

Appendix D

Essential Fish Habitat Assessment

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ESSENTIAL FISH HABITAT ASSESSMENT
for the
FLOATING DRY DOCK PROJECT
at
NAVAL BASE SAN DIEGO, SAN DIEGO, CA

February 2020



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**Essential Fish Habitat Assessment
 Floating Dry Dock Project
 Naval Base San Diego, California
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Abbreviations and Acronyms

Acronym	Definition	Acronym	Definition
°C	degrees Celsius		Magnuson-Stevens Fishery
AFDM	Medium Auxiliary Floating Dry Dock	MSFCMA	Conservation and Management Act
AT/FP	Anti-Terrorism / Force Protection	NAVFAC SW	Naval Facilities Engineering Command Southwest
BMP	best management practice	Navy	United States Department of the Navy
CAC	Common Access Card	NEPA	National Environmental Policy Act
Caltrans	California Department of Transportation	NBSD	Naval Base San Diego
CDF	confined drying facility	ODMDS	Ocean Dredged Material Disposal Site
CDFW	California Department of Fish and Wildlife	PFMC	Pacific Fishery Management Council
CFR	Code of Federal Regulations	POSD	Unified Port of San Diego
cm	centimeters	RHA	Rivers and Harbors Act
COL	Commercial Out Lease	RMS	root mean square
CPS	Coastal Pelagic Species	SANDAG	San Diego Association of Governments
CWA	Clean Water Act	SAV	submerged aquatic vegetation
cy	cubic yards	CEMP	California Eelgrass Mitigation Policy
dB	decibels	SEL	sound exposure level
EA	Environmental Assessment	sf	square feet
EFH	Essential Fish Habitat	SPL	sound pressure level
ESQD	Explosives Safety Quantity- Distance	TL	transmission loss
FMP	Fishery Management Plan	TTS	temporary threshold shift
FR	Federal Register	U.S.	United State
GPS	Global Positioning System	USC	United States Code
HAPC	Habitat Area of Particular Concern	USACE	United States Army Corps of Engineers
km	kilometers	USEPA	United States Environmental Protection Agency
log	logarithm to base 10	USS	United States Ship
MGBW	Marine Group Boat Works, LLC	ZOI	zone of influence
MHHW	mean higher high water		
MLLW	mean lower low water		
MPRSA	Marine Protection, Research, and Sanctuaries Act		

1 Introduction

1.1 Introduction

Naval Base San Diego (NBSD) is a major port for Navy ships assigned to the Pacific Fleet and is the major West Coast logistics base for surface forces of the United States (U.S.) Department of the Navy (Navy), dependent activities, and other commands. Activities at NBSD include Continuous Maintenance Availabilities and loading/unloading of supplies for fleet vessels (Navy 2012b, 2016).

In a memorandum dated 16 January 2018, the Commander of the U.S. Pacific Fleet (CPF) identified a current and projected shortfall of dry dock space necessary to support the U.S. Pacific Fleet's forecasted surface ship maintenance requirement.

Existing dry dock space available for surface ship maintenance in San Diego Bay consists of two floating docks owned and operated by British Aerospace Engineering San Diego (BAE); one floating dock owned and operated by National Steel and Shipbuilding Company (NASSCO); and one government-owned graving dock located on NBSD. The graving dock is capable of docking only the Avenger Class Mine Counter Measure and the Freedom-variant of the Littoral Combat Ship (LCS) and cannot support an Arleigh Burke class Guided Missile Destroyer (DDG) because the draft of the ship's sonar dome compared with the depth of the dock.

A concept study was completed by the Naval Systems Engineering Directorate (Naval Sea Systems Command [NAVSEA] 05), which identified an average of 3.6 dry dockings per year between fiscal year (FY) 2017 and FY 2026 and a peak of 8 dry dockings during one month in FY 2022. The Navy cannot currently accommodate this need because it does not control the schedules for the existing dry docks owned by private companies (i.e., BAE and NASSCO). As described in the concept study, a conservative estimate of the average dry docks plus one standard deviation results in a requirement of five dry docks. Dry dock workload could then be appropriately managed through fleet scheduling actions.

1.2 Location

NBSD is located approximately 3 miles southeast of the City of San Diego's Central Business District and 10 miles north of the U.S./Mexico border on the eastern shore of San Diego Bay. NBSD is bordered to the north by the community of Barrio Logan, to the east by Interstate 5 (I-5), and to the south by the cities of National City and Chula Vista. East Harbor Drive divides NBSD into two main parts: the mainly industrial bayfront area west of East Harbor Drive and the community support complex east of East Harbor Drive. There are approximately 977 acres of land and 326 acres of water that extend to the U.S. pier headline in San Diego Bay. NBSD contains 12 piers (including a Mole Pier), two channels, and various quay walls that extend along approximately 5.6 miles of shoreline (see Figure 1-1).

The emplacement of the proposed floating dry dock(s) would occur within San Diego Bay at the south berth of the Mole Pier and the southern edge of the NBSD property boundary near the existing Marine Group Boat Works, LLC (MGBW) maintenance piers.

The Mole Pier is located approximately 1 mile south of the entrance gate to NBSD, immediately south of Pier 8 and the Paleta Creek Channel, and north of Pier 10. The south berth of the Mole Pier, which was originally constructed in the early 1980s, comprises a concrete wharf, mechanical pier, electrical pier, access pier, and ramp (see Figure 1-2). The pile-supported concrete wharf is approximately 588 feet long and 53 feet wide. The mechanical pier (approximately 75 feet long and 53 feet wide), electrical pier (approximately 21 feet long and 53 feet wide), and access pier (approximately 42 feet long and 53 feet wide) were constructed north of the wharf to provide servicing and access to the wharf. The ramp pier (approximately 105 feet long and 23 feet wide) is a finger pier located on the quay wall just east of the wharf between the Mole Pier and Pier 10. A sump was originally dredged at the south berth of the Mole Pier to accommodate Medium Auxiliary Floating Dry Dock (AFDM) 14 "Steadfast," a floating dry dock previously used to repair Navy ships before it was relocated in 1998. The south berth of the Mole Pier was modified in 2002 to accommodate berthing and mooring of the U.S. Ship (USS) Curtiss, which is currently stationed at the wharf. Modifications to the wharf involved construction of two mooring points for the USS Curtiss, a dolphin at the forward portion of the vessel, and an extension of the wharf at the aft location (Navy 2018a). Additionally, floating hoteling facilities for the USS Curtiss are located immediately adjacent to the ramp pier. The Mole Pier site would include the proposed dredge footprint (approximately 4.79 acres) as well as upland areas along the south berth of the Mole Pier that would require improvements to support the proposed emplacement and operation of the proposed floating dry dock (approximately 5.30 acres). Therefore, the total Mole Pier site area would encompass approximately 10 acres.

The southern edge of the NBSD property boundary is located approximately 3,700 feet (0.7 mile) south of the Mole Pier and 1,220 feet (0.25 mile) south of Pier 13. Additionally, this location is approximately 500 feet south of the former Pier 14 site, which was previously used to berth shallow-draft vessels, but was later demolished by the Navy in 2008.

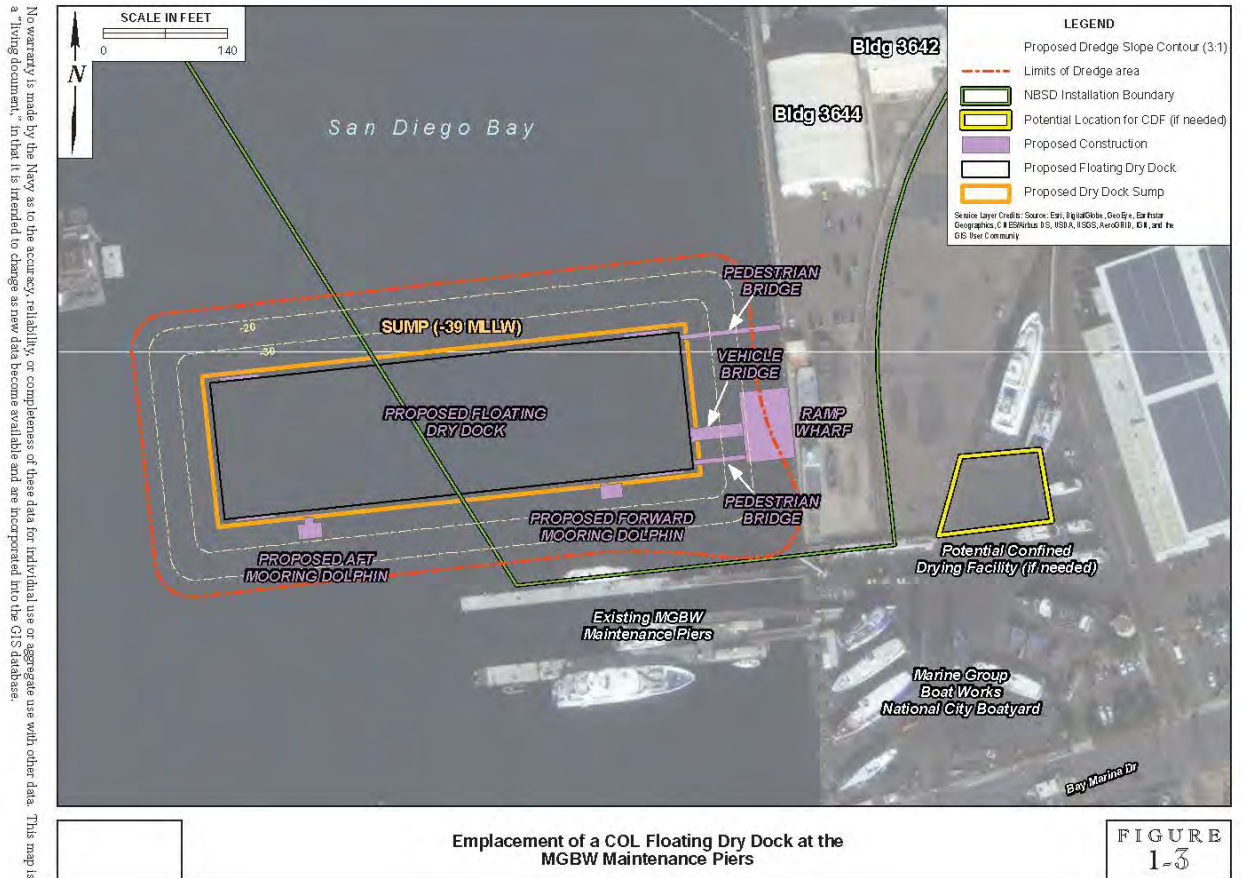
The southern edge of NBSD is located immediately adjacent to the MGBW National City Boatyard, a full-service facility that specializes in refits, repairs, and new construction. The MGBW National City Boatyard includes two maintenance piers, which are between 15 and 40 feet wide and extend for approximately 400 feet. According to a recent Sediment Quality Survey Report, the existing water depth at this site ranges from approximately -9 to -17 feet mean lower low water (MLLW) (Mission Environmental LLC 2018). The project site would include the proposed 5.55-acre water lease area as well as the proposed 0.88-acre landside lease area, which would be leased by the Navy to MGBW for a period of 30 years. Therefore, the total project site area would encompass approximately 6.43 acres.

To address the current and projected shortfall of dry dock space required for maintenance of the U.S. Pacific Fleet, the emplacement and operation of a floating dry dock – including all required dredging and sediment disposal, as well as all required demolition and construction activities – has been proposed at two locations at NBSD in San Diego Bay: 1) at the south berth of the Mole Pier; and 2) the southern edge of the NBSD property boundary near the existing Marine Group Boat Works, LLC (MGBW) maintenance piers.

Figure 1-2 Emplacement of a Floating Dry Dock at the South Berth of the Mole Pier



Figure 1-3 **Emplacement of a COL Floating Dry Dock at the MGBW Maintenance Piers**
Location



No warranty is made by the Navy as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

2 Proposed Action

2.1 Proposed Action

The scope of the Proposed Action includes all required dredging and sediment disposal as well as all required demolition and construction activities necessary to support the proposed emplacement and operation of a floating dry dock at each of two locations at NBSD in San Diego Bay: 1) at the south berth of the Mole Pier; and 2) the southern edge of the NBSD property boundary near the existing MGBW maintenance piers. Specifically, the scope of the Proposed Action includes the following:

- 1) Relocation of the USS Curtiss and hoteling facilities that are currently moored along the south berth of the Mole Pier;
- 2) Dredging of approximately 251,121 cubic yards (cy) of sediment (86,121 cy at the south berth of the Mole Pier and 165,000 cy near the MGBW maintenance piers) and subsequent sediment disposal activities;
- 3) Partial demolition of the existing decking and the existing dolphin at the south berth of the Mole Pier;
- 4) Installation of mooring dolphins and fendering upgrades;
- 5) Installation of access structures at the MGBW maintenance piers location;
- 6) Utility modification and other landside improvements; and
- 7) Emplacement and operation of a steel floating dry dock at each location.

The Navy has yet to determine the exact source of the required floating dry docks and is currently conducting a business analysis of acquisition alternatives via either purchase or lease of a floating dry dock from a U.S.-based shipyard. This review includes the various capacities of potential shipyards and their locations, expected associated costs, and environmental impacts both direct and indirect. It would be possible to construct each of the floating dry docks in one continuous unit, or to build and transport them in smaller lengths or modules, which would then be assembled onsite at NBSD. The floating dry docks would be acquired in time for emplacement at NBSD after dredging and all other required site modifications have been completed, or shortly thereafter. When an acquisition strategy has been identified, the action details and associated environmental impacts would be analyzed under the National Environmental Policy Act (NEPA) and an appropriate level of subsequent environmental documentation would be prepared.

The floating dry dock(s) would not be self-powered or capable of maneuvering with assistance from support vessels; therefore, the floating dry dock(s) would remain permanently moored to their locations at the south berth of the Mole Pier and the MGBW maintenance piers location.

This Environmental Fish Habitat (EFH) Assessment is for implementation of the preferred alternative described below in Section 2.1.1, *Preferred Alternative*.

2.1.1 Preferred Alternative

As described above in Section 2.1, *Proposed Action*, the Proposed Action includes emplacement and operation of prefabricated floating dry docks – including a floating dry dock at the south berth of the Mole Pier and a Commercial Out Lease (COL) floating dry dock at the MGBW maintenance piers location. Modifications to the south berth of the Mole Pier that are needed to support the floating dry dock include

dredging and sediment disposal; demolition of small portions of the existing decking and the existing dolphin; installation of two mooring dolphins and two fender piles necessary to support the floating dry dock; and upgrades and/or extension of existing utilities. The MGBW site would also require dredging and sediment disposal as well as installation of two mooring dolphins. Additional access structures at the MGBW site would include two pedestrian bridges and a vehicle bridge.

Dredging

The proposed dredging area at the south berth of the Mole Pier (see Photo 6) is divided into three subareas: Turning Basin (1.73 acres), Approach (1.65 acres), and Sump (1.40 acres) (refer to Figure 1-2). Dredging would be completed to depths up to -36 feet MLLW in the Turning Basin, -37 feet MLLW in the Approach, and -55 feet MLLW in the Sump. The south berth of the Mole Pier was originally dredged to -55 feet MLLW to facilitate the emplacement of AFDM 14 "Steadfast" (Navy 2018a), a floating dry dock previously used to repair Navy ships before it was relocated in 1998. Currently, the depths in the proposed dredging area range from -19 feet MLLW to -55.5 feet MLLW. As such, it is anticipated that dredging would involve removal of approximately 86,121 cy of sediment over a 4.79-acre area using a barge-mounted clamshell dredge. Because of the potential presence of munitions, and associated Explosives Safety Quantity-Distance (ESQD) arcs, dredging activities would be limited to nighttime (6:00pm to 6:00am), Monday through Friday. Therefore, dredging activities would take approximately 14 weeks, with an average daily dredge volume of approximately 1,231 cy.¹ A conservative estimate of 20 workers would be required for the duration of dredging activities to transport, set up, and operate dredging equipment and sediment transport tugs and barges (personal communication from Alberto Sanchez 2019).

Emplacement of the proposed COL floating dry dock at the MGBW maintenance piers location would require dredging of a 5.55-acre area, including a 2.14-acre base dredged to a depth up to -39 feet MLLW (refer to Figure 1-3). According to a recent Sediment Quality Survey Report, the existing water depth near the existing MGBW maintenance piers ranges from approximately -9 to -17 feet MLLW (Mission Environmental LLC 2018). As such, it is anticipated that dredging would involve the removal of approximately 165,000 cy of sediment using a barge-mounted clamshell dredge. Similar to the south berth of the Mole Pier, because of the potential presence of munitions and associated ESQD arcs, dredging activities would be limited to nighttime (6:00 p.m. to 6:00 a.m.), Monday through Friday. Therefore, dredging activities would take approximately 27 weeks, with an average daily dredge volume of approximately 1,223 cy.

Future maintenance dredging may be necessary to maintain operational depth requirements. (*Maintenance dredging* refers to routine removal of accumulated sediment to maintain a desired depth. Maintenance dredging would not include any expansion of the previously dredged area or increase in depth.) The frequency of maintenance dredging would depend on sedimentation patterns, and such maintenance dredging would be evaluated as a separate action and permitted with the appropriate regulatory agencies accordingly.

¹ This average daily dredging volume has been rounded to the nearest cubic yard, representing an overly conservative total dredge volume.

Sediment Disposal

Three options for sediment disposal have been identified, one of which will be selected on the basis of the results of sampling and laboratory testing pursuant to the U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) Green Book (1991) and Inland Testing Manual (1998). If the sediment characterization and chemistry results determine that dredged sediments meet allowable parameters for beneficial reuse, this preferred option would be pursued to the maximum extent feasible pursuant to Clean Water Act (CWA) Section 404(b)(1), which requires selection of the Least Environmentally Damaging Practicable Alternative. If the sediment characterization and chemistry results do not meet allowable parameters for beneficial reuse, ocean disposal, or upland disposal options would be considered. Testing results could also dictate a combination of disposal options.

Under each of the three options, sediment disposal associated with this alternative would adhere to all applicable regulations and guidance documents as well as the Navy's project-specific consultations with appropriate regulatory agencies.

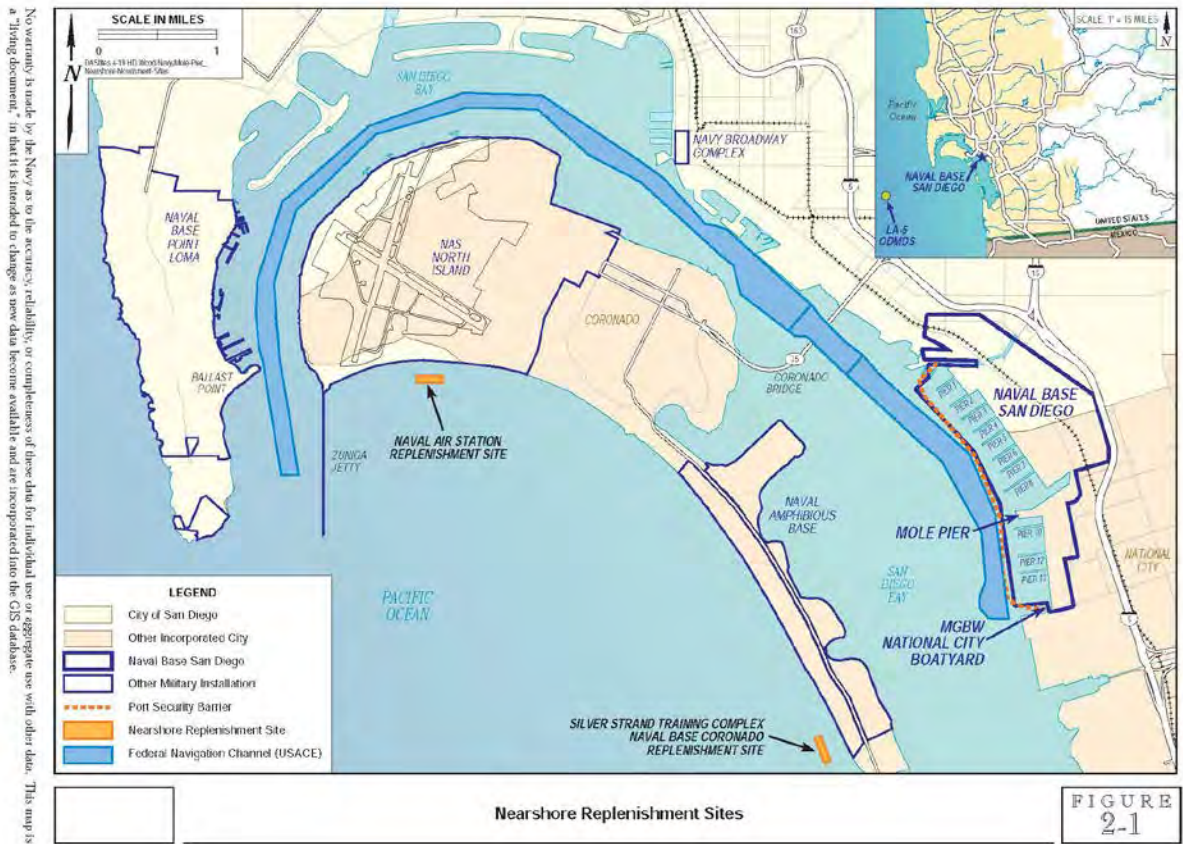
Option 1: Nearshore Replenishment – Beneficial Reuse

The *Nearshore Replenishment – Beneficial Reuse* option involves loading the dredged sediment into barges and transporting it to a nearshore replenishment site for beneficial reuse. Nearshore replenishment sites that are currently under consideration include the following:

- Naval Base Coronado Silver Strand Training Complex Boat Lanes 9 and 10, located approximately 14 miles (in-water transit distance) from the Mole Pier (preferred site);
- Naval Air Station North Island Beach, located approximately 10.5 miles (in-water transit distance) from the Mole Pier; and
- Other suitable location(s) identified during the permitting process.

One or a combination of nearshore replenishment sites may be used to receive the dredged sediments. Two 1,000-cy barges would be used to transport the dredged sediment. Barges would be equipped with electronic tracking devices to document that material releases occurred within the disposal site boundaries, as specified by the dredging permit. The location of each nearshore replenishment site is shown on Figure 2-1.

Figure 2-1 Nearshore Nourishment Sites



No warranty is made by the Navy as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as more data become available and are incorporated into the GIS database.

Option 2: Ocean Disposal

The *Ocean Disposal* option involves loading the dredged sediment into barges and transporting it to the LA-5 Ocean Dredged Material Disposal Site (ODMDS). LA-5 ODMDS is a designated offshore open-water disposal site located on the ridged slope of the continental shelf at a depth of approximately 600 feet, 5.4 nautical miles off the San Diego Coast (Navy 2014b). Two 1,000-cy barges would be used to transport the dredged sediment to LA-5 ODMDS. One tug/barge would be loaded with material at the dredge site, while the other is disposing of sediment at LA-5 ODMDS, ensuring that dredging can be completed in a timely manner while complying with LA-5 ODMDS restrictions prohibiting more than one barge onsite at a time. Round trip from NBSD to LA-5 ODMDS is expected to take approximately 34 hours (Navy 2014b). The barges would not be filled to their 1,000-cy capacity to avoid the potential for material releases. Further, the barges would be equipped with electronic tracking devices to document that material releases occurred within the disposal site boundaries specified in the dredging permit. The ocean disposal of dredged sediment is regulated under Section 103 of the MPRSA and disposal operations would be required to comply with all applicable permitting and dredging regulations published in 33 Code of Federal Regulations (CFR) Parts 320–330 and 33 CFR Parts 335–338.

Option 3: Upland Disposal

The *Upland Disposal* option would be implemented if it is determined that the dredged sediments are not suitable for either beneficial reuse or ocean disposal. This option involves transporting dredged sediment via barge to an upland confined drying facility (CDF) at NBSD (e.g., the area located on the northern side of the Mole Pier, which has previously been used to offload dredged sediment) or the MGBW National City Boatyard. Once adequately dried, the dredged sediment would be placed on a dump scow and mixed with a thickening agent. The sediment would then be transferred to a secondary holding site and tested for pH and water content in accordance with applicable landfill requirements and then transported via large trucks to a landfill such as the Otay Landfill, a permitted Class III Landfill (USEPA Facility Registration System ID 110000832243) located at 1700 Maxwell Road in Chula Vista, California, approximately 12.2 miles from NBSD. The landfill has a permitted maximum disposal rate of 6,700 tons per day, and it does not have a daily truck count limit (CalRecycle 2019).

Demolition Activities

Following the relocation of the USS Curtiss and associated hoteling facilities and prior to any demolition activities, initial hazardous material surveys would be conducted at the south berth of the Mole Pier. Based on the results of these surveys, the existing utilities would be abated, disconnected, and cleaned and all electrical and mechanical equipment would be removed from the concrete wharf.

The pile-supported extension at the west end of the wharf – originally installed to support berthing and mooring of the USS Curtiss – would be demolished to allow for installation of the aft dolphin needed to support the floating dry dock. This work would include demolition of three 24-inch octagonal concrete piles and approximately 100 square feet (sf) of deck. Partial demolition at the eastern end of the wharf would be required to allow for construction of the forward dolphin. This work would include demolition of fourteen 24-inch by 24-inch square concrete piles and approximately 2,245 sf of pier deck. Demolition of the existing mooring dolphin at the eastern end of the wharf would include the demolition of seven 24-inch octagonal concrete piles along with approximately 450 sf of deck (Navy 2018a). In total, demolition activities would occur over a period of approximately 4 weeks.

Typical pier demolition activities progress bay-ward to landward and from the top down (Navy 2016). First, fender piles and exterior appurtenances (e.g., utilities) would be demolished above and below the pier deck. Fender piles would be disconnected from the wharf, extracted or sheared, and processed onsite for disposal or recycling (see Photo 7). The concrete pier deck would be saw cut longitudinally and transversely at mid-span of every row of piles, allowing for removal in large but manageable sections, with weights of less than 50 tons. While the section is rigged to the derrick crane, a hydraulic shearing tool attached to a barge-mounted excavator would be used to cut the piles just below pile cap. Once freed from the piles, the sections would be set onto a barge. Following removal of the pier deck, a hydraulic cutter (or pile clipper) would be lowered over each of the existing piles, allowing the pile to be cut at the mudline, removed by the crane, and set onto a barge (personal communication from Alberto Sanchez 2019).

All appropriate best management practices (BMPs) would be implemented during demolition activities (see Table 2-1). For example, a system of rafts would be used under the demolition locations to capture any debris (Navy 2016). Additionally, concrete slurry from the cut operation would be vacuumed as saw cutting occurs (Navy 2016).

Throughout the demolition phase, the following equipment would likely be used to remove, collect, and transport demolition debris: a spud-anchored barge, barge and wharf cranes, one tugboat, mobile construction equipment, transport trucks, and scows (Navy 2016).

Several types of debris would result from the demolition activities, including concrete, steel, and asphalt. The Navy would comply with the Low-Impact Development Initiative requiring that all demolition projects that take place after 2011 to recycle and divert materials from local landfills to the maximum extent practicable. Materials appropriate for recycling, including concrete, steel, and asphalt, would be recycled. Materials that could not be recycled would be transported to a permitted landfill.

Mooring Dolphins

The proposed floating dry dock would require two mooring dolphins at each site—located fore and aft of the proposed dry dock at each location (Navy 2018a) (refer to Figure 1-2 and 1-3). The aft and fore mooring dolphins at both locations would each be supported by approximately sixteen 24-inch octagonal concrete piles (Navy 2018a) (see Table 2-1 and 2-2). The aft mooring dolphin would also require approximately two 24-inch battered steel-pipe piles (Navy 2018a). Up to eight additional 24-inch steel piles will be required for the forward and aft mooring dolphins installed at the MGBW maintenance piers location (see Table 2-2). Cast-in-place reinforced concrete caps, 30 feet by 30 feet, would be installed at each mooring dolphin location. Grippers would be secured to the dolphins' concrete pile caps and used to hold the dry dock in position. Construction materials would be delivered by truck and the piles would likely be installed using a floating crane and an impact pile driver aided by jetting methods. The number of final strikes for each pile would be dependent on the underlying geology. For example, pile-driving activities associated with the Pier 12 replacement required between 500 and 600 blows per pile (personal communication from Alberto Sanchez 2019).

Fender Piles

Up to two new fender piles would be installed along the outface of the south berth of the Mole Pier. It is anticipated that fender piles would consist of two steel piles of 16-inch diameter or less in size. Piles would initially be installed using a diesel impact hammer and vibratory methods, potentially aided by jetting methods.

Access Structures

Two pedestrian bridges and a vehicle bridge would be constructed to provide landside access and servicing to the COL floating dry dock (refer to Figure 1-3). The port-side pedestrian bridge, which would provide access to the port wing deck, would be approximately 115 feet long supported by a landside concrete abutment. The proposed ramp wharf would be approximately 80 feet wide and 55 feet long and would support a 60-foot-long vehicle bridge that would provide vehicle access to the COL floating dry dock. The ramp wharf would also support the starboard pedestrian bridge, which would provide access to the starboard wing deck. The concrete ramp wharf and vehicle bridge would cover approximately 5,360 sf and would be supported by twenty-four 24-inch octagonal concrete piles. These access structures, which would be similar to those currently provided at the south berth of the Mole Pier and other Navy piers in the vicinity, would allow for construction vehicles and heavy equipment to be used during maintenance of Navy vessels. Construction materials would be delivered by truck and the piles would likely be installed using a floating crane and a diesel impact hammer as well as vibratory methods and jetting methods, as necessary.

Table 2-1 Proposed Pile Extraction/Installation Activities at the South Berth of the Mole Pier

<i>Activity</i>	<i>Pile Purpose/Location</i>	<i>Total Number of Piles</i>	<i>Pile Size/Type</i>	<i>Pile Extraction/Installation Method</i>	<i>Strikes per Pile</i>	<i>Minutes per Pile</i>	<i>Assumed Daily Maximum Number of Piles Extracted/Installed</i>	<i>Assumes Total Maximum Number of Days for Pile Extraction/Installation</i>
Demolition-Extraction	West end of wharf, wharf extension	3	24-inch octagonal concrete	Vibratory Extraction	NA	10 minutes	1	3
	Eastern end of wharf	14	24-inch by 24-inch square concrete	Vibratory Extraction	NA	10 minutes	1	14
	Eastern end of wharf, mooring dolphin	7	24-inch octagonal concrete	Vibratory Extraction	NA	10 minutes	1	7
Construction-Installation	Proposed forward and aft mooring dolphins east and west of existing wharf	32	24-inch octagonal concrete	Diesel Impact Hammer	600 blows	NA	1	32
	Proposed aft mooring dolphin batter piles	2	24-inch steel round pipe	Diesel Impact Hammer	600 blows	NA	1	2
				Vibratory	NA	10 minutes	1	
	Proposed new fender piles	2	16-inch steel round pipe	Diesel Impact Hammer	600 blows	NA	1	2
Vibratory				NA	10 minutes	1		

Notes: The pile extraction/installation methods listed above are the preferred techniques for pile handling; however, depending on conditions encountered while dredging at the NBSD Mole Pier, other methods may be applied.

The piles listed above are assumed to be the largest pile sizes that may be driven for the floating dry dock locations. If pile sizes/types are altered during the design process, monitoring efforts will be adjusted to account for any changes to the piles.

Abbreviations: NA = Not Applicable

Table 2-2 Proposed Pile Installation Activities at the MGBW Maintenance Piers Location

<i>Activity</i>	<i>Pile Purpose/Location</i>	<i>Total Number of Piles</i>	<i>Pile Size/Type</i>	<i>Pile Extraction/Installation Method</i>	<i>Strikes per Pile</i>	<i>Minutes per Pile</i>	<i>Assumed Daily Maximum Number of Piles Extracted/Installed</i>	<i>Assumes Total Maximum Number of Days for Pile Extraction/Installation</i>
Construction-Installation	Proposed forward and aft mooring dolphins	32	24-inch Octagonal concrete	Diesel Impact Hammer	600 blows	NA	1	32
	Proposed forward and aft mooring dolphins	8	24-inch steel	Diesel Impact Hammer	600 blows	NA	1	8
				Vibratory	NA	10 minutes	1	
	Proposed aft mooring dolphin	2	24-inch steel	Diesel Impact	600 blows	NA	1	2
				Vibratory	NA	10 minutes	1	
	Ramp wharf and vehicle bridge	24	24-inch Octagonal concrete	Diesel Impact Hammer	600 blows	NA	8	3

Notes: The pile extraction/installation methods listed above are the preferred techniques for pile handling; however, depending on conditions encountered while dredging at the MGBW maintenance piers location, other methods may be applied.

The piles listed above are assumed to be the largest pile sizes that may be driven for the floating dry dock locations. If pile sizes/types are altered during the design process, monitoring efforts will be adjusted to account for any changes to the piles.

Abbreviations: NA = Not Applicable

Utilities Modification

The existing potable water and sanitary sewer utilities at the south berth of the Mole Pier are adequate to serve the proposed floating dry dock. Electrical distribution at the Mole Pier area is currently fed from the South Cummings Substation. Existing electrical infrastructure at the Mole Pier is adequate; however, emplacement of the proposed floating dry dock would extend 12-kilovolt feeders from the existing substation with flexible lines to the proposed floating dry dock. It is anticipated that industrial power mounds would be installed and electrical service would be extended to the new mounds so that contractors could bring in their own compressed air units. A packaged water booster pump station would also be required to provide water for firefighting purposes.

At the MGBW maintenance piers location, the lessee would need to provide all power services. Required utilities work would include construction of a switching station, primary and secondary distribution systems, telephone services, coaxial and fiber optic communications, supervisory control and data acquisitions systems for energy monitoring and control, and a fire alarm. Other utilities would consist of sanitary sewer, storm water, and potable water supply lines, and a steam distribution and return condensate system. The lessee would tie into existing utilities on or near the site (e.g., existing 16-inch water line). The Navy would also conduct a preliminary assessment of the lease area to identify any additional landside improvements required.

Security Improvements

Required security improvements would include removal and replacement of the installation's secure perimeter fence, including installation of a Common Access Card (CAC)-enabled turnstile for personnel access. The facility would be required to maintain a 30-foot standoff distance from Building 3644 in compliance with existing Anti-Terrorism/Force Protection (AT/FP) standards. MGBW would also be required to install their own water barrier system in accordance with Unified Facilities Criteria 4-025-01, *Security Engineering: Waterfront Security*.

Floating Dry Dock Emplacement

The proposed floating dry docks would be procured by Naval Sea Systems Command PMS 325 and then barged to each location. The floating dry dock proposed at the south berth of the Mole Pier would be constructed entirely of steel and have an 18,000-ton vessel-lifting capacity designed to meet the requirements of the Navy's MIL-STD 1625D (Reference 15) and American Bureau of Shipping Standards. The minimum dimensions for the floating dry dock are: 700-foot length, 163-foot outside width, a 139-foot inside width, a pontoon height of 14 feet, and a wing wall height of 44 feet above the pontoon deck. The proposed floating dry dock at the south berth of the Mole Pier would support maintenance operations for DDG-51, LCS-2, LSD-41, and/or LSD-49 class vessels.

The floating dry dock at the MGBW maintenance piers location would also be constructed entirely of steel but would be smaller than the dry dock proposed for the Mole Pier location having a 9,000-ton vessel-lifting capacity. It would also be designed to meet the requirements of the Navy's MIL-STD 1625D (Reference 15) and American Bureau of Shipping Standards. The minimum dimensions for the floating dry dock are: 531.5-foot length, 154.2-foot outside width, a 120.08-foot inside width, a pontoon height of 10.2 feet, and a wing wall height of 42.85 feet above the pontoon deck. Both proposed floating dry docks would be installed to support maintenance operations for LCS-2, LSD-41, and LSD-49 class vessels only. DDG-51 class vessels would continue to be maintained at existing dry docks within San Diego Bay.

2.2 Best Management Practices Included in Proposed Action

This section presents an overview of the best management practices (BMPs) that are incorporated into the Proposed Action in this document. BMPs are existing policies, practices, and measures that the Navy would apply to reduce environmental impacts of designated activities, functions, or processes. Although BMPs mitigate potential impacts by avoiding, minimizing, or reducing/eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are 1) existing requirements for the Proposed Action; 2) ongoing, regularly occurring practices; or 3) not unique to this Proposed Action. In other words, the BMPs identified in this document are inherently part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action. Table 2-3 includes a list of BMPs. Mitigation measures are discussed separately in Chapter 3.

Table 2-3 Best Management Practices

<i>BMP</i>	<i>Description</i>	<i>Impacts Reduced/Avoided</i>
Pre-Construction <i>Caulerpa</i> Survey	A pre-construction <i>Caulerpa</i> survey will occur for both sediment collection and dredging activities per the <i>Caulerpa</i> Control Protocol.	Potential spread of invasive <i>Caulerpa</i> associated with bottom-disturbing activities and/or transport of dredged sediments.
Pre- and Post-Dredging and Construction Eelgrass Survey at the MGBW Maintenance Piers Location	Prior to dredging and construction at the MGBW maintenance piers location, this area will be surveyed for eelgrass. If detected, it will be mapped, and a post-construction survey will be conducted to determine the extent of any project-related impacts, which the Navy would mitigate consistent with the California Eelgrass Mitigation Policy (October 2014).	Potential loss of eelgrass which is important habitat for fish and sea turtles.
Vessel Speed Limits	Vessel operators will follow designated speed zones to and from the project site.	Potential vessel strikes with aquatic species.
Green Turtle Monitoring (Clamshell Dredge/Daytime Operation)	A qualified biological monitor will be present to look for green turtle activity in the vicinity of the project site and will provide a brief training to vessel operators dredge operations, transportation of materials (including dredged sediments), and other construction vessels.	Potential impacts on green turtle.
Marine Mammal Monitoring	A qualified biological monitor will be present to look for marine mammal activity in the vicinity of the project site and will provide a brief training to vessel operators dredge operations, transportation of materials (including dredged sediments), and other construction vessels.	Potential impacts on marine mammals.
Pre-Construction Visual Sweep	A visual scan of the project surface area will be conducted prior to commencing pile-driving activities, and after a break in pile driving for more than 30 minutes.	Potential impacts on green turtle and/or marine mammals.

Table 2-3 Best Management Practices

<i>BMP</i>	<i>Description</i>	<i>Impacts Reduced/Avoided</i>
Sensitive Species Protection	<p>Operations will be halted temporarily if any marine mammal or green turtles is observed in transit or occupying the project site or selected disposal sites.</p> <p><u>Dredging:</u> Work will be suspended if an animal is observed within the buffered shutdown zone (<25 meters). Work will be allowed to restart once the animal has been observed leaving the buffered shutdown zone, or once 15 minutes has elapsed since the most recent observation.</p> <p><u>Pile driving:</u> Work will be suspended if an animal is observed within the buffered shutdown zone (<25 meters). Work will be allowed to restart once the animal has been observed leaving the buffered shutdown zone, or once 15 minutes has elapsed since the last observation.</p>	Potential impacts on marine mammals and green turtle.
Pile Driving Soft-Start Procedure	Prior to the start of pile driving each day, or after each break of more than 30 minutes, the soft-start procedure will be used (i.e., at least three unfueled hammer blows separated by 30 seconds to allow any undetected animals in the area to leave of their own volition prior to a fueled blow).	Potential impacts on marine mammals and green turtle.
Minimization of Suspended Sediments	Dredge passes will start near the shoreline and move toward deeper water to minimize suspended sediments by reducing sloughing toward open water.	Potential water quality impacts.
Vessel Grounding Prevention	Vessel draft and movements will be controlled by the contractor to limit potential for grounding.	Potential water quality impacts associated with sediment disturbance or material spill due to vessel grounding incidents.
Sediment Spillage Control	During transport and handling of sediment, containment measures will be used to minimize spillage.	Potential water quality impacts associated with sediment spillage outside of selected disposal sites.
Surface Debris Survey	The contractor will be required to conduct a surface debris survey prior to dredging.	Potential water quality impacts associated with transport and deposition of nondredge material.
GPS Barge Locator Requirement	The contractor will use a GPS to ensure that material is removed from the correct locations.	Potential water quality impacts associated with dredge and transport of materials outside the project area.

Table 2-3 Best Management Practices

<i>BMP</i>	<i>Description</i>	<i>Impacts Reduced/Avoided</i>
Dredge Material Screening	Dredge materials requiring upland disposal and considered to be potentially hazardous will be screened for munitions and explosives of concern and radiological commodities, as necessary.	Potential safety issues associated with upland dredge material disposal.
Nighttime Dredging	Dredging operations will take place between 6:00 p.m. and 6:00 a.m., Monday through Friday.	Potential impacts associated with munitions and ESQD arcs.
Dredge Depth Limit and Area Limits	The contractor will not be allowed to excavate beyond the overdredge depth or outside of the project area limits.	Potential water quality impacts associated with dredge and transport of materials outside the project area.
Dredge Bucket Swing Limit	The dredge bucket will be swung directly to the barge after it breaks the water surface using the minimal swing distance.	Potential water quality impacts associated with sediment release at dredge site due to prolonged transit of dredge bucket to barge/scow.
Bottom Stockpiling and Dredging Limit	No bottom stockpiling or multiple bites of the clamshell bucket will be allowed.	Potential water quality impacts associated with unnecessary sediment disturbance at dredge site.
Overdredge Limit	The contractor will not be allowed to overdredge beyond the designed side slopes.	Potential water quality impacts associated with over-steepening of the slope resulting in unnecessary sediment movement/sliding or impacts on adjacent structural stability.
Dredge Bucket Fill Limit	The dredge bucket will not be overfilled.	Potential water quality impacts associated with sediment spillage from overfilled dredge bucket.
Barge/Scow Maximum Capacity	The barge/scow will not be filled beyond 85 percent capacity.	Potential water quality impacts associated with sediment spillage outside selected disposal sites.
Dredge Material Control	Material will not be allowed to leak from the bins or overtop the walls of the barge/scow.	Potential water quality impacts associated with unintended sediment release outside of selected disposal sites.
Offloading Spill Control	During offloading, metal spill aprons, upland spill control curbing and collection systems, and other spill control measures will be implemented. If a bucket is used, a dribble apron will be used.	Potential water quality impacts associated with uncontrolled deposition of sediment during offloading operations.
Spill/Sheen Response Materials	Surface booms, oil-absorbent pads, and similar materials will be maintained onsite to contain any sheen that may occur on the surface of the water during dredging.	Potential water quality impacts associated with spill/sheen.
Clean Materials	Only clean construction materials suitable for use in the oceanic environment will be used.	Potential water quality impacts associated with construction materials.

Table 2-3 Best Management Practices

<i>BMP</i>	<i>Description</i>	<i>Impacts Reduced/Avoided</i>
Debris Control	A cable net and floating boom will be used to capture floating debris that falls into the water during demolition activities and debris will be collected and disposed of onshore.	Potential water quality impacts associated with uncontrolled construction and demolition debris.

Abbreviations:

- BMP = best management practice
- ESQD = Explosives Safety Quantity-Distance
- GPS = Global Positioning System
- MGBW = Marine Group Boat Works, LLC

3 ESSENTIAL FISH HABITAT

3.1 EFH and Habitat Areas of Particular Concern Designations

EFH is described as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (50 CFR Section 600.10). Regional Fishery Management Councils are required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) to identify EFH in Fishery Management Plans (FMPs) (16 U.S. Code [U.S.C.] Sections 1801-1891[d]).

The Pacific Fishery Management Council (PFMC) is responsible for designating EFH for all federally managed species occurring in the coastal and marine waters off the coasts of Washington, Oregon, and California, including Puget Sound. The PFMC has designated EFH for species within the FMPs for each of the four primary fisheries that they manage: Pacific Coast Groundfish (PFMC 2016a), Coastal Pelagic Species (PFMC 2019), Pacific Coast Salmon (PFMC 2016b), and West Coast Fisheries for Highly Migratory Species (PFMC 2018).

In addition to designating EFH, the PFMC is also responsible for identifying Habitat Areas of Potential Concern (HAPC) for federally managed species. EFH that is considered to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, also may be identified by the National Marine Fisheries Service (NMFS) as HAPCs. For types or areas of EFH to be considered HAPCs, at least one of the following must be demonstrated:

- The importance of the ecological function provided by the habitat;
- The extent to which the habitat is sensitive to human-induced environmental degradation;
- Whether, and to what extent, development activities are, or would be, negatively impacting the habitat type; and/or
- The rarity of the habitat.

The PFMC has designated HAPC for groundfish only. The HAPCs are seagrass, canopy kelp, rocky reef, and estuarine habitats along the Pacific coast (PFMC 2016a). Two HAPCs, estuarine habitats and eelgrass (*Zostera marina*), a species of seagrass, are in San Diego Bay (Naval Facilities Engineering Command Southwest [NAVFAC SW] 2010). The only HAPC within or adjacent to the FDD sites is eelgrass, which is absent within the Mole Pier site but is present within the MGBW maintenance piers location (refer to Figure 2-1).

Estuarine habitat is associated with the Sweetwater Marsh (south of NBSD) and, to a very limited extent, upstream of the bay in the Paleta Creek channel (north of the Mole Pier) (Navy 2014a; Navy and POSD 2013). NBSD is in a part of San Diego Bay characterized as seasonally hypersaline due to evaporation and reduced tidal flushing (Navy and POSD 2013). The project area does not provide estuarine habitat as usually recognized because freshwater inflows are limited to temporary runoff from the developed surroundings, and salinities average about 30 parts per thousand (Navy 2016). It is recognized, however, that Southern California bays, including San Diego Bay, are classified as estuarine HAPC by NMFS due to their importance as nursery habitat.

Figure 3-1 Eelgrass within the Vicinity of the Project Sites



No warranty is made by the Navy as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

Eelgrass habitat is extensive in San Diego Bay. This shallow water habitat supports a unique assemblage of juvenile and adult fishes (Pondella and Williams 2009a and 2009b). It provides important nursery areas for fish and invertebrates that are foraged on by the California least tern and other marine birds. Furthermore, these sites are noted for overall higher diversity compared with the unvegetated bottom habitat that characterizes the Mole Pier project site. Results of recent eelgrass habitat mapping of San Diego Bay showed that approximately 14 percent of the Bay (approximately 1,693 acres of 12,100 acres) is vegetated with eelgrass (refer to Figure 3-1; Merkel & Associates, Inc. 2018).

3.2 Descriptions of Managed Species

Of the 109 species of fish previously identified in San Diego Bay, 10 are managed by the NMFS. Four are managed under the Coastal Pelagics FMP (PFMC 2018a): northern anchovy (*Engraulis mordax*); pacific sardine (*Sardinops sagax*); pacific mackerel (*Scomber japonicus*); and jack mackerel (*Trachurus symmetricus*). Six species are covered under the Pacific Groundfish FMP (PFMC 2016a) and occur, although not in abundance, in San Diego Bay: California scorpionfish (*Scorpaena guttata*); grass rockfish (*Sebastes rastrelliger*); English sole (*Parophrys vetulus*); curlfin sole (*Pleuronichthys decurrens*); leopard shark (*Triakis semifasciata*); and soupfin shark (*Galeorhinus galeus*) (Navy 2010; Navy and POSD 2013). These species are discussed briefly below.

3.2.1 Coastal Pelagic Species

Coastal pelagic species are those fish that live in the water column, in contrast to groundfish species, which live near the sea floor. The coastal pelagic species (CPS) fishery includes four finfish (Pacific sardine, Pacific [chub] mackerel, northern anchovy, and jack mackerel) and the invertebrate, market squid (PFMC 2019). Pelagic species can generally be found anywhere from the surface to a depth of 3,300 feet. San Diego Bay is entirely within the boundary of EFH for coastal pelagic species finfish. All except for market squid are likely to occur in the bay. Finfish are highly transient and two types, northern anchovy and Pacific sardine, can be found throughout the bay. Jack mackerel and Pacific mackerel are typically found in the North, North-Central, and South-Central Ecoregions of the bay (Allen et al. 2002).

EFH for the CPS finfish is defined both through geographic boundaries and by sea surface temperature ranges (PFMC 2019). The east-west geographic boundary of EFH for each individual CPS finfish and market squid is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (200 miles) and above the thermocline where sea surface temperatures range between 10 degrees Celsius (°C) and 26°C. The southern extent of EFH for CPS finfish is the U.S.-Mexico maritime boundary. The northern boundary of the range of CPS finfish is more dynamic and variable because of the seasonal cooling of the sea surface temperature. The northern EFH boundary is, therefore, the position of the 10°C isotherm (which varies both seasonally and annually). San Diego Bay is entirely within the boundary of EFH for CPS finfish.

In addition to their value to commercial Pacific fisheries, CPS finfish species are also recognized for their importance as food for other fish, marine mammals, and birds (63 Federal Register [FR] 13833). CPS finfish are considered sensitive to overfishing, loss of habitat, reduction in water and sediment quality, and changes in marine hydrology (PFMC 2019).

Following are descriptions of CPS finfish that occur in San Diego Bay. All the CPS finfish have been documented to occur in deep subtidal habitat, and all but the jack mackerel—which is less common and

hence less likely to have been detected in the few surveys conducted—have been documented around manmade structures (Merkel & Associates, Inc. 2014).

Northern anchovies are small, short-lived fish that are typically found in schools near the water's surface. They are found from British Columbia to Baja California and have recently appeared in the Gulf of California. Northern anchovies are divided into northern, central, and southern subpopulations. The central subpopulation is located in the Southern California Bight, between Point Conception, California, and Point Descanso, Mexico. They grow to approximately 8 inches (18 centimeters [cm]) and rarely live beyond 4 years. Northern anchovies spawn during every month of the year, but spawning increases in late winter and early spring (peaking from February to April).

In San Diego Bay, highly mobile schools of northern anchovies spend most of their time and feed in the water column in all the natural and manmade habitats, primarily in the North Bay. The bay serves as a nursery area for this species; 100 percent of northern anchovies collected in quarterly surveys throughout the bay over a course of 5 years (1994–1999) were juveniles (Allen et al. 2002).

Spawning primarily occurs outside of the bay, and the pelagic eggs and larvae are advected into the bay. Young-of-year northern anchovies recruit to the midwater of nearshore habitats and the channel, and abundances peak in late spring and early summer (Allen et al. 2002; Allen 1999 referenced by Robbins 2006). During this time, northern anchovies can numerically dominate the fish assemblage in the northern quadrant of the bay (Allen et al 2002; Pondella and Williams 2009a and 2009b).

Northern anchovies eat phytoplankton and zooplankton. Northern anchovies are subject to natural predation throughout all life stages and are important forage for other species. Eggs and larvae fall prey to an assortment of invertebrate and vertebrate planktivores. As juveniles, anchovies are vulnerable to a wide variety of predators, including many recreationally and commercially important species of fish. Adult anchovies are fed upon by numerous fishes (some of which have recreational and commercial value), marine mammals, and birds (PFMC 2016b; NAVFAC SW 2010).

Pacific sardines are also small schooling fish. At times, they have been the most abundant fish species in the California current, a highly productive current that extends up to 660 miles (1,000 kilometers [km]) offshore from Oregon to Baja California. When the population of Pacific sardines is large, they are abundant from the tip of Baja California to southeastern Alaska, and throughout the Gulf of California. Sardines typically grow to approximately 12 inches (30 cm) in length and may live as long as 13 years, but they are usually younger than 5 years old.

Pacific sardines are typically distributed more offshore than northern anchovies. Pacific sardines occur in estuaries, but the fish are most common in the nearshore and offshore domains along the coast (PFMC 2019). Spawning occurs year-round, peaking from April through August. Eggs and larvae occur nearly everywhere adults are found and eggs are most abundant between 14°C and 15°C. Sardines spawn in loosely aggregated schools in the upper 164 feet (50 meters) of the water column. The main spawning area for the historical population off the U.S. was between Point Conception and San Diego, California, out to approximately 100 miles (160 km).

In the vicinity of the proposed project sites, Pacific sardines, like northern anchovies, occur in highly mobile schools and feed in the water column in all natural and manmade habitats. The species is among the numerically dominant taxa during the summer and fall in the bay (Allen et al 2002; Pondella and Williams 2009a and 2009b). The bay serves as a nursery area for this species; 96 percent of Pacific sardines

collected in quarterly surveys throughout the bay over a course of 5 years (1994–1999) were juveniles (Allen et al. 2002).

Pacific sardines feed on phytoplankton and zooplankton. The fish are heavily preyed upon at all life stages. Sardine eggs and larvae are consumed by an assortment of invertebrate and vertebrate planktivores, including northern anchovies. Juvenile and adult sardines are consumed by a variety of predators, including commercially important fish (e.g., yellowtail, barracuda, bonito, tuna, marlin, mackerel, hake, salmon, and sharks), seabirds (pelicans, gulls, and cormorants) and marine mammals (sea lions, seals, porpoises, and whales). In all probability, sardines are forage for the same predators that prey on northern anchovies (PFMC 2019).

Jack mackerels are schooling fish that range widely throughout the northeastern Pacific. They grow to about 24 inches (60 cm) and can live 35 years or longer. Much of their range lies far offshore outside the 200-mile U.S. Exclusive Economic Zone. Jack mackerels in southern California are more likely to appear on offshore banks in late spring, summer, and early fall. The spawning season for jack mackerels off California extends from February to October, with peak activity from March to July. Little is known about the maturity cycle of large fish offshore, but peak spawning appears to occur later in more northerly waters. Small jack mackerels (up to 6 years of age) are most abundant in the Southern California Bight, where they are often found near the mainland coast and islands and over shallow rocky banks.

Young juvenile fish sometimes form small schools beneath floating kelp and debris in the open sea. In southern California waters, jack mackerel schools are often found over rocky banks, artificial reefs, and shallow rocky coastal areas including kelp beds. They remain near the bottom or under kelp canopies during daylight and venture into deeper surrounding areas at night.

Jack mackerel is the least common species among the managed pelagic finfish species in the bay (Allen et al. 2002). Jack mackerels have been observed over bare sand, bare mud, and eelgrass, in marinas, and under wharves in northern San Diego Bay (see Table 3-1). Jack mackerels have been observed over eelgrass only in an experimental transplanted bed located across the channel from the proposed project sites (Pondella et al. 2006). The species could occur in the proposed project area, although it has not been observed in the southern half of the bay.

Small jack mackerels taken off southern California and northern Baja California eat large zooplankton, juvenile squid, and juvenile northern anchovies. Larvae feed almost entirely on plankton. They provide forage for a variety of fish, mammals, and sea birds.

3.2.2 Pacific Groundfish Species

The Pacific Coast Groundfish FMP manages 86 species over a large ecologically diverse area covering the entire West Coast of the continental U.S. Although groundfish are those fish considered demersal (fish that live on or near the seabed), they occupy diverse habitats at all stages in their life histories. EFH areas may be large because the pelagic eggs and larvae of a species are widely dispersed, for example, or comparatively small, as is the case with the adults of many nearshore rockfishes, which show strong affinities to a particular location or type of substrate. However, the species rarity in all or parts of San Diego Bay makes it unlikely that any will occur within the vicinity of the project sites (Merkel & Associates, Inc. 2014). These species include curlfin sole, English sole, California scorpionfish, grass rockfish, leopard shark, and soupfin shark.

Curlfin sole are found along the Pacific Coast of North America from the Bering Sea south to San Quintin, Baja California (Eschmeyer et al. 1983). Adults are demersal (bottom dwellers) flatfish and are associated with soft bottoms, occurring all along the west coast at depths from 125 to 1,150 feet (38 to 350 meters). This species spawns from April to August and grows to a maximum size of 15 inches (37 cm). Curlfin sole feed primarily on polychaete worms, crustacean eggs, and brittle star fragments.

Curlfin sole are documented to occur in bare sand and bare mud habitat in northern San Diego Bay (see Table 3-1; NAVFAC SW 2010). However, the species is very uncommon in San Diego Bay; no specimens were collected during quarterly surveys from 1994–1999 or surveys in 2008 (Allen et al. 2002; Pondella and Williams 2009a and 2009b). Kramer (1991) conducted extensive trawl and seine surveys in San Diego County and found that curlfin sole were very uncommon nearshore along the open coast and were absent from catches in San Diego Bay. This flatfish has not been found in eelgrass beds of San Diego Bay. Thus, curlfin sole is unlikely to occur in the proposed project area.

English sole are found in water less than 1,000 feet (300 meters) from Baja California to the Gulf of Alaska (PFMC 2016a). Spawning occurs offshore in waters shallower than 100 meters (330 feet), primarily during the autumn and winter, depending on the stock. English sole use nearshore coastal and estuarine waters as nursery areas. Adults and juveniles prefer soft bottoms composed of fine sands and mud, but also occur in eelgrass habitats. This species may reach ages in excess of 20 years. Females generally reach maturity after 4 years. Juveniles and adults are carnivorous, feeding on polychaetes, small bivalves, clam (*Tagelus californianus*) siphons, and other benthic invertebrates. English sole is uncommon in the San Diego Bay, and few individuals have been collected infrequently over bare mud and sand habitat in the northern quadrant of the bay (Allen et al. 2002; NAVFAC SW 2010; Merkel & Associates, Inc. 2014). English sole is unlikely to occur in the proposed project area.

California scorpionfish is a benthic species found from central California to the Gulf of California in depths between the inter-tidal and 555 feet (170 meters). Although it generally inhabits rocky reefs, it also aggregates over sandy or muddy substrate, depending on the area or season (PFMC 2006). California scorpionfish migrate to deeper water to spawn from May to September (peaking in July). This species feeds on a wide variety of prey, including crabs, fishes, octopi, isopods, and shrimp. California scorpionfish utilize eelgrass beds as juvenile nursery habitat and a resource for prey.

California scorpionfish occur somewhat frequently in very low numbers in San Diego Bay. From 1994-1999, 37 California scorpionfish were collected in quarterly surveys in the North Bay (comprising less than 0.01 percent of the total catch throughout the bay), and only 2 individuals were collected in the southern half of the bay (Allen et al. 2002). NAVFAC SW (2010) indicates that California scorpionfish occur in all manmade habitats composed of hard structure. Juvenile and adult California scorpionfish have been collected in eelgrass (a designated HAPC) and channel habitats of north and north-central San Diego Bay (Allen et al. 2002; Pondella and Williams 2009a and 2009b). Pondella et al. (2006) report observations of the species in an established natural eelgrass bed near Shelter Island and in experimental artificial reefs set in the North Bay across the channel from the proposed project area. Merkel & Associates, Inc. (2014) report additional observations of California scorpionfish within structured habitats, including the seawall of the Tenth Avenue Marine Terminal, on the Coronado Bridge piles, and on the pendant wall at the J Street Marina. Thus, California scorpionfish may occur, although in small numbers in NBSD.

Grass rockfish is a common, shallow-water rockfish found from Playa Maria Bay, Baja California, to Yaquina Bay, Oregon, although they are most common south of southern Oregon. Among rockfishes, they have one of the shallowest and narrowest depth ranges. They are found from the intertidal zone to 184 feet, frequently less than 49 feet, and are commonly found from the intertidal to 20 feet. The species is common in nearshore rocky areas, along jetties, and in kelp. Around reef structures, adults may be found hiding in crevices (PFMC 2005). Grass rockfish have become an important component of the live-fish fishery. Both sexes of grass rockfish begin to mature at 9 inches (23 cm) and are fully mature at 11 inches (28 cm); these lengths correspond to ages 2 to 5 years for males and 3 to 5 years for females. Larvae are released from January to March (PFMC 2005). Grass rockfish habitat generally is restricted to rocky areas (Leet et al. 2001).

Grass rockfish are documented to occur in eelgrass beds, a designated HAPC, but not in any other habitat in the San Diego Bay. Juveniles of shallow dwelling rockfish species will inhabit eelgrass habitat as shelter and resource for prey for months; however, no life history stage of this or other rockfish species is dependent on eelgrass beds. Grass rockfish are very uncommon in San Diego Bay; no specimens of this species or other rockfishes (*Sebastes* spp.) were collected in more than 5 years of fish surveys in eelgrass or unvegetated nearshore and channel habitats in the bay (Allen et al. 2002; Pondella et al. 2006; Pondella and Williams 2009a and 2009b). Thus, grass rockfish are unlikely to occur within the vicinity of the project sites.

Leopard sharks are found from southern Oregon to Baja California, Mexico, including the Gulf of California. They are most common at depths ranging from 0 to 15 feet (0 to 5 meters) in muddy bays, and reside in estuaries, bays, and kelp beds over soft and hard bottoms, as well as along open coast sandy beaches (PFMC 2006). Leopard sharks are most common on or near the bottom in waters less than 4 meters (13 feet) deep, but have been caught as deep as 91 meters (300 feet).

Leopard sharks spawn and give birth to live young (“pup”) in shallow water. Seasonally, pups occur along sandy beaches and in protected bays. Leopard sharks will utilize eelgrass beds as juvenile nursery habitat and as a resource for prey. The maximum recorded length of a leopard shark is 6 feet (180 cm), but most do not exceed 5 feet (150 cm) in length. Females may take 10 to 15 years to reach maturity, while males may only take 7 to 13 years. Maximum age is reported to be 30 years. This species feeds on a variety of prey, including crabs, clams, fish, and octopus.

Leopard sharks have been documented to use intertidal sandy beach and subtidal soft bottom sediments (mud, sand, and silty sand), two habitat components of San Diego Bay (Hoffmann 1986 referenced by Robbins 2006). These habitats can be influenced by seasonal freshwater input, and thus are designated estuarine HAPC for this managed groundfish species. In Humboldt and San Francisco Bay, females have been observed releasing their young in beds of eelgrass, while in southern California females are thought to release their pups along more open coastal areas (Carlisle and Smith 2009). No specimens were collected over 6 years of surveys by Allen et al. (2002) and Pondella and Williams (2009a and 2009b). Thus, leopard shark is expected to be very uncommon in San Diego Bay and within the vicinity of the project sites.

Southern sharks range from northern British Columbia to Abreojos Point, Baja California, and the Gulf of California. This shark is an abundant coastal-pelagic species of temperate continental and insular waters. They are often associated with the bottom, inhabiting bays and muddy shallows. Males and females

apparently segregate by gender; adult males occur in deeper water and adult females occur closer inshore. Females and young tend to be more common in southern California waters. Primary nursery grounds are in southern California inshore areas south of Point Conception, with females moving in to bays to bear live young (PFMC 2005). Soupfin sharks are opportunistic carnivores, preying upon moderate-sized bony fishes, echinoderms, shrimp, invertebrates, and squid. This species is one of many caught by recreational fishermen in the San Diego Bay (NAVFAC SW 2000). Although the whereabouts of this species in the bay is unknown, its rarity makes it unlikely to occur within the vicinity of the project sites.

3.2.3 Description of Habitats in the Proposed Project Area

The project area consists of the developed shorelines and piers on NBSD from the Mole Pier to the southern boundary of NBSD, and the surrounding waters of the San Diego Bay (refer to Figures 1-1, 1-2, and 1-2). The only undeveloped terrestrial habitat in the vicinity is along Paleta Creek (Navy 2014a), which is north of the Mole Pier and would not be affected by the project. The south-central portion of the bay is recognized as a distinct hydrodynamic region of the bay, with physical and biological characteristics that also differ from areas to the north and south within the bay (Navy and POSD 2013; Merkel & Associates, Inc. 2018; Tierra Data, Inc. 2010).

Habitats of San Diego Bay are differentiated by elevation or depth, substrate, and manmade or natural biological features. Habitats associated within the project area include the developed shoreline and artificial substrates such as pier pilings and marine benthic (bottom), water column, and surface water habitat. Depths at the south berth of the Mole Pier site range from -16 to -55 feet MLLW except along artificial shorelines which rise steeply from the subtidal to dry land (Navy and POSD 2013). The depths at the MGBW location range from -9 to -17 feet MLLW (Mission Environmental LLC 2018). The associated habitats and communities are described below.

The shoreline of the affected environment at both project sites consists of developed adjacent upland and artificial substrates. Artificial substrates comprise pier pilings, bulkheads, rock riprap, floating docks, seawalls, mooring systems, artificial reefs, and derelict ships and ship parts. These substrates form extensive artificial habitat along the NBSD shoreline. From the intertidal zone to deep subtidal habitat, the manmade structures support abundant invertebrates and seaweeds. California spiny lobsters (*Panulirus interruptus*), along with a variety of crabs, worms, oysters, mussels, barnacles, echinoderms, sponges, hydroids, sea anemones, bryozoans, and tunicates (sea squirts), all inhabit artificial substrates in San Diego Bay (Navy and POSD 2013; Merkel & Associates, Inc. 2014). These areas may also provide refuge and feeding areas for juvenile and predatory fishes. Riprap niches are often filled with invertebrate fauna. Small mobile invertebrates, including nemertean worms (ribbon worms), amphipods, shrimp, decorator crabs, and gastropods, are common on piles (Navy and POSD 2013). Approximately 74 percent (45.4 miles) of the shoreline of San Diego Bay is armored by manmade structures that protect developed sites (Navy 2011).

Although a number of potential negative impacts have been attributed to overwater structures (Nightingale and Simenstad 2001; NMFS 2013), wharves, docks, and piers in San Diego Bay provide increased three-dimensional substrate and cover that locally increase the productivity of benthic organisms as well as the species richness and abundance of fish compared to more open waters (Merkel & Associates, Inc. 2014; Navy 2016). It must be noted, however, that many of the species that inhabit artificial structures in San Diego Bay (e.g., the recently discovered bryozoan *Watersipora subovoidea*, are nonindigenous and may displace or have other detrimental effects on native species) (Ruiz and Geller 2015).

A hardened shoreline typically produces a very steep shore profile that can provide elevated roosting sites for bay waterbirds, such as California brown pelicans (*Pelecanus occidentalis californicus*), cormorants, and gulls, which allow them to conserve energy and avoid harsh weather conditions (Navy and POSD 2013). The surface roughness and complexity of a structure can affect its ability to provide refuge niches and allow water retention at low tides.

Subtidal habitats in San Diego Bay are differentiated by depth as follows (Navy and POSD 2013):

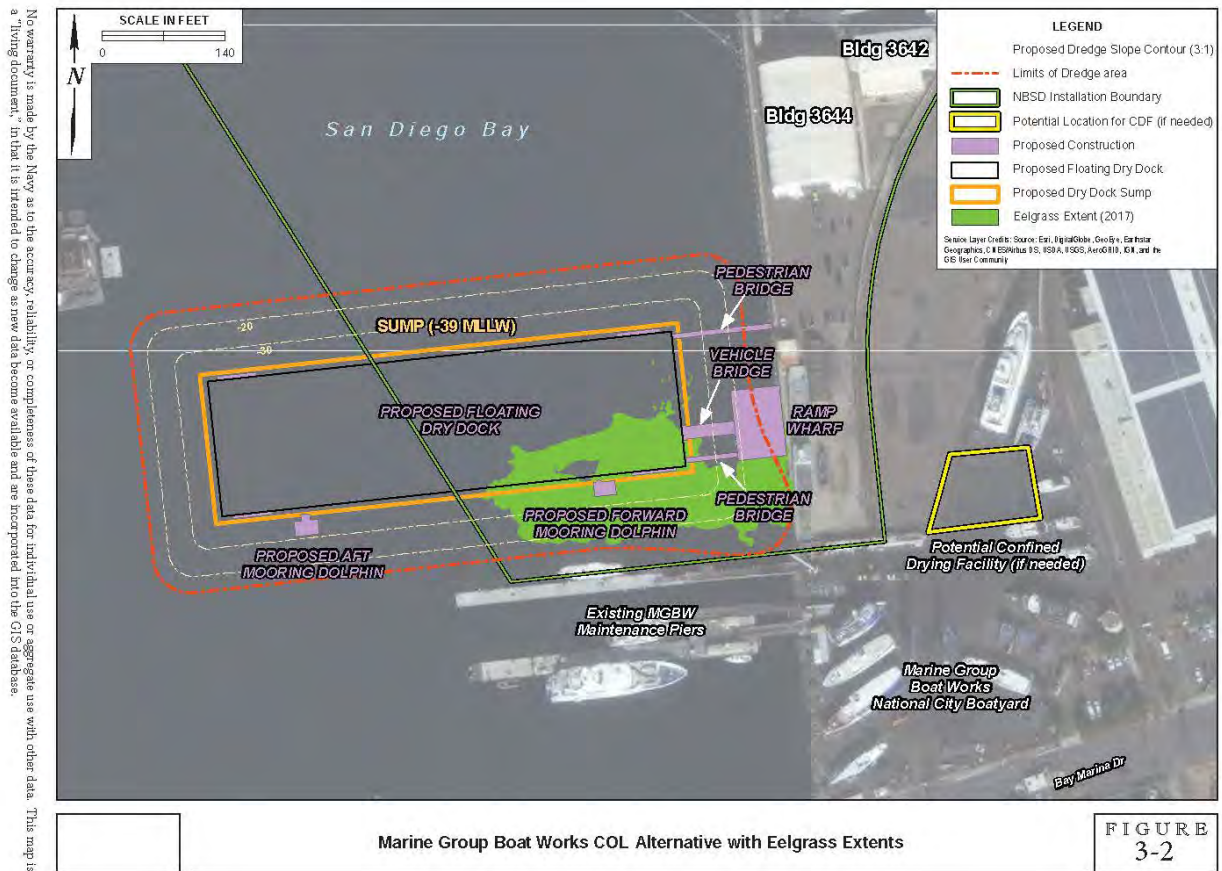
- Shallow Subtidal (-2.2 to -12 feet MLLW)
- Moderately Deep Subtidal (-12 to -20 feet MLLW)
- Deep Subtidal (deeper than -20 feet MLLW)

The occurrence of each habitat with respect to the project area is discussed below.

Shallow subtidal habitats are highly productive and important in San Diego Bay, in part because of the presence of eelgrass (*Zostera marina*) beds and algal mats on shallow sandy to muddy substrates in many areas of the bay (Merkel & Associates, Inc. 2018; Navy 2011; Navy and POSD 2013). Both eelgrass habitats and unvegetated shallows in this depth range are important to invertebrates, fish, and birds that prey on them (Navy and POSD 2013). Shallow subtidal habitat in San Diego Bay supports 12 species of fish that are indigenous to the bays and estuaries of Southern California (Allen et al. 2002; Navy and POSD 2013). Areas that would be dredged to support the floating dry dock at the MGBW maintenance piers location are predominantly shallow subtidal habitat, with depths of -9 to -17 feet MLLW (Mission Environmental LLC 2018). At the south berth of the Mole Pier, shallow subtidal habitat is limited to the near-vertical surfaces of artificial structures. Eelgrass is predominantly present along the west side and south end of the Bay but has also been documented on the east side of the Bay to a lesser extent (refer to Figure 3-1; Merkel & Associates, Inc. 2018). Eelgrass is absent from the south berth of the Mole Pier location. However, a 0.83 acre eelgrass bed is present within the proposed lease area at the MGBW maintenance piers location (see Figure 3-2; Merkel & Associates, Inc. 2018).

Moderately deep subtidal habitat in the project area is primarily within the near-vertical surfaces of artificial substrates within this depth range at the Mole Pier site. All of the remaining habitat at the Mole Pier site is deep subtidal. For both the moderately deep and deep subtidal habitats, primary production by phytoplankton occurs in the overlying water column, but benthic primary production is limited because of low light penetration; algal mats and eelgrass beds are lacking. The base of the food chain for the benthic community is provided instead by organic detritus that originates in shallower water and drifts/sinks into deeper water. Fauna residing in subtidal benthic habitats (across all depths) include the warty sea cucumber (*Apostichopus parvimensis*) and a diversity of infaunal species, including suspension feeders, burrowers, and tube builders. Feeding by nematode and polychaete worms, clams, gastropod mollusks, brittlestars, crabs, isopods, and a wide variety of smaller crustaceans transforms detritus and small invertebrates into usable food for larger invertebrates and fishes. The soft bottom benthos provides other functional roles besides serving as a prey base for fish and birds. The less conspicuous mollusks, polychaete worms, small crustaceans, and other invertebrates living at the bottom of the bay mineralize organic wastes as it accumulates, consume algae, and return essential chemicals and organic matter to the water column (Navy and POSD 2013).

Figure 3-2 Marine Group Boat Works COL Alternative with Eelgrass Extents



Although a variety of organisms inhabit the waters of NBSD, the sediments in the area are historically known to be contaminated, and the associated biological communities have been considered degraded (Fairey et al. 1996 and 1998). Typical deep subtidal fish species include round stingray (*Urobatis halleri*), spotted sand bass (*Paralabrax maculatofasciatus*), California halibut (*Paralichthys californicus*), barred sand bass (*Paralabrax nebulifer*), and bat ray (*Myliobatis californica*) (Navy and POSD 2013).

The deep subtidal water column is home to phytoplankton and zooplankton, including species that spend their entire lives (holoplankton), or only a portion of their life cycle (e.g., as eggs, larvae, or juveniles [meroplankton]), in the plankton. For the meroplankton, which includes many fish and invertebrates, an important function of the deep subtidal environment is transport into and out of the relatively warm, sheltered waters of the bay, which provide nursery habitats.

Table 3-1 is a summary of the local-scale habitats that the 10 managed fishes are expected to utilize in the northern and southern halves of San Diego Bay. The data are excerpted from NAVFAC SW (2010), which provides characterizations of the potential community of fishes, including the managed species, and other marine organisms at each habitat. One natural habitat, bare mud, is in the proposed project area. Six habitats are manmade: riprap, marina, wharf, artificial reef, bulkhead wall, and launch ramp. Mud, wharf, and bulkhead wall habitats are in the proposed project areas.

Numerous surveys have been conducted over the last few decades in San Diego Bay to quantify fish diversity and abundance. The most comprehensive surveys of the bay have been conducted by the Vantuna Research Group (Allen et al. 2002; Williams et al. 2015 and 2016) and Martinez-Takeshita et al. (2015). These surveys have generally found much lower abundance, biomass, and diversity of fishes in the south-central bay than in other parts of San Diego Bay.

Note that the south-central bay sites sampled in these studies were across San Diego Bay from NBSD at Glorietta Bay and the Naval Amphibious Base, and probably are not representative of the fish community associated with the NBSD piers. The South Bay sites that have been sampled are in the southern end of the bay which is virtually all shallow subtidal and intertidal and supports extensive eelgrass beds (Allen et al. 2002; Merkel & Associates 2018). These and other works related to fish and EFH were characterized by Merkel & Associates, Inc. (2014) and the Navy (2010).

Approximately 109 species of bottom-living and open-water fishes occur in San Diego Bay (Williams et al. 2015, 2016). There is a greater variety of fish species in the North Bay area than in the South Bay, and the greatest fish diversity can be found at artificial reefs. Increased levels of flushing found in the North Bay also increase food availability, supply of larval recruits, and water quality (Navy 2010). Eelgrass beds in particular are recognized as highly productive and important nursery habitat for a number of fish species in San Diego Bay and a 0.83 acre eelgrass bed is present within the MGBW maintenance pier location (Allen et al. 2002; Navy and POSD 2013; Merkel & Associates, Inc. 2014, 2017). While there is no commercial fishing within San Diego Bay, seven fish species inhabiting the bay support commercial fisheries elsewhere in southern California waters. Examples of notable fishery populations found in San Diego Bay include California halibut and white seabass (*Atractoscion nobilis*). At least 58 species are involved in the recreational catch (Navy and POSD 2013).

Table 3-1. Summary of Federally Managed Fishes Observed in Habitats of the Northern (N) and Southern (S) Half of San Diego Bay

Species	Bare sand*	Bare mud*	Eelgrass*	Riprap*	Marina	Wharf*	Artificial Reef	Bulkhead Wall*	Launch Ramp
Coastal Pelagic Species									
Northern anchovy	N,S	N,S	N,S	N	N	N	N	N	N
Pacific sardine	N,S	N,S	N,S	N,S	N,S	N	N	N	N
Pacific mackerel	N	N	N		N	N	N	N	N
Jack mackerel	N	N	N ***		N	N			
Pacific Coast Groundfish									
Curlfin sole	N	N							
English sole	N	N							
California scorpionfish			N,S	N, S	N,S	N,S	N, S	N,S	
Grass rockfish			N						
Leopard shark			N **						
Soupfin shark#									

Notes:

* Habitat present in the proposed project area based on maps from NAVFAC SW 2010.

** Leopard shark observed by Hoffman 1986 referenced by Robbins 2006.

*** May occur in bar sand and eelgrass habitat; observed in an eelgrass transplantation bed (Pondella et al. 2006).

caught by recreational anglers in the San Diego Bay (Pondella et al. 2009a and 2009b), whereabouts unknown.

Source: NAVFAC SW 2010; Merkel & Associates 2014

While no surveys have been conducted at the south berth of the Mole Pier or the MGBW maintenance piers location, Merkel & Associates (2014) have provided lists of San Diego Bay fish species that are associated with deep subtidal versus manmade structural habitats, based on the surveys of Pier 2 and Pier 8 (just north of the Mole Pier; refer to Figure 1-1). Despite much less intensive sampling than in the deep subtidal habitat, a large number of species have been documented around piers and other artificial structures, including most of the common species found in San Diego Bay. When comparably sampled, piers have been found to support a greater abundance and species diversity of fish than adjacent deep open water areas (Merkel & Associates 2014).

Fish species observed in transects along the edges of and/or underneath Pier 2 and Pier 8 included spotted sand bass (*Paralabrax maculatofasciatus*); barred sand bass (*Paralabrax nebulifer*); kelp bass (*Paralabrax clathratus*); black croaker (*Cheilotrema saturnum*); round stingray (*Urobatis halleri*); yellowfin croaker (*Umbrina roncadore*); white sea bass (*Atractoscion nobilis*); midshipman (*Porichthys* sp.); sargo

(*Anisotremus davidsonii*); slough anchovy (*Anchoa delicatissima*); giant kelpfish (*Heterostichus rostratus*); and bay blenny (*Hypsoblennius gentilis*) (Merkel & Associates 2014). The same species would be expected to occur along the Mole Pier and potentially within the MGBW maintenance piers location. In contrast, in deep subtidal habitat away from the piers, only one fish species, black croaker, was observed (next to a tire on the bottom), although other species considered likely to use this habitat include spotted sand bass, round stingray, barred sand bass, midshipman, and gobies (family Gobiidae). California spiny lobsters were also observed under Pier 2, but were not observed and are not likely to occur in the open deep subtidal habitat. Similar results would be expected in open water away from the Mole Pier site due to a lack of suitable habitat.

The shallow subtidal habitat of the MGBW maintenance piers location is likely to support a fish community similar to that described for South-Central and South San Diego Bay by Allen et al. (2002). All of the fish species mentioned in the preceding paragraph are expected to occur at this location, with the addition of Southern California bay and estuary species that include pipefishes (*Syngnathus* spp.), California killifish (*Fundulus parvipinnis*), and striped mullet (*Mugil cephalus*) (Allen et al. 2002).

4 ASSESSMENT OF IMPACTS AND CONSERVATION MEASURES

An adverse effect to EFH is “any impact that reduces the quality and/or quantity of EFH” (see 50 CFR Section 600.910 [a] for further clarification). Potential impacts to EFH associated with the Proposed Action would occur during dredging, sediment transport, and disposal, as well as during demolition and construction activities, including partial demolition of a mooring wharf and construction of mooring dolphins and fender piles at each site as well as construction of pedestrian and vehicle bridges at the MGBW maintenance piers location. Project activities may impact EFH as a result of increased noise, turbidity, shading, and other direct disturbances. A detailed description as it relates to potential impacts to species is provided below.

4.1 Noise

Dredging activities are estimated to occur over a 14-week period at the south berth of the Mole Pier and 27 weeks at the MGBW maintenance piers location. Based on a previous study using a bucket dredge in soft substrate in Cook Inlet, Alaska, underwater noise associated with dredging operations measured up to 124 decibels (dB) at 493 feet (150 meters) (Dickerson et al. 2001), which is just below background noise levels (averaging at approximately 126 dB [Dahl and Dall’Osto 2019a]).

Pile-driving activities (i.e., installation and removal during demolition) would generate the loudest noise levels during project implementation. Pile removal and installation at the south berth of the Mole Pier is anticipated to occur over a 14-week period (e.g., demolition is anticipated to take 4 weeks and pile installation is anticipated to take up to 10 weeks total). Pile installation at the MGBW maintenance piers location would also take up to 10 weeks.

For the types of piles to be driven suitable proxy sound source levels, based on the same pile sizes, types, and similar water conditions were determined by reference to the California Department of Transportation (Caltrans) Compendium (Caltrans 2015). Table 4-1 provides these sound source levels for impact pile driving at the standardized reference distance of 10 meters. Piles are assumed to require 600 strikes per pile; this is conservative given the use of additional methods to assist pile installation. Tables 2-1 and 2-2 provide the number of piles extracted/installed per floating dry dock site.

Source levels associated with nonimpulsive (i.e., continuous) sound sources, any of which may be used, are provided in Table 4-2. These sources include a vibratory driver/extractor to assist the removal or installation of concrete and steel piles; use of high-pressure water jetting to install or remove concrete piles, and to install steel piles; and the use of pile clippers for the removal of concrete piles. Data from the most similar activities reported in the Acoustic Compendium for San Diego Bay (NAVFAC SW 2018) or by Caltrans (2015) have been used as proxies for the proposed activities. Each of these sources is assumed to operate for 10 minutes; this is a conservative assumption given that the contractor will be allowed flexibility to combine and use the most efficient methods. For these purposes, the maximum RMS SPL is the only relevant criterion; peak SPLs and SELs for these types of sources are not usually measured and would only exceed thresholds less than a meter from the source.

Table 4-1 Single-Strike Underwater Noise Source Levels Modeled for Impact Pile Driving

<i>Pile Type and Diameter</i>		<i>Peak (dB re 1 μPa)</i>	<i>RMS (dB re 1 μPa)</i>	<i>SEL (dB re 1 μPa² sec)</i>
Concrete	20- and 24-inch	188	176	166
Steel pipe	24-inch	207	194	178
	16-inch	182	163	158

Source: Caltrans 2015

Notes:

All SPLs are unattenuated; single strike SEL are the proxy sources levels presented for impact pile driving and were used to calculate distances to PTS; Source levels for 20- and 24-inch concrete square and octagonal are assumed to be the same.

Abbreviations:

dB re 1 μPa = decibels referenced to a pressure of 1 microPascal (measures underwater SPL)

dB re 1 μPa² sec = decibels referenced to a pressure of 1 microPascal squared per second (measures underwater SEL)

RMS = root mean square

SEL = sound exposure level

SPL = sound pressure level

Table 4-2 Underwater Noise Source Levels Modeled for Nonimpulsive Sources

<i>Method</i>	<i>Pile Type</i>	<i>RMS SPL (dB re 1 μPa)</i>
Vibratory install or extraction	All steel and concrete piles	160 ¹
High-pressure water jetting	All steel and concrete piles	158 ²
Large pile clipper	All concrete piles	161 ²

Sources: ¹ Caltrans 2015, based on 24-inch steel sheet pile (no data on vibratory installation or extraction of concrete piles); ² NAVFAC SW 2018, high pressure jetting as used on 24-by-30-inch concrete piles, clipper used on 24-inch square concrete piles

Notes:

All SPLs are unattenuated

Abbreviations:

dB re 1 μPa = decibels referenced to a pressure of 1 microPascal (measures underwater SPL)

RMS = root mean square

Thresholds for fish mortality, injury, and temporary threshold shift (TTS = temporary hearing impairment) from pile driving are shown in Table 4-3. These are the thresholds used in the *Hawaii-Southern California Training and Testing Final EIS/OEIS* (Navy 2018b) and represent best available science (Popper et al. 2014). Use of a single threshold dB value for behavioral responses is not supported, although a threshold of 150 dB RMS has been routinely used (Caltrans 2015). The likelihood of behavioral responses is qualitatively considered to be high within tens of meters, intermediate within hundreds of meters, and low at thousands of meters (Popper et al. 2014). Fish monitored visually and with acoustic tags during the Fuel Pier Replacement Project exhibited only brief startle responses and no habitat displacement during pile driving (NAVFAC SW 2014).

Table 4-3 Sound Exposure Criteria for Mortality, Injury, and TTS from Impact Pile Driving

Fish Hearing Group	Onset of Mortality		Onset of Injury		TTS	Behavior
	SEL _{cum}	SPL _{peak}	SEL _{cum}	SPL _{peak}	SEL _{cum}	(150 dB RMS)
Fishes without a swim bladder	> 219	> 213	> 216	> 213	NC	150
Fishes with a swim bladder not involved in hearing	210	> 207	203	203	> 186	150
Fishes with a swim bladder involved in hearing	207	>207	203	> 207	186	150
Fishes with a swim bladder and high-frequency hearing	207	> 207	203	> 203	186	150

Source: Navy 2018b

Notes:

Notes: SEL_{cum} = Cumulative sound exposure level (decibel referenced to 1 micropascal squared seconds [dB re 1 μPa²-s]), SPL_{peak} = Peak sound pressure level (decibel referenced to 1 micropascal [dB re 1 μPa]), “>” indicates that the given effect would occur above the reported threshold. TTS = Temporary Threshold Shift, NC = effects from exposure to sound produced by impact pile driving is considered to be unlikely, therefore no criteria are reported, > indicates that the given effect would occur above the reported threshold.

In all that follows, the logarithm to the base 10 is abbreviated as log. SEL_{cum} at the 10-meter source distance is calculated for impact pile driving as follows:

$$SEL_{cum} = \text{Single-strike SEL} + 10 \log (\text{number of strikes per day})$$

For each pile, 600 pile strikes are assumed.

For nonimpulsive sources, SEL_{cum} at the 10-meter source distance is calculated as:

$$SEL_{cum} = \text{One-second RMS SPL} + 10 \log (\text{number of seconds of operation per day})$$

For the nonimpulsive sources, up to 10 minutes (600 seconds) operation of the equipment is assumed.

Transmission loss (TL) in dB from the 10-meter source distance is estimated using the assumption of “practical spreading loss” as follows:

$$TL = 15 \log \left(\frac{R1}{R2} \right)$$

where R1 is the measured distance and R2 is the source level distance (10 meters).

This equation results in a reduction of 4.5 dB with each doubling of distance, and is used to compute the distances to the effects thresholds for fish, with TL being equal to the difference between the source level and the threshold value. The degree to which underwater noise propagates away from a noise source is dependent on a variety of factors, most notably by bathymetry and the presence or absence of reflective or absorptive conditions, including the sea surface and sediment type. The TL model described above was used to calculate the expected noise propagation from each installation and extraction method, using representative source levels to estimate the zone of influence (ZOI) or area exceeding the noise criteria. The extent of the representative ZOIs are shown in Table 4-4 for each pile type. Hydroacoustic modeling for the south-central San Diego Bay indicates that sound transmission loss from pile driving and/or extraction in deep water would be impacted by the dredged navigation channel directly to the west of the

project site. This is primarily due to the upward slope of the navigation channel, with sound transmission being impeded as the sound travels from deep into shallower water on the western side of San Diego Bay (Dahl and Dall’Osto 2019b). These results suggest that the threshold distances and ZOI’s that cross the navigation channel would be smaller than predicted based on practical spreading loss.

Table 4-4 presents the calculated impact ranges to mortality, injury, and TTS from impulsive and nonimpulsive underwater noise construction methods. These ranges apply to fishes with swim bladders, with minor differences between the different groups in Table 4-3. For fishes without a swim bladder (e.g., sharks), no thresholds are exceeded beyond 3 feet (1 meter) from the pile. The table also provides the distances within which the nominal behavioral disturbance threshold of 150 dB would be exceeded. Threshold distances from impulsive and nonimpulsive sources are also summarized in the bullets that follow.

Table 4-4 Mortality, Injury, TTS, and Behavior Impact Ranges* (meters) for Fish from Impulsive and Nonimpulsive Underwater Noise Construction Methods

Pile Size and Type	Onset of Mortality		Onset of Injury		TTS	Behavior (150 dB RMS)
	SEL _{cum}	SPL _{peak}	SEL _{cum}	SPL _{peak}	SEL _{cum}	
Impulsive Sources						
16-inch Steel Pipe	0	< 1	1	< 1	10	74
24-inch Steel Pipe	8	< 10	15	< 10	208	8,577
20-and 24-inch Concrete	1	<1	2	< 1	33	541
Nonimpulsive Source						
Pile Clipper (concrete)	NA	NA	NA	NA	15	54
Vibratory Pile Driver/Extractor (all)	<1	NA	<1	NA	13	46
Water Jetting (all)	0	NA	1	NA	10	34

Notes: * Distances represent maximum theoretical distances from the source within which thresholds would be exceeded, except where sound transmission is blocked by natural or manmade barriers. SEL_{cum} = Cumulative sound exposure level (decibel referenced to 1 micropascal squared seconds [dB re 1 μPa²-s]), SPL_{peak} = Peak sound pressure level (decibel referenced to 1 micropascal [dB re 1 μPa]), TTS = Temporary Threshold Shift, based on a maximum of 600 pile strikes per day, or 10 minutes’ use of nonimpulsive source, and 1 pile installed/day, ranges are for fish with a swim bladder. For fish with swim bladders not involved in hearing, the TTS would be less than the reported range(s). Distances in meters.

- For impact driving the 20 to 24-inch octagonal and square concrete piles, the potential for mortality would only exist at less than 3 feet (1 meter) from the pile, and potential injury thresholds would not extend more than 2 meters from the pile. The potential for TTS would exist within 109 feet (33 meters) from the pile. Threshold distances are less for all of the nonimpulsive sources, with the potential for TTS existing within 50 feet (15 meters) during use of the pile clipper. Behavioral effects may be anticipated 1,775 feet (541 meters) from the pile during impact driving but only within 112-178 feet (34-54 meters) from the pile during the use of nonimpulsive sources.
- For impact driving the 24-inch steel pipes, the potential for mortality would exist within 33 feet (10 meters). Potential injury thresholds would extend to 16 meters, and the potential for TTS would exist within 683 feet (208 meters). Use of a vibratory pile driver-extractor (the loudest nonimpulsive source that could be used on 24-inch steel piles) results in smaller distances, less

than 3 feet (1 meter) for potential mortality or injury, and potential TTS within 43 feet (13 meters). During impact driving, the potential for behavioral effects (150 dB RMS) is a calculated distance of 5.32 miles (8,577 meters) and would extend to shore (or other obstructions) in all directions from the source, but as discussed above, sound transmission from deep into shallow water (crossing the navigation channel) would be smaller than calculated (Dahl and Dall'Osto 2019b). In addition, fish are routinely exposed to sound sources levels from 141 dB RMS to 186 dB RMS from vessel traffic in San Diego Bay (Galli et al., 2003; Matzner & Jones 2011; McKenna 2011). During pile driving use of nonimpulsive sources, the potential for behavioral effects is only within 112-151 feet (34-46 meters) from the pile.

- For impact driving the 16-inch steel pipe, the potential for mortality would only exist at much less than 3 feet (1 meter) from the pile, and potential injury thresholds would not extend more than 1 meter from the pile. The potential for TTS would exist within 33 feet (10 meters) of the pile. The initial use of water jetting would have the same ZOIs as impact driving, whereas the initial use of a vibratory driver would result in potential mortality within 1.7 feet (0.5 meter), injury within 3 feet (0.9 meter), and TTS within 43 feet (13 meters). Behavioral effects may be anticipated 74 meters from the pile during impact driving but only within 112-178 feet (34-54 meters) from the pile during the use of nonimpulsive sources.

As the foregoing indicates, acoustic effects on EFH would be relatively minor in terms of behavior, hearing impairment, or the potential for injury or mortality, and temporary, being limited to the duration of sound-generating activities.

4.2 Turbidity

Turbidity is expected to increase short-term during pile installation, pile removal, dredging, and disposal of dredged sediments. The size and shape of the turbidity plume from pile driving and dredging and disposal are difficult to quantify because of variability in naturally occurring conditions, such as wind and currents, and type of dredging equipment. Consequently, it is difficult to predict the specific areas that may be influenced by the plume.

Dredging activities for the Proposed Action would cause minor and short-term impacts to EFH, affecting existing unvegetated soft-bottom benthic communities, existing eelgrass, and any marine species within the immediate areas through exposure to short-term changes in suspended sediments, turbidity, dissolved oxygen, or light diffusion. Elevated turbidity levels and associated resuspended sediments would decrease to background levels within a period of several hours after dredging activities cease (USACE 2009, 2012). Sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance and would persist for the duration of dredging activities. Turbidity would vary spatially based on currents and sediment grain size. Increased turbidity may result in temporary decreases in light penetration and levels of dissolved oxygen. The clamshell bucket dredge method would likely be used because it causes less turbidity than the cutter head/hopper dredge method. Increases in turbidity would be low because of the physical characteristics (mainly sand) of the dredge sediments and would be limited to the immediate vicinity of the operation. Decreases in levels of light penetration and dissolved oxygen would occur only within a few hundred feet of the dredging site and would end several hours after cessation of dredging activities, making a permanent decline in aquatic primary productivity unlikely.

Pile removal and installation activities are likely to increase turbidity in the immediate vicinity, for example when high-pressure water jetting is used. Turbidity monitoring during jetting to remove caissons for the Fuel Pier Replacement Project revealed relatively minor if any changes, with only localized decreases in water clarity that dissipated within 11 minutes or less (NAVFAC SW 2017). Pile removal and installation at the proposed dry dock locations when jetting is employed would likely have similar effects, resulting in relatively minor (local to the pile being worked on) and temporary negative effects on the quality of EFH.

4.3 Alteration of Marine Habitats and Communities

The floating dry dock at the south berth of the Mole Pier would shade approximately 3 acres of deep subtidal habitat, representing less than 0.1 percent of the 4,431 acres of deep subtidal habitat in San Diego Bay (Navy and POSD 2013). The deep subtidal area is muddy, lacking eelgrass or attached algae, so any effects on productivity would be minimal (see attachments). Additionally, the area that would be covered at the south berth of the Mole Pier was once the site of AFDM 14 "Steadfast" until 1998, and since 2002 has provided a berth for the USS Curtis, which is approximately 600 feet by 100 feet (shading an area of 1.4 acres). The USS Curtiss, which is currently stationed at the wharf, would be relocated to another location prior to initiating any modifications necessary to accommodate the proposed floating dry dock. Similarly, the existing hoteling facilities along the south berth of the Mole Pier would also be temporarily relocated to another existing berth within NBSD. See attachments for a specific breakdown of the habitat conversion at Mole Pier.

At the MGBW maintenance piers location, dredging would convert approximately 5 acres of shallow subtidal habitat, representing approximately 0.13 percent of shallow subtidal habitat in San Diego Bay (Navy and POSD 2013), to moderately deep and deep subtidal habitat (see attachments). The dredge footprint of 5.55 acres would include 3-to-1 side slopes (extending upward to shallow subtidal depths). Dredging would remove 0.83 acre of eelgrass. Subsequent to dredging, the floating dry dock and accessory structures would shade approximately 2.1 acres that has been converted to deep subtidal habitat.

Dredging at the MGBW maintenance pier location would remove all of the biologically active surface layers as well as some eelgrass habitat resulting in impacts to the benthic fish and invertebrate communities. Given the depth and lack of recent dredging in this area, the community of algae and invertebrates is presumed to be more diverse and productive than occurs in surrounding deep subtidal areas that have been dredged. See attachments for a specific breakdown of the habitat conversion at MGBW.

Because of dredging, habitat values would be degraded, probably for several years before sediment characteristics, and fish, invertebrate, and microbial communities would approach those of the surrounding deep subtidal areas that have been dredged in the past. These are considered adverse effects to EFH under the MSFCMA. The benthic community would gradually be colonized by the same organisms that inhabit the surrounding deep subtidal habitat. This process would be slow, probably requiring several years, because of the low productivity of deep subtidal habitat and poor circulation in the southern part of San Diego Bay (Navy and POSD 2013). Impacts to habitat by the removal of eelgrass, deepening of shallow subtidal and increased shading would be mitigated (see attachments for the specific breakdown of habitat affected and mitigation using the Navy Eelgrass Mitigation Bank).

Dredging, sediment disposal, demolition, and pile-driving activities for the Proposed Action would cause minor and short-term impacts to existing unvegetated soft-bottom benthic communities within the Approach Area, Turning Basin, and the Sump of the south berth of the Mole Pier. Organisms occurring in

the immediate area would be lost or displaced during dredging activities, either directly by equipment and noise associated with these activities or indirectly by exposure to short-term changes in suspended sediments, turbidity, dissolved oxygen, or light diffusion. Elevated turbidity levels and associated resuspended sediments would decrease to background levels within a period of several hours after dredging activities cease (USACE 2009, 2012). Potential impacts to plankton communities could include a localized decrease in primary productivity due to reduced photosynthesis. However, sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance and would persist for the duration of dredging activities. Turbidity would vary spatially based on currents and sediment grain size. Increased turbidity would have relatively minor, localized, and temporary adverse effects on benthic or water column habitats in the project area footprint of the Mole Pier site. The proposed dredge area in the Approach Area, the Turning Basin, and the Sump is, and would remain, deep subtidal habitat at depths greater than -20 feet MLLW at the south berth of the Mole Pier. As such, no permanent change in habitat would result from the proposed dredging activities.

As discussed above, dredging at the MGBW maintenance piers location would remove an existing shallow subtidal benthic community and eelgrass habitat. Demolition is not proposed at this site; pile installation during mooring dolphin and bridge construction would both cause temporary disturbance to fish in the area and would displace benthic habitat with new piles. As previously discussed, dredging may have adverse impacts to EFH with the removal of eelgrass. Removal of the eelgrass bed will be mitigated using the Navy Eelgrass Mitigation Bank.

A survey for *Caulerpa* consistent with NMFS and California Department of Fish and Wildlife (CDFW) requirements would be conducted before initiating in-water project activities (NMFS 2008). If *Caulerpa* is found in the project area during this survey, NMFS-approved *Caulerpa* Control Protocols would be followed. Therefore, implementation of the Proposed Action would not result in significant impacts to special aquatic sites associated with the spread of *Caulerpa*.

Impacts to fish communities in the project area would be primarily associated with noise and disturbance of bottom sediments and unvegetated habitat during demolition, and unvegetated and vegetated habitats during dredging and pile-driving activities. Sediment resuspension and increased turbidity would be limited to the areas of bottom disturbance and would persist for several hours following the disturbance. Fish present during project activities are capable of avoiding project equipment and areas affected by increased turbidity and increased noise from dredging. Greater potential for impacts would exist if there were substantial amounts of fine sediments and organisms in the potential dredging areas. Subject to the terms and conditions identified in the project-specific CWA Section 404 and RHA Section 10 permits issued by USACE, precautionary measures would be implemented to minimize turbidity associated with dredging activities. Precautionary measures may include operational controls implemented by the dredge operator, such as reducing bucket speed. A turbidity threshold may be adopted or alternative measures identified during the project-specific USACE permitting process would be implemented. Impacts to fish species would be temporary and limited in nature because of the focused duration of dredging activities, restriction to dredging during nighttime hours, and the quantity of sediment (251,121 cy) dredged in an approximately 10.34-acre area of San Diego Bay. Therefore, implementation of the Proposed Action would not result in significant impacts to fish communities.

Fish species occurring in the immediate area would be displaced during project activities, either directly by equipment and noise associated with these activities or indirectly by short-term changes in suspended sediments, turbidity, dissolved oxygen, and light diffusion. Based on previous studies conducted in both

coarse sand/gravel and unconsolidated sediment, the noise associated with bucket/clamshell dredging operations is anticipated to measure up to 124 dB for the bucket contacting the bottom at a distance of 493 feet (150 meters) (Dickerson et al. 2001). Extrapolating back to the source (assuming the same rate of transmission loss as discussed previously for pile driving) suggests a 33-foot (10-meter) source level of approximately 142 dB, well below the hypothetical 150 dB disturbance threshold. Impacts to fish from underwater noise would have a limited geographic and temporal scale, and fish species would be displaced, if at all, only a very short distance during dredging activities. Impacts to EFH under the MSFCMA are discussed below.

Four managed coastal pelagic fish species (jack mackerel, northern anchovy, Pacific mackerel, and Pacific sardine) and six managed groundfish species (curlfin sole, California scorpionfish, English sole, grass rockfish, leopard shark, and soupfin shark) are likely to occur in the project area (Navy 2000; Allen et al. 2002; Pondella and Williams 2009a and 2009b; Williams et al. 2016). Northern anchovies and Pacific sardines can be found throughout San Diego Bay and were recorded at both dry dock locations (Allen et al. 2002). Jack mackerels were found only on the North Bay survey area and Pacific mackerels were found at all locations except south bay (Allen et al. 2002). All of these species are highly transient, are not tied to artificial substrates, and routinely experience turbid and noisy conditions from natural processes and ship traffic within San Diego Bay. Impacts from demolition at the Mole Pier site and dredging and pile-driving activities at both dry dock locations would be the same as those described for other fish communities in the fisheries discussion above. Namely, noise associated with these activities would temporarily displace EFH species within a limited scope, and equipment and piles in the water would likely cause fish to avoid that area and thus no fish would be injured. Other effects would occur from increased suspended sediments and turbidity and increased underwater noise levels from demolition, dredging, and pile-driving activities. These impacts would result in minimal adverse effects to coastal pelagic EFH but may result in adverse effects to Pacific Coast groundfish EFH with the removal of eelgrass which is an HAPC per the MSFCMA.

As discussed previously, turbidity plumes would be expected to persist for several hours following disturbance. Subject to the terms and conditions in the project-specific USACE CWA Section 404 and RHA Section 10 permits, avoidance and minimization measures would be implemented to alleviate turbidity associated with dredging activities. Avoidance and minimization measures may include turbidity monitoring or other alternative measures developed during the USACE permitting process. A turbidity threshold would be adopted, or alternative measures identified during the project-specific USACE permitting process would be implemented.

Although the outer edges of piers support increased fish biomass, abundance, and species richness, EFH species expected to occur at the Mole Pier site are highly mobile and are not closely tied to artificial substrates. Species within the MGBW maintenance piers location and existing eelgrass are also likely to avoid the area with implementation of pre-dredging measures to provoke fish to leave the area.

An indirect effect of the temporary reduction in invertebrate populations would be a reduction in forage base for fish and other organisms feeding on invertebrates. Nevertheless, colonization of the sands would begin almost immediately, and development of the invertebrate prey base would proceed naturally. The Proposed Action would result in the disposal of 251,121 cy of sediment at a nearshore replenishment site(s). Replenishment would occur at one or more potential sites along an approximately 12-mile stretch of beach. Therefore, because of the relatively rapid recovery rates of sandy subtidal invertebrates, direct and indirect impacts to marine organisms within the replenishment site are expected to be less than

significant. Further, nearshore replenishment provides beneficial beach nourishment, which is ultimately positive for marine organisms and coastal ecology. The nearshore replenishment sites and LA-5 ODMDS have been previously reviewed and permitted for replenishment activities (San Diego Association of Governments [SANDAG] 2008) and dredged sediment disposal (USEPA 1987). During that process, evaluations for these sites as receiving locations for dredge deposit had been performed for impacts to habitat, and BMPs have been identified for implementation during dredge deposition. Implementation of the Proposed Action would follow all required protocols established at replenishment/disposal sites. Hence, there would be minimal, short-term adverse effects on EFH from dredging per the MSFCMA at the Mole Pier site but potential adverse effects to EFH at the MGBW maintenance piers location. With the implementation of mitigation for habitat conversion (removal of eelgrass, deepening of shallow subtidal and increased shading) using the Navy Eelgrass Mitigation Bank, the overall impacts would not be significant under NEPA.

4.4 Consideration of Additional Conservation Measures

4.4.1 Consideration of NMFS (2013) Programmatic EFH Conservation Recommendations

Although the Programmatic EFH Consultation developed by NMFS for the USACE permitting of overwater structures in Southern California waters (NMFS 2013) does not procedurally apply to the Navy, the discussion of adverse effects and proposed conservation measures have been used to serve as points of discussion and analysis to this Proposed Action:

1. The MGBW maintenance piers location contain seagrass (eelgrass) and thus dredging at that location would result in an adverse effect to the groundfish HAPC through removal of eelgrass.
2. The Proposed Action would result in approximately 3 acres of shading over existing deep subtidal habitat that is partly shaded at present and lacks complex natural or manmade structures; and the shading of approximately 2.1 acres of former shallow water habitat converted by dredging to moderately deep and deep subtidal habitat. The fish community of this habitat in the south part of San Diego Bay is relatively poor in terms of the diversity and abundance of species with designated EFH (Allen et al. 2002; Merkel & Associates 2014).

As recommended by NMFS during the previous EFH consultation for Pier 8 replacement, the following provides the Navy's detailed consideration of the conservation recommendations developed in the Programmatic EFH Consultation for Overwater Structures (NMFS 2013). For the sake of completeness, the NMFS measures are reproduced in their entirety, followed by Navy responses in **bold**.

General Recommendations

1. All overwater structure construction (including in-kind replacement) should be required to follow eelgrass monitoring requirements put forth in the California Eelgrass Mitigation Policy (CEMP). Exceptions may be granted for areas that USACE and NMFS believe are highly unlikely to support eelgrass habitat. **See measures and discussion below.**
2. Given the significant alteration of existing shoreline and shallow water habitats in southern California, all overwater structures should be water dependent. Proposed projects should clearly explain their water dependency and why the project is in the public's best interest. **The project is water dependent because it is not feasible to move Navy ships out of the water onto land**

for maintenance. The project is in the public's best interest under Title 10 of the United States Code, which requires the Navy to maintain its ships pursuant to the national defense.

3. As part of the project application, the proponent should describe how their proposal addresses the specific conservation recommendations identified below. NMFS recognizes that not all conservation recommendations will be relevant in all situations. Therefore, the proponent should clearly articulate when a particular recommendation is not applicable to the proposed project. Based upon the project application, USACE should determine whether the project implements appropriate conservation recommendations and, therefore, can be covered by this programmatic consultation. **See measures and discussion below.**

Mooring Anchors and Persistently Moored Vessels

For all projects, the project proponent should strive to implement avoidance measures to the extent feasible. When avoidance measures are not feasible, minimization measures should be implemented:

Avoidance

1. Mooring anchors placed within suitable submerged aquatic vegetation (SAV) habitat should use midline floats to prevent chain scour to the substrate. This action will prevent adverse impacts to SAV and other benthic habitat. **SAV is not present within the Mole Pier site but, as of 2019, SAV, specifically an eelgrass bed covering 0.83 acre, was present within the proposed dredging footprint of the MGBW maintenance piers location. This bed would be removed by dredging. The net loss of eelgrass would be mitigated in accordance with the CEMP using the Navy Mitigation Bank.**
2. Persistently moored vessels that are moored over SAV or rocky reef habitats with less than 18 inches between the bottom of the vessel and the substrate at low tides should utilize float stops. This action will prevent adverse grounding impacts to benthic habitat. **Rocky reef habitats do not occur. See preceding measure for eelgrass mitigation.**

Minimization

1. Mooring anchors placed within suitable SAV habitat should use midline floats to prevent chain scour to the substrate. This action will prevent adverse impacts to SAV and other benthic habitat. **Not applicable given proposed mitigation for eelgrass removal.**
2. Persistently moored vessels that are moored over SAV or rocky reef habitats with less than 18 inches between the bottom of the vessel and the substrate at low tides should utilize float stops. This action will prevent adverse grounding impacts to benthic habitat. **Not applicable given the absence of rocky reef habitat and proposed eelgrass mitigation.**

Pile Removal and Installation

Minimization

1. When feasible, remove piles with a vibratory hammer rather than a direct pull or clamshell method. **The piles would be removed using dry pulling, with the assistance of a vibratory hammer or high pressure water jetting to loosen piles as needed, which would be the case only if the piles were heavily coated with mud. Otherwise, if the piles can be easily removed by crane, indicating they are relatively free of mud, use of the vibratory hammer would not**

be feasible because it would be substantially slower and would not result in a meaningful reduction in sediment resuspension.

2. Slowly remove pile to allow sediment to slough off at or near the mudline. **This action would be completed.**
3. Hit or vibrate the pile first to break the bond between the sediment and the pile to minimize the likelihood of the pile breaking and to reduce the amount of sediment sloughed. **This action would be completed.**
4. Encircle the pile with a silt curtain that extends from the surface of the water to the substrate, where appropriate and feasible. **This action is not proposed because currents are weak in the Mole Pier and the MGBW maintenance piers location: speeds range from 2 inches (5 cm) per second near the quay wall to 4-6 inches (10-15 cm) per second between the piers (Navy 1999). Sediments resuspended by pile removal/installation and construction vessel movements would settle out around the nearby Navy piers, where sediment and marine water quality conditions are similar to those at the south berth of the Mole Pier and MGBW maintenance piers location (i.e., industrial marine facilities where water and sediments are not pristine).**
5. If contaminated sediment occurs in the footprint of the proposed project, cap all holes left by the piles with clean native sediments. **This action is not proposed because the holes would fill rapidly as a result of inward collapse of the unconsolidated sediments as a pile is removed; Furthermore, due to the continuing project-related activities, and tidal currents in the area, any sediment added to the holes may enter the water column and increase suspended sediment loads.**
6. Drive piles during low tide periods when substrates are exposed in intertidal areas. This action minimizes the direct impacts to fish from sound waves and minimizes the amount of sediments resuspended in the water column. **Not applicable because all of the piles would be in deep water (shallow areas would be dredged prior to pile installation).**
7. Use a vibratory hammer to install piles, when possible. Under those conditions where impact hammers are required (i.e., substrate type and seismic stability) the pile should be driven as deep as possible with a vibratory hammer prior to the use of the impact hammer. This action will minimize noise impacts. **A vibratory hammer or high pressure water jetting method would be used whenever dictated by the engineering analysis and considerations of time and cost, taking into account the substrate, drivability of the pile type by impact versus vibratory, and capacity requirements. The contractor would have discretion on when to switch to impact hammering. In particular, piles installed by vibratory driver generally need to be “proofed” by impact driving to ensure bearing capacity requirements are met. It is appropriate for the contractor to determine what is the appropriate depth for vibratory driving, allowing the pile to be finished by impact driver.**

Pile Supported Over-water Structures

For all projects, the project proponent should strive to implement avoidance measures to the extent feasible. When avoidance measures are not feasible, minimization measures should be implemented:

Avoidance

1. To the maximum extent practicable, site overwater structures in areas not occupied by or determined to be suitable for sensitive habitat (e.g., SAV, salt marsh, intertidal flats). **Removal of SAV by dredging prior to construction at the MGBW maintenance piers location would be mitigated in accordance with the CEMP using the Navy Mitigation Bank.**
2. Any cross or transverse bracing should be placed above the mean higher high water (MHHW) to avoid impacts to water flow and circulation. **Does not apply.**

Minimization:

1. Minimize, to the maximum extent practicable, the footprint of the overwater structure. The overwater structure should be the minimum size necessary to meet the water-dependent purpose of the project. **Pier construction is not required at either site. Overwater coverage would be minimized by installing mooring dolphins at both locations and pedestrian and vehicle bridges at the MGBW maintenance piers location.**
2. Design structures in a north-south orientation, to the maximum extent practicable, to minimize persistent shading over the course of a diurnal cycle. **Not feasible.**
3. For residential dock and pier structures, the height of the structure above water should be a minimum of 5 feet above MHHW. **Not applicable.**
4. For residential dock and pier structures, the width of the structure should be limited to a maximum of 4 feet wide. Exceptions may be provided to comply with the Americans with Disabilities Act. **Not applicable.**
5. For residential dock and pier structures, one turnaround is permitted not exceeding 10 feet long and 6 feet wide, or 60 square feet. The turnaround is intended to accommodate efficient unloading/loading of boating equipment and is not intended to be used for non-water-dependent uses. **Not applicable.**
6. For residential dock and pier structures, a terminal platform should not exceed 5 feet long by 20 feet wide, or 100 square feet. **Not applicable.**
7. Extend the structure's terminal platform into nearest adjacent deep water to minimize the need for dredging and to minimize the likelihood of boat grounding, propeller scar/scour in shallow water habitat. **The Mole Pier location is in deep water. The MGBW maintenance piers location would require dredging to create deep water for accommodating maintenance at a dry dock at that location.**
8. Use the fewest number of piles practicable for necessary support of the structure to minimize pile shading, substrate impacts, and impacts to water circulation. Pilings should be spaced a minimum of 10 feet apart on center. **The project design involves a relatively small number of piles, the spacing of which, however, is dictated by engineering and safety requirements.**
9. Gaps between deck boards should be a minimum of 0.5 inch. If the overwater structure is placed over SAV or salt marsh habitat, 1-inch deck board spacing or use of light transmitting material with a minimum of 40 percent transmittance should be used. Exceptions may be provided to comply with the Americans with Disabilities Act. **Not applicable.**
10. The use of floating dock structures should be minimized to the extent practicable and should be restricted to terminal platforms placed in the deepest water available at the project site. **The**

project sites will be in deep water maintained by dredging and a site that will be dredged to accommodate dry dock requirements.

11. Incorporate materials into the overwater structure design to maximize light transmittance. When suitable SAV habitat is within the project vicinity, appropriate grating should be used to permit sufficient light for SAV production. **Not applicable because the depth of water at the Mole Pier site does not support SAV habitat; the eelgrass present within the MGBW maintenance piers location will need to be removed but removal would be mitigated.**

4.4.2 Additional Proposed Measures

To reduce and avoid the potential impacts to FMP species, the following measures would be implemented to minimize impacts:

- A cable net and floating boom would be used to capture debris that falls into the water during pier demolition. Such debris would be collected and disposed of onshore.
- Spill kits and cleanup materials would be present during construction should there be a spill of hazardous materials or liquid into the surrounding water.
- The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure that no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil, or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site.
- All debris would be transported to, and disposed of, at an appropriate upland disposal site, or recycled, if appropriate.
- During project implementation, the Navy would regularly monitor construction activities to ensure that no deviations from the project as described herein are occurring. The Navy would report any violation of authorized impacts to NMFS within 24 hours of occurrence.

4.5 Conclusion

As described in the effects analysis above, the Navy has determined that the project may have relatively minor but adverse temporary and permanent effects on EFH for federally managed fish species within the Coastal Pelagic Species and Pacific Coast Groundfish FMPs. Impacts to EFH through removal of eelgrass, habitat conversion from shallow to deep water and increase in bay shading would be mitigated using the Navy Eelgrass Mitigation Bank. A combined 1.141 acres (1.073 for MGBW and 0.068 for Mole Pier) of the Navy Eelgrass Mitigation Bank will be used to offset the adverse effects. The two attached documents (Bay Habitat Mitigation Planning for Commercial Out Lease of a Floating Dry Dock at the MGBW Maintenance Piers in San Diego Bay, California and NBSD Mole Pier Floating Dry Dock Ecological Functional Loss Analysis and Potential for Offsetting Mitigation Employing the NEMS Bank) layout the scientific justification for the offsetting mitigation.

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Meisinger, Nick

To: Seneca, Lisa A CIV USN NAVFAC SW SAN CA (USA)
Subject: RE: EFHA for NBSD Floating Drydock Project

From: Eric Chavez - NOAA Federal <eric.chavez@noaa.gov>

Sent: Tuesday, April 14, 2020 4:03 PM

To: Suk, S H (Sean) CIV USN NAVFAC SW SAN CA (USA) <seung.suk@navy.mil>

Cc: Dan Lawson - NOAA Federal <dan.lawson@noaa.gov>; Seneca, Lisa A CIV USN NAVFAC SW SAN CA (USA) <lisa.seneca@navy.mil>; Basinet, Richard J CIV USN NAVFAC SW SAN CA (USA) <richard.basinet@navy.mil>

Subject: Re: [Non-DoD Source] Re: EFHA for NBSD Floating Drydock Project

Sean,

NOAA's National Marine Fisheries Service (NMFS) has reviewed the U.S. Department of the Navy (Navy) Essential Fish Habitat (EFH) Assessment for the Floating Dry Dock Project at Naval Base San Diego (NBSD), located in south-central San Diego Bay, California (proposed project). NMFS has also reviewed other relevant information, including the "*Bay Habitat Mitigation Planning for Commercial Out Lease of a Floating Dry Dock at the MGBW Maintenance Piers in San Diego Bay, California*" prepared by Marine Taxonomic Services, Ltd., the "*NBSD Mole Pier Floating Dry Dock Ecological Functional Loss Analysis and Potential for Offsetting Mitigation Employing the NEMS Bank or New Eelgrass Restoration*," and the "*Supplemental Analysis for Ecological Functional Loss Associated with Water Column Shading by the NBSD Mole Pier and MGBW Floating Dry Docks*," both prepared by Merkel & Associates, Inc. (Mitigation Plans).

The proposed project includes the installation and operation of two steel floating dry dock facilities on NBSD, including all required dredging and sediment disposal, as well as all required demolition and construction activities. One dry dock will be located at the south berth of the Mole Pier, while the second would be installed at a commercial outlease location near the Marine Group Boat Works, LLC (MGBW) maintenance piers. Dredging activities would include the removal of approximately 86,121 cubic yards (cy) of sediment at the Mole Pier and 165,000 cy of sediment at the MGBW maintenance piers using a barge-mounted clamshell dredge. Options for dredge disposal include beneficial reuse, ocean disposal, or upland disposal; with beneficial reuse being the current preferred option pending the results of future sediment testing. Prior to dry dock installation, existing wharf decking and mooring dolphins at the Mole Pier site will be partially demolished using a hydraulic cutter or pile clipper to cut piles at the mudline and remove them via crane. Construction of the floating dry docks includes installation of new mooring dolphins and fendering upgrades to existing wharf structures, and installation of access structures at the MGBW site. Pile installation, which will involve a combination of impact and vibratory hammer, will include 32 (24-inch) octagonal concrete piles, 2 (24-inch) steel round pipe piles, and 2 (16-inch) steel round pipe piles at the Mole Pier site, while the MGBW site will require 32 (24-inch) octagonal concrete piles, 8 (24-inch) steel piles, 2 (24-inch) steel piles, and 24 (24-inch) octagonal concrete piles. Overall, the proposed project at the two locations would result in dredging of approximately 251,121 cy over a 10.34 acre footprint (4.79 acres and 5.55 acres at Mole Pier and MGBW, respectively), 5.1 acres of shading (3 acres and 2.1 acres at Mole Pier and MGBW, respectively), and 0.83 acre of eelgrass impacts at MGBW. Project activities associated with the MGBW dry dock are currently scheduled to begin as early as the fall (September) of 2020, whereas project activities associated with the NBSD Mole Pier dry dock are currently projected to occur some time after the spring of 2024.

The proposed project occurs in EFH for various federally managed fish species within the Pacific Coast Groundfish and Coastal Pelagic Species Fishery Management Plans (FMPs). In addition, the project occurs within an estuary and eelgrass habitat, which have been designated as habitat areas of particular concern (HAPCs) for various federally managed fish species within the Pacific Coast Groundfish FMP. Designated HAPC are not afforded any additional regulatory protection under the Magnuson-Stevens Fishery Conservation and Management Act; however, federal projects with potential adverse impacts to HAPC are more carefully scrutinized during the consultation process.

Project related activities that may adversely affect EFH include dredging, disposal of dredge material, increased coverage from overwater structures, and pile installation and removal. Adverse effects to EFH from dredging include direct

removal and/or burial of organisms and habitats, turbidity, and/or siltation, contaminant release and uptake, release of oxygen consuming substances, entrainment, noise disturbance, and alteration to hydrodynamic regimes and physical habitat. Increased shading from the addition of large overwater structures would decrease productivity and have adverse impacts to the physical and biological elements of EFH. Of primary concern to NMFS are the loss of eelgrass habitat, conversion of intertidal and shallow subtidal habitat to moderately deep and deep subtidal habitat (as characterized in the San Diego Bay Integrated Natural Resource Management Plan) to allow the installation and operation of the dry docks, and an increase in shading of bay waters from new overwater structures. However, the proposed project includes conservation measures to avoid, minimize, or offset those impacts. Specifically, the aforementioned Mitigation Plans propose to use .084 acre (Mole Pier) and 1.084 acre (MGBW) of credits from the Navy's San Diego Bay Eelgrass Mitigation Bank to offset the impacts associated with the direct loss of eelgrass habitat, conversion of shallow water habitat to deeper water, and shading impacts from the two new dry dock structures. NMFS has reviewed the Mitigation Plans and does not object to the proposed compensatory mitigation. Therefore, as long as the proposed conservation measures are implemented, including the compensatory mitigation, we have no additional EFH Conservation Recommendations to provide at this time. Thank you for consulting with NMFS.

Regards,

Eric

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Eric Chavez

NOAA Fisheries West Coast Region

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