, particularly those with a swim bladder, with the level of effect influenced by factors such as species, size of fish (smaller fish are affected more), physical condition of fish, peak sound pressure and frequency, shape of the sound wave, depth of water at the piles, location of fish in the water column, amount of air in the water, size and number of waves on the water surface, bottom substrate composition and texture, tidal currents, and presence of predators (NMFS, 2004). Scientific investigations on the effect of noise on fish indicate that sound levels below 183 to 187 dB do not appear to result in any acute physical damage or mortality to fish (ICF and Illingworth & Rodkin 2012). Types of effects on fish can include mortality from swim bladder rupture or internal hemorrhaging, changes in behavior, and hearing loss (permanent or temporary) (Vagle, 2003). The most common behavioral changes include temporary dispersal of fish schools.

The sound pressure waves from pile driving could result in temporary avoidance of the construction areas as well as cause mortality of some fish in the Coastal Pelagics FMP, especially smaller fish such as Northern Anchovy, Pacific Sardine, and silversides (Topsmelt, Jacksmelt, and California Grunion), which are more susceptible to acoustic injury or mortality. These species play important roles in the cycling of energy and nutrients in the Harbor, which has been designated as EFH for both Northern Anchovy and Pacific Sardine. Northern Anchovy are abundant in the Harbor, and although individuals could be adversely affected by pile driving, the Northern Anchovy population in the Harbor is not expected to be substantively reduced, nor would the energy and nutrient cycles be substantively degraded due to the limited area of potential effect from pile driving, and the numbers of fish exposed to harmful pressure waves would represent a very small proportion of the number of fish in the Port at any given time.

Sound transmission in the underwater environment can be affected by local bathymetry, substrates, currents, and stratification of the water column. Based on underwater studies of gray whale behavior, a disturbance threshold (Level B harassment) of 160 decibels Root Mean Square (dB_{RMS}) has been identified for marine mammals based on previous research on cetaceans (*Federal Register*, 2006). Exposure to sound at this level would likely cause avoidance, but not injury, for marine mammals. The current Level A harassment (injury) threshold for non-explosive sounds is 180 dB_{RMS} for cetaceans and 190 dB_{RMS} for pinnipeds. Thirty-eight steel pipe piles, ranging in diameter from 42 to 72 inches, would be installed as part of the proposed Project. Impact driving of steel piles at the proposed Project site could potentially result in Level A injury (within short distances of the pile driving) and Level B harassment farther from pile driving. Acoustic data from three different projects (and pile sizes) were compiled to estimate the distance of the 160 dB_{RMS} isopleth from steel pile driving. Exponential regression lines were calculated for each of the three data sets, and the coefficients of determination (R^2) for all three data sets ranged from 0.93 to 0.97, indicating high agreement between the data points and the regression lines (**Table 3**). (An R^2 of 0.0 indicates that the model explains none of the variability of the response data around its mean, while an R^2 of 1.0 indicates that the model explains all the variability of the response data around its mean).

Table 3. Acoustic data from steel pile driving projects using impact hammers.

Project Location	Pile Diameter (in.)	Estimated Distance to 160 dB_{RMS}	Coefficient of Determination (R^2)	Data Source
San Rafael Bridge (Richmond, CA)	66	171 m	0.943	ICF and I&R (2012)
Noyo River Bridge (Fort Bragg, CA)	60	165 m	0.965	ICF and I&R (2009)
Cerritos Channel (Long Beach, CA)	24	147 m	0.933	Noreas (2012)

The estimated distances to the 160 dB_{RMS} isopleth for each of the steel pile sizes were plotted to calculate the effective safe distance for the 42-inch to 72-inch steel piles included as part of the proposed Project. These distances were calculated based on acoustic data from steel pipe pile driving using impact hammers. Based on the same exponential regression technique described previously, the estimated distance to the Level B harassment threshold (160 dB_{RMS}) ranged from 157 to 173 m with a high level of agreement between the data points and the regression line ($R^2 = 0.988$). Likewise, the estimated distance to the Level A injury threshold (180 dB_{RMS} for cetaceans) ranged from 24 to 36 m with a high level of agreement between the data points and the regression line ($R^2 = 0.970$). Mitigation Measure BIO-1 has been proposed to reduce the potential for impacts to marine mammals from pile driving.

Implementation of Mitigation Measure BIO-1 would reduce the likelihood of impacts to fish and marine mammals as a result of pile driving. Mitigation Measure BIO-1 would require that pile-driving initiates with a soft start, which would minimize potential impacts to fish and marine mammals, since they would likely leave the area as pile driving commenced. Avoidance of the area would be temporary; in-water construction would take place for approximately 14 months, and occur mostly during daylight hours. There would be no physical barriers to movement, and the baseline condition for fish and wildlife access would be essentially unchanged. Further, Mitigation Measure BIO-1 would implement procedures during pile driving to actively monitor for the presence of marine mammals, and if present, to minimize adverse impacts to such mammals.

Mitigation Measure BIO-1

Although it is expected that marine mammals will voluntarily move away from the area at the commencement of the vibratory or "soft start" of pile driving activities, as a precautionary measure, pile driving activities will include establishment of a safety zone, by a qualified marine mammal professional, and the area surrounding the operations (including the safety zones) will be monitored for marine mammals by a qualified marine mammal observer.[1] The pile driving site will move with each new pile; therefore, the safety zones will move accordingly.

[1] Marine mammal professional qualifications shall be identified based on criteria established by LAHD during the construction bid specification process. Upon selection as part of the construction award winning team, the qualified marine mammal professional shall develop site specific pile driving safety zone requirements, which shall follow NOAA Fisheries Technical Guidance Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS, 2016) in consultation with the Acoustic Threshold White paper prepared for this purpose by LAHD (LAHD, 2017). Final pile driving safety zone requirements developed by the selected marine mammal professional shall be submitted to LAHD Construction and Environmental Management Divisions prior to commencement of pile driving.

Habitat Loss

No permanent loss of marine habitat would occur because the proposed Project would not result in fill being discharged into the marine environment that could eliminate marine habitat functions.

Effects to Special Aquatic Habitats

There are no wetlands or giant kelp beds in the vicinity of the marine oil terminal. Water quality effects are expected to be transitory and are not expected to significantly affect any wetlands or kelp beds. There are no mudflats or marshes near the Project site that would be affected by proposed Project construction. However, approximately 275 m^2 of eelgrass was present at the southern end of the Project site (beneath the Berth 169 mooring dolphin) in September 2013, and 364 m^2 was present in May 2014. This eelgrass could be affected during wharf demolition or reconstruction. Adverse impacts to eelgrass beds and/or eelgrass habitat must be minimized and/or mitigated according to the California Eelgrass Mitigation Policy. Implementation of Mitigation Measure BIO-2 would reduce potential impacts to eelgrass.

Mitigation Measure BIO-2

The proposed Project shall comply with the California Eelgrass Mitigation Policy. Pursuant to the Policy, the following activities shall be performed:

- *A pre-construction eelgrass survey to map the location and extent of eelgrass that could potentially be affected by wharf demolition and construction;*
- *Use of minimization measures or Best Management Practices, such as silt curtains, to reduce potential effects to eelgrass during Project construction (if present);*
- *A post-construction eelgrass survey to map the location and extent of eelgrass after completion of wharf demolition and construction;*
- *If eelgrass is lost due to Project construction, eelgrass shall be mitigated at a ratio of 1.2 to 1.*

Timing of eelgrass surveys, including the frequency of post-mitigation surveys (if applicable), shall comply with provisions in the California Eelgrass Mitigation Policy.

In addition, the placement of mooring dolphin MD7 (proposed at the southernmost area of the Project site/Berth 169) would be in a manner that does not affect eelgrass that could occur in the vicinity of Berth 169. Therefore, impacts would be less than significant.

Effects of Wharf Improvements

Construction activities related to wharf improvements could result in temporary impacts on surface water quality if debris or construction materials enter Harbor waters. No upland surface bodies of water currently exist within the proposed Project boundaries. Thus, proposed Project-related impacts on surface water quality would be limited to potential non-stormwater discharges or discharges of stormwater runoff to Harbor waters that receive runoff from the proposed Project site. Runoff from a construction site could contain a variety of contaminants, including metals and PAHs associated with construction materials, and spills of oil or other petroleum products. Impacts on surface water quality from accidental spills are addressed below.

Accidental Spills

Accidents resulting in spills of fuel, lubricants, or hydraulic fluid from equipment used during wharf demolition, pile installation, and wharf improvements could occur during proposed Project construction. Based on the history for this type of work in the Harbor, accidental leaks and spills of large volumes of hazardous materials or wastes containing contaminants during onshore construction activities have a very low probability of occurring because large volumes of these materials typically are not used or stored at construction sites.

Shading & Light

Shade from construction vessels, and lights to support construction activities at night, would have temporary influences on the distribution of water column species. Certain zooplankton, fish, and squid are attracted to light. Other species may be attracted by concentrations of zooplankton and squid associated with night lighting. Conversely, daytime shading from construction vessels or localized turbidity during in-water construction may reduce algal productivity. Certain fish species are attracted to shade and cover that construction vessels provide, while vibration and activity may frighten certain species from the area. However, because construction activities and locations would be constantly changing, the effects would be similar to those that occur under normal Port operations with vessels constantly coming and going, and night lighting provided for Port operations. Therefore, no substantial disruption of biological communities would occur.

Operational Impacts

The proposed improvements to the terminal are intended to meet MOTEMS safety requirements, and would not result in an increase in the terminal's capacity. However, the number of tanker vessels calling at the marine terminal could increase in the future. Operation of the proposed Project would not result in the permanent loss of marine habitat. Although tanker traffic could be more intensive than in the past, proposed Project operations are not likely to substantially disrupt biological communities, and the presence of new terminal structures (such as pipe piles and catwalks) or increased vessel traffic would not substantially disrupt biological communities in the Harbor.

A product spill depending on its location, spill volume, and extent could result in substantial impacts to managed species or EFH; however, the potential of such a spill is very low. With compliance with existing spill prevention and clean-up protocols, and federal, state, and local regulations, as well as the standard controls, the potential for incidental spills to occur is low, but should they occur, they would not likely substantially disrupt EFH because they would be promptly contained and cleaned up.

ASSESSMENT SUMMARY

Impacts during construction would be localized and temporary. Potential impacts from wharf demolition, pile installation, construction runoff, accidental spills during construction, clean-up dredging, and shading would be less than significant. No habitat loss would occur. Acoustic impacts from pile driving could result in adverse effects to fish and marine mammal species in the immediate construction area. However, due to the limited potential impact area, this is not considered a substantial disruption. Additionally, with implementation of Mitigation Measure BIO-1, the pile-driving would initiate with a soft start, which would minimize potential impacts to fish and marine mammals, as they would likely leave the area as pile driving commenced. Marine mammal observers would monitor waters adjacent to pile driving for marine mammals, and alter pile-driving operations to minimize the potential for acoustic impacts to marine mammals. Avoidance of the area would be temporary; in-water activities, such as pile driving, would last for approximately 14 months, and occur mostly during daylight hours. There would be no physical barriers to movement, and the baseline condition for fish and wildlife access would be essentially unchanged. Due to the limited potential impact area and with the implementation of Mitigation Measure BIO-1, this is not considered a substantial disruption.

With compliance with existing spill prevention and clean-up protocols, and federal, state, and local regulations, as well as the standard controls, the potential for incidental spills to occur is low, but should they occur, they would not likely substantially disrupt EFH because they would be promptly contained and cleaned up.

Approximately 275 m^2 of eelgrass was present at the southern end of the Project site (beneath the Berth 169 mooring dolphin) in September 2013, and 364 m^2 was present in May 2014. This eelgrass could be affected during wharf demolition or reconstruction. Adverse impacts to eelgrass beds and/or eelgrass habitat must be minimized and/or mitigated according to the California Eelgrass Mitigation Policy. Implementation of Mitigation Measure BIO-2 would reduce potential impacts to eelgrass. In addition, the placement of mooring dolphin MD7 (proposed at the southernmost area of the Project site/Berth 169) would be in a manner that does not affect eelgrass that could occur in the vicinity of Berth 169.

This page left intentionally blank

REFERENCES

Allen, L. G., M. M. Yoklavich, G. M. Cailliet, and M. H. Horn. 2006. Bays and estuaries. Pp. 119–148 *In* The Ecology of Marine Fishes: California and Adjacent Waters, L. G. Allen, D. J. Pondella II, and M. H. Horn (eds.). Univ. Calif. Press, Berkeley. 660 p.

AMEC Earth & Environmental, Inc. (AMEC). 2011. Final Berths 167–169 Maintenance Dredging Sediment Characterization Study, Los Angeles Harbor. Submitted to the Port of Los Angeles. November 2011. 392 p.

Anchor Environmental. 2003. Literature review of effects of resuspended sediments due to dredging operations. Prepared for the Los Angeles Cont. Sed. Task Force, Los Angeles, CA. June 2003. 87 p. plus appendices.

Cross, J. N. and L. G. Allen. 1993. Fishes. Pp. 459-540 *In:* Ecology of the Southern California Bight: A synthesis and interpretation. M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Univ. Calif. Press, Los Angeles, CA. 926 p.

Dobroski, N., C. Brown, R. Nedelcheva, C. Scianni, and J. Thompson. 2015. 2015 Biennial report on the California Marine Invasive Species Program. Prepared for the California State Legislature. Feb. 2015.

Feldkamp, S.D., R. L. DeLong, and G.A. Antonelis. 1989. Diving patterns of California sea lions, *Zalophus californianus*. Can. J. Zool. 67(4):872-883.

Fitch, J. E. and R. J. Lavenberg. 1975. Marine food and game fishes of California. Univ. Calif. Press, Berkeley, CA. 179 p.

Gjertz, I., C. Lyderson, and O. Wiig. 2001. Distribution and diving of harbor seals (*Phoca vitulina*) in Svalbard. Polar Bio. 24(3):209-214.

Hayes, D. 2012. Memo to AECOM: Tappan Zee Hudson River Crossing Project, Dredging Water Quality Assessment. Apr. 24, 2012.

ICF and Illingworth & Rodkin (ICF and I&R). 2012. Final: Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Prepared for Calif. Dept. of Transportation. Appendix I updated in Oct. 2012. 367 p.

ICF and Illingworth & Rodkin (ICF and I&R). 2009. Final: Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Prepared for Calif. Dept. of Transportation. Feb. 2009. 298 p.

Laughlin, J. 2011. Underwater Sound Levels Associated with Driving 72-inch Steel Piles at the SR 529 Ebey Slough Bridge Replacement Project. Wash. State Dept. of Trans. Off. Of Air Qual. and Noise. Mar. 2011. 56 p.

Los Angeles Harbor Department (LAHD). 2015. Unpublished water quality data for monthly Harbor-wide surveys, September through December 2014.

Los Angeles Regional Water Quality Control Board (LARWQCB). 1994. *Water Quality Control Plan Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*. Available: http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/. Last posted or revised: May 1, 2013.

Love, M.S., M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. (with contributions from J. Butler). Univ. Calif. Press, Los Angeles, CA. 405 p.

MBC Applied Environmental Sciences (MBC). 1991. Distribution of juvenile California halibut (*Paralichthys californicus*) in bay and coastal habitats of Los Angeles, Orange, and San Diego Counties in 1990. Final Report. Prepared for Southern Calif. Edison Co., Rosemead, CA. April 1991. 21 p. plus appendices.

MBC Applied Environmental Sciences (MBC). 1994. Marine biological baseline study Queensway Bay, Long Beach Harbor. Prepared for City of Long Beach.

MBC Applied Environmental Sciences (MBC). 2001. Summary Report: Berths 212-215 Maintenance Dredge Receiving Water Monitoring. Prepared for Port of Los Angeles. Dec. 2001. 6 p. plus appendices.

MBC Applied Environmental Sciences (MBC). 2015. National Pollutant Discharge Elimination System 2014 receiving water monitoring report, Harbor Generating Station, Los Angeles County, California. Prepared for Los Angeles Dept. of Water and Power.

MBC Applied Environmental Sciences (MBC). 2016. 2013–2014 Biological Surveys of Long Beach and Los Angeles Harbors. Prepared for the Ports of Long Beach and Los Angeles. In Association with Merkel & Associates and Thomas Johnson Consultant LLC. June 2016.MBC Applied Environmental Sciences, Tenera Environmental, Inc., and URS Corporation. 2007. Final Report: Harbor Generating Station Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study. Prepared for the City of Los Angeles Dept. of Water and Power. Dec. 26, 2007.

MBC, Tenera Environmental, Inc., and URS Corporation. 2007. Final Report: Harbor Generating Station Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study. Prepared for the City of Los Angeles Dept. of Water and Power. Dec. 26, 2007.

MEC Analytical Systems (MEC). 1988. Biological baseline and ecological evaluation of existing habitats in Los Angeles Harbor and adjacent waters. Vol. I - Executive Summary. Vol. II - Final report. Vol. III - Appendices. Prepared for Port of Los Angeles. MEC05088001.

MEC Analytical Systems (MEC). 1999. Port of Los Angeles Special Study. August 1999. Prepared for the Port of Los Angeles, San Pedro, CA. 9 p. plus tables, figures, and appendices.

MEC Analytical Systems (MEC and Associates). 2002. Ports of Long Beach and Los Angeles: Year 2000 Biological Baseline Study of San Pedro Bay. June 2002. Submitted to Port of Long Beach, June 2002.

Miller, D. J. and R. N. Lea. 1972. Guide to the coastal marine fishes of California. Calif. Dept. Fish and Game Fish Bull. 157. 249 p.

National Marine Fisheries Service (NMFS). 2002. The final rule for essential fish habitat. Federal Register 67(12):2343-2383. http://www.nero.noaa.gov/hcd/efhfinalrule.pdf

National Marine Fisheries Service (NMFS). 2004. Final Report on the National Oceanic and Atmospheric Administration "Shipping Noise and Marine Mammals: A forum for science, management, and technology". Presented 18-19 May 2004. Arlington, Virginia. 40 p.

National Marine Fisheries Service (NMFS). 2014. California Eelgrass Mitigation Policy and Implementing Guidelines. Oct. 2014.

National Marine Fisheries Service (NMFS). 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commerce., NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178 p.

National Oceanographic and Atmospheric Administration (NOAA). 2013. NOAA Tides & Currents, online data for Station 9410660 (Los Angeles, CA). http://tidesandcurrents.noaa.gov/ .

Noreas. 2012. Schuyler Heim Bridge Replacement Project: 2011 Annual Biological Report. 10 p.

Pacific Fishery Management Council (PFMC). 2011. Coastal Pelagic Species Fishery Management Plan as Amended through Amendment 13. Sept. 2011. 48 p. plus appendices.

Pacific Fishery Management Council (PFMC). 2014. Pacific Coast Groundfish Fishery Management Plan: For the California, Oregon, and Washington Groundfish Fishery. May 2014. 146 p. plus appendices.

Palermo, M.R., P.R. Schroeder, T.J. Estes, and N.R. Francingues. 2008. Technical Guidelines for Environmental Dredging of Contaminated Sediments. ERDC/EL TR-08-29. U.S. Army Engineer Research and Development Center, Vicksburg, MS. Sept. 2008.

Port of Los Angeles (POLA). 2009a. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Pre-Dredge Survey: June 18, 2009. July 14, 2009.

Port of Los Angeles (POLA). 2009b. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #1, Week of July 13-18, 2009. July 31, 2009.

Port of Los Angeles (POLA). 2009c. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #2, Week of July 20-24, 2009. Aug. 12, 2009.

Port of Los Angeles (POLA). 2009d. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #3, Period of July 26-Aug. 7, 2009. Sept. 1, 2009.

Port of Los Angeles (POLA). 2009e. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #4, Period of Aug. 10-14, 2009. Sept. 1, 2009.

Port of Los Angeles (POLA). 2009f. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #5, Period of Aug. 17-21, 2009. Sept. 8, 2009.

Port of Los Angeles (POLA). 2009g Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #6, Period of Aug. 24-28, 2009. Sept. 11, 2009.

Port of Los Angeles (POLA). 2009h. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #7, Period of Aug. 31 – Sept. 4, 2009. Sept. 25, 2009.

Port of Los Angeles (POLA). 2009i. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #8, Period of Sept.7-16, 2009. Oct. 1, 2009.

Port of Los Angeles (POLA). 2010a. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #9, Period of Sept.2-8, 2010. Sept. 15, 2010.

Port of Los Angeles (POLA). 2010b. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #10, Week of Oct. 4-10, 2010. Oct. 14, 2010.

Port of Los Angeles (POLA). 2010c. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Construction Dredge Survey #11, Week of Oct. 11-17, 2010. Oct. 29, 2010.

Port of Los Angeles (POLA). 2010d. Port of Los Angeles Receiving Water Monitoring Report: Berths 145-147 Wharf Improvements. Order No. R4-2008-0061, Program No. 9450, File No. 08-081. Post Dredge Survey Conducted Oct. 21, 2010. Nov. 3, 2010.

Port of Los Angeles and Port of Long Beach (POLA and POLB), 2009. Ports of Los Angeles and Long Beach Water Resources Action Plan. Final Report, August 2009.

Science Applications International Corporation (SAIC). 2010. 2008 Biological Surveys of Los Angeles and Long Beach Harbors. In Association with Seaventures, Keane Biological Consulting, Tenera Environmental, ECORP Consulting Inc., and Tierra Data Inc. Apr. 2010.

Swift, C. C., J. L. Nelson, C. Maslow, and T. Stein. 1989. Biology and distribution of the tidewater goby, *Eucyclogobius newberryi* (Pisces: Gobiidae) in California. Contrib. in Science 404:1–19.

Swift, C.C., T.R. Haglund, M. Ruiz, and R.N. Fisher. 1993. The status and distribution of the freshwater fishes of southern California. Bull. So. Calif. Acad. Sci. 92(3):101-172.

Tetra Tech. 2011. Final Baseline Hydroacoustic Survey Report: Commodore Schuyler F. Heim Bridge Demolition and Replacement Project, Long Beach, California. Prepared for Alameda Corridor Transportation Authority, Carson, CA. April 2011. 9 p. plus tables, figures, and appendices.

U.S. Army Corps of Engineers (USACE) and Los Angeles Harbor Department (LAHD). 1992. Final EIS/EIR for Deep Draft Navigation Improvements, Los Angeles and Long Beach Harbors, San Pedro Bay, CA. Sept. 1992.

U.S. Army Corp of Engineers (USACE) and Los Angeles Harbor District (LAHD). 2008. Re-circulated Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for Berth 97-109 (China Shipping) Container Terminal Project.

U.S. Army Corp of Engineers (USACE) and Los Angeles Harbor District (LAHD). 2009. Port of Los Angeles Channel Deepening Project. Final Supplemental Environmental Impact Statement/Environmental Impact Report (FSEIS/FSEIR). April 2009.

Vagle, S. 2003. On the impact of underwater pile-driving noise on marine life. Report prepared for the Canadian Coast Guard, Department of Fisheries and Oceans, Canada (unpublished). 41 p.

Walker, B.W. 1949. The periodicity of spawning by the grunion, *Leuresthes tenuis*, an atherine fish. Ph.D. Thesis, Scripps Inst. Oceanogr., La Jolla, CA. 166 p.

Walker, B.W. 1952. A guide to the grunion. Calif. Fish & Game 38(3):411-420.

Wellington, G. M. and B. C. Victor. 1989. Planktonic duration of one hundred species of Pacific and Atlantic damselfishes (Pomacentridae). Mar. Biol. 101:557–567.

Wolf, P., P.E. Smith, and D.R. Bergen. 2001. Pacific sardine. Pp. 299-302 *In:* California's Living Marine Resources: A status report. W.S. Leet, C.M, DeWees, R. Klingbeil, and E.J. Larson, eds. Calif. Dept. of Fish and Game Publ. SG01-11.

APPENDIX

Coastal Pelagic Species

Pacific Groundfish Species

Coastal Pelagic Species

Common Name	Category
Managed Species	
Northern Anchovy	Fish
Pacific Sardine	Fish
Pacific (chub) Mackerel	Fish
Jack Mackerel	Fish
Market Squid	Invertebrate
Krill (euphausiids)	Invertebrate
Ecosystem Component Species	
Jacksmelt	Fish
Pacific Herring	Fish

Shared Ecosystem Component Species (Coastal Pelagics and Pacific Groundfish)

Common Name	Category
Round Herring	Fish
Thread Herring	Fish
Mesopelagic Fishes	Fish
Pacific Sand Lance	Fish
Pacific Saury	Fish
Silversides (Atherinopsidae)	Fish
Smelts (Osmeridae)	Fish
Pelagic Squids	Invertebrate

Pacific Groundfish Ecosystem Component Species

Common Name	Category
Aleutian Skate	Fish
Bering/Sandpaper Skate	Fish
Big Skate	Fish
California Skate	Fish
Roughtail/Black Skate	Fish
Other Skates	Fish
Pacific Grenadier	Fish
Giant Grenadier	Fish
Other Grenadiers	Fish
Finescale Codling	Fish
Ratfish	Fish
Soupfin Shark	Fish

Pacific Groundfish Species

Common Name	Category		Common Name	Category
Leopard Shark	Sharks		Olive Rockfish	Rockfish
Spiny Dogfish	Sharks		Pacific Ocean Perch	Rockfish
Longnose Skate	Sharks		Pink Rockfish	Rockfish
Lingcod	Roundfish		Pinkrose Rockfish	Rockfish
Cabezon	Roundfish		Pygmy rockfish	Rockfish
Kelp Greenling	Roundfish		Quillback Rockfish	Rockfish
Pacific Cod	Roundfish		Redbanded Rockfish	Rockfish
Pacific Hake	Roundfish		Redstripe Rockfish	Rockfish
Sablefish	Roundfish		Rosethorn Rockfish	Rockfish
Aurora Rockfish	Rockfish		Rosy Rockfish	Rockfish
Bank Rockfish	Rockfish		Rougheye Rockfish	Rockfish
Black Rockfish	Rockfish		Sharpchin Rockfish	Rockfish
Black-and-Yellow Rockfish	Rockfish		Shortbelly Rockfish	Rockfish
Blackgill Rockfish	Rockfish		Shortraker Rockfish	Rockfish
Blackspotted Rockfish	Rockfish		Shortspine Thornyhead	Rockfish
Blue Rockfish	Rockfish		Silverygray Rockfish	Rockfish
Bocaccio	Rockfish		Speckled Rockfish	Rockfish
Bronzespotted Rockfish	Rockfish		Splitnose Rockfish	Rockfish
Brown Rockfish	Rockfish		Squarespot Rockfish	Rockfish
Calico Rockfish	Rockfish		Starry Rockfish	Rockfish
California Scorpionfish	Rockfish		Stripetail Rockfish	Rockfish
Canary Rockfish	Rockfish		Sunset Rockfish	Rockfish
Chameleon Rockfish	Rockfish		Swordspine Rockfish	Rockfish
Chilipepper	Rockfish		Tiger Rockfish	Rockfish
China Rockfish	Rockfish		Treefish	Rockfish
Copper Rockfish	Rockfish		Vermilion Rockfish	Rockfish
Cowcod	Rockfish		Widow Rockfish	Rockfish
Darkblotched Rockfish	Rockfish		Yelloweye Rockfish	Rockfish
Dusky Rockfish	Rockfish		Yellowmouth Rockfish	Rockfish
Dwarf-red Rockfish	Rockfish		Yellowtail Rockfish	Rockfish
Flag Rockfish	Rockfish		Arrowtooth Flounder	Flatfish
Freckled Rockfish	Rockfish		Butter Sole	Flatfish
Gopher Rockfish	Rockfish		Curlfin Sole	Flatfish
Grass Rockfish	Rockfish		Dover Sole	Flatfish
Greenblotched Rockfish	Rockfish		English Sole	Flatfish
Greenspotted Rockfish	Rockfish		Flathead Sole	Flatfish
Greenstriped Rockfish	Rockfish		Pacific Sanddab	Flatfish
Halfbanded Rockfish	Rockfish		Petrale Sole	Flatfish
Harlequin Rockfish	Rockfish		Rex Sole	Flatfish
Honeycomb Rockfish	Rockfish		Rock Sole	Flatfish
Kelp Rockfish	Rockfish		Sand Sole	Flatfish
Longspine Thornyhead	Rockfish		Starry Flounder	Flatfish
Mexican Rockfish	Rockfish			