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**NATIONAL MARINE FISHERIES SERVICE**  
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Regulatory Office, Building 230  
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DEC 06 2018

RE: Endangered Species Act 7(a)(2) consultation on the Kapalama Container Terminal Wharf and Dredge Project, Honolulu Harbor, Honolulu, Island of Oahu, Hawaii. (PIR-2018-10346, I-PI-18-1632-AG, POH-2012-00081).

Dear Ms. Paahana:

On May 29th, 2018, NOAA's National Marine Fisheries Service (NMFS) received your written request for concurrence that the U.S. Army Corps of Engineers (Corps) proposed Kapalama Container Terminal Wharf and Dredge Project, is not likely to adversely affect the following ESA-listed or candidate endangered or threatened species, or critical habitat that has been designated or proposed for those species under our jurisdiction: green sea turtles (Central North Pacific Distinct Population Segments (DPS)), hawksbill sea turtle; Hawaiian monk seals; Hawaiian monk seal critical habitat; oceanic whitetip shark; giant manta ray; fin, blue, sei and sperm whales; Main Hawaiian Island insular false killer whale and their designated critical habitat. This response to your requests was prepared by NMFS pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 *et seq.*), implementing regulations at 50 CFR 402, and agency guidance for the preparation of letters of concurrence.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System [<https://pcts.nmfs.noaa.gov>]. A complete record of this consultation is on file at the Pacific Island Regional Office, Honolulu, Hawaii.

#### Proposed Action

The proposed improvements include constructing two docks for overseas container ships and two docks for interisland barges along a common wharf with modern infrastructure for container loading, offloading, storage, and transshipment. Specifically, the following proposed activities require a Department of the Army (DA) permit to achieve the project purpose:

- A total of 972 meters (m) (3,190 feet (ft)) of sheet/king pile installed in uplands and waters of the U.S. to armor the shoreline and construct the new bulkhead for the wharf.
- Dredging in waters of the U.S. and excavation in uplands to remove a total of



319,740 cubic meters (m<sup>3</sup>) (417,900 cubic yards (yd<sup>3</sup>)) of material. The total dredging and excavation area is 8.42 acres, which consists of 11,250 square meters (m<sup>2</sup>) (2.78 acres) of fast land and 22,832 m<sup>2</sup> (5.64 acres) of soft benthic substrate in waters of the U.S.

- Permanent discharge of dredged and fill material into 10,077 m<sup>2</sup>. (2.49 acres) of waters of the U.S. to fill in the enclosed Snug Harbor, Rail Slip and Pier 40F.
- A total of 757 m<sup>3</sup> (990 yd<sup>3</sup>) of rock permanently discharged in shallow water over 409 m<sup>2</sup> (4,400 ft<sup>2</sup>) of waters of the U.S. at the west end of Pier 43 near the northern abutment of the Sand Island Bridge for scour protection.
- A total of 151,700 m<sup>3</sup> (198,400 yd<sup>3</sup>) of dredged material would be transported for ocean disposal at the South Oahu Offshore Dredged Material Disposal Site (SOODMDS). The remainder of the dredged/excavated material would be disposed of in uplands. New utility lines, including water lines beneath the harbor channel, other appurtenant structures (e.g. bollards, ladders, fenders, etc.), and temporary Best Management Practice (BMP) measures would also be installed in, over, or under navigable waters to complete the Project.
- A total of 8.13 acres of waters of the U.S. would be directly and permanently impacted by new wharf construction activities, including permanently filling 10,077 m<sup>2</sup> (2.49 acres) of waters of the U.S. to construct new wharf structures.

To minimize total area of waters of the U.S. filled and converted to uplands to construct the docks, Hawaii Department of Transportation Harbors Division (DOT-Harbors) has proposed the excavation of uplands to create and expand the area of waters of the U.S. by 11,254 m<sup>2</sup> (2.78 acres). Overall, the Project would yield a total net gain of 1,174 m<sup>2</sup> (0.29 acres) of waters of the U.S.

#### Construction Phases of the action

The proposed action is divided into the following 8 general construction phases:

1. Waterline Installation beneath Kalihi Channel
2. Demolition of Existing Shoreline Facilities
3. Shoreline Bulkhead Construction and Sand Island Bridge Scour Protection
4. Enclosing and Filling Snug Harbor, the Rail Slip, and Pier 40F
5. Shoreline Excavation
6. Harbor Dredging
7. Dredged Spoils Disposal
8. Wharf Infrastructure and Surface Facilities Construction

Construction is planned to begin in 2018 and would require 36 months to complete the overlapping construction phases.

#### Waterline Installation beneath Kalihi Channel

Two new, 12 to 16-inch diameter High Density Polyethylene (HDPE) water lines would be installed approximately 50 to 70 feet beneath the Kalihi Channel bottom using entry and exit pits located in uplands of both the Project area and Sand Island via Horizontal Directional Drilling (HDD). The new water lines would replace existing 12-inch and 16-inch diameter water lines

owned by the Honolulu Board of Water Supply, currently proposed for abandonment in place up to the new sheet-pile bulkhead. The Honolulu Board of Water Supply (HBWS) waterlines will be abandoned after the two new waterlines are installed and connected to the existing HBWS water system.

#### Demolition of Existing Shoreline Facilities

All existing man-made structures occurring in waters of the U.S. along the shoreline, including 452 concrete piles, sheet-pile bulkheads, in-water concrete debris, rail-slip hardware and foundations, wharf pavement and other deleterious concrete structures would be completely removed from the existing 1,277-m (4,190-ft.) long shoreline. All demolition waste generated on site would be disposed of at an approved upland facility or reused as on-site fill, where appropriate.

#### Shoreline Bulkhead Construction and Sand Island Bridge Scour Protection

A king pile and sheet pile wall with a total length of 972 m (3,190 ft.) would be driven into the substrate by impact and/or vibratory hammer from the west end of Pier 43 to the junction of Piers 42 and 41 and along the new face of Pier 41 to its junction with Pier 40. Most of the wall would be installed within uplands well inland of the existing shoreline. In-water pile installation would occur across the mouth of Snug Harbor and the Rail Slip and along Pier 40F. To protect against scouring, the west end of Pier 43 near the Sand Island Bridge would be lined with a 409 m<sup>2</sup> revetment constructed of a three-foot layer of quarry rock overlain by a 5-ft thick layer of armor stone.

#### Enclosing and Filling Snug Harbor, the Rail Slip, and Pier 40F

A temporary, in-water, sub-surface rock dike will be constructed across the mouth of Snug Harbor, the Rail Slip and Pier 40F to permit vessel access for fill activities, and contain fill material within the fill area. In addition, a turbidity curtain will be erected water-ward of the rock dike and opened only to allow entry and exit of fill vessels, with complete closure during fill activities. The temporary rock dike will be buried in place. Initially, Snug Harbor would be partially filled with dredged material by direct deposition from hopper barges prior to the installation of the sheet/king pile wall across the harbor mouth. The balance of the fill to Snug Harbor, the Rail Slip and Pier 40F would be dredged spoils and excavated materials placed within the pile walls. Additional dredged material would be added as surcharge to the top of the fill areas to compress the fill. The total area of waters of the U.S. that would be filled and permanently converted to uplands is 2.49 acres.

#### Shoreline Excavation

A 2.78-acre area of existing fast land would be excavated from the existing shoreline at Piers 41, 42 and 43 back to the new wharf face. The excavation activities would result in the permanent conversion of 2.78 acres of uplands to waters of the U.S., and result in a net gain of 0.29 acres of waters of the U.S.

#### Harbor Dredging

Material that cannot be excavated from the shoreline would be dredged from the harbor using barge-mounted equipment to achieve the design depths of -30 and -40-feet MLLW, plus two-foot over-dredge. Dredging would be achieved using mechanical means, specifically, a clamshell

dredge with an “environmental bucket” (fitted with a lid) to minimize inadvertent discharges into the water column. Neither cutter-head nor suction dredge is proposed. The total excavated and dredged quantity would be approximately 319,740 m<sup>2</sup> (417,900 yd<sup>3</sup>) of uplands and in-water sediments.

#### Offshore or upland disposal of excess dredged spoils

Significant quantities of dredged materials generated from this action will be disposed of at the SOODMODS offshore of the Island of Oahu (21.252° N; 157.947° W). The United States Environmental Protection Agency (USEPA) is responsible for designating and managing ocean dumping sites under the Marine Protection, Research and Sanctuaries Act. Ocean Dredged Material Disposal Sites (ODMDSs) which are selected to minimize the impacts of the disposed material on human health and the marine environment. USEPA Region IX, has engaged in pre-consultation technical assistance for an ESA Section 7 consultation on five existing ODMDSs in the main Hawaiian Islands with the Interagency Cooperation and Consultation Branch of the Pacific Island Regional Office (USEPA 2018). The USEPA has provided NMFS monitoring reports for the ODMDSs off Oahu, Maui, Hawaii, and two sites off of Kauai. For dredging projects occurring prior to a finalized ODMDS consultation with USEPA, NMFS will assess potential effects of dredged material disposal, based on these monitoring reports and other available information, as effects of the dredging action.

The USEPA has issued a suitability determination and conditional concurrence dated July 14, 2015, and correction to this determination and concurrence dated August 13, 2015, approving DOT-Harbors’ proposed disposal of dredged material at SOODMDS. The conditions prescribed by the USEPA would become required special conditions of the DA permit, if issued.

#### Wharf infrastructure and surface facilities construction

Under the greater Kapalama Container Terminal project, the new wharf would be topped with a 21-inch thick reinforced concrete deck and infrastructure capable of supporting the cranes and other equipment necessary to operate a modern container terminal. The wharf infrastructure would also include on-site drainage facilities equipped with storm water treatment systems designed to treat storm water runoff from the new wharf.

#### Construction Sequence

The following construction sequence is based on a likely sequence of general construction activities for the project. The construction sequence could vary based on the contractor selected and the contractor’s operations and means and methods. Some construction activities listed separately below may occur simultaneously with others or may be shifted around in sequence.

1. Install applicable construction BMPs prior to commencement of associated construction activities.
2. Conduct demolition work.
3. Construct wharf structure at Piers 41 and 40F.
  - a) Install king pile-sheet pile bulkhead system.
  - b) Construct anchor blocks, CIDH piles, and tie-back system.
4. Install closure dike at Snug Harbor.
5. Dredge area at Piers 41 and 40F.

6. Place dredge material from Piers 41 and 40F in Snug Harbor and upland disposal site.
7. Install stone column ground improvements at Piers 41 and 40F.
8. Construct wharf structure at Snug Harbor.
  - a) Install king pile-sheet pile bulkhead system.
  - b) Construct anchor blocks, CIDH piles, and tie-back system.
9. Construct wharf structure at Piers 42 and 43 and install structural portion of slope protection measures at west end of Pier 43.
  - a) Install king pile-sheet pile bulkhead system.
  - b) Construct anchor blocks, CIDH piles, and tie-back system.
10. Install stone column ground improvements at Piers 42 and 43.
11. Dredge area at Piers 42 and 43.
12. Place dredge material from Piers 42 and 43 in Snug Harbor, existing rail slip, Pier 40F, upland fill sites, and SOODMDS (process coralline material as needed prior to placement).
13. Place surcharge material at fill sites for minimum required surcharge durations.
14. Install stone column ground improvements at Snug Harbor.
15. Construct rock revetment slope protection measures at west end of Pier 43.
16. Remove surcharge material and dispose of at SOODMDS or upland facility.
17. Conduct civil site work.
  - a) Install utility systems.
  - b) Install post-construction BMPs (stormwater treatment units).
  - c) Construct concrete wharf deck/pavement.
  - d) Install fenders, bollards, and ladders.
18. Remove temporary construction BMPs.

#### Action Area

The proposed action area consists of consists of the in-water work areas to be directly impacted by the proposed action (8.13 acres), the marine waters within 50 yd seaward of this area and the transit corridor between the harbor and the ocean disposal site south of Oahu (Figures 1-4). The action area includes the estimated in-water area within a 100 yd radius around all auxiliary small crafts, and a 100 yd radius around personnel in the water, including transit paths for all vessels. Furthermore, the action area also includes the down-current extent of plumes that may result from discharges of wastes or toxic chemicals such as fuels and/or lubricants from any vessel.



**Figure 1.** Kapalama Container Terminal Wharf and Dredging Location Map. Source: USACOE 2018.

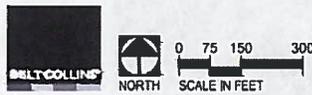
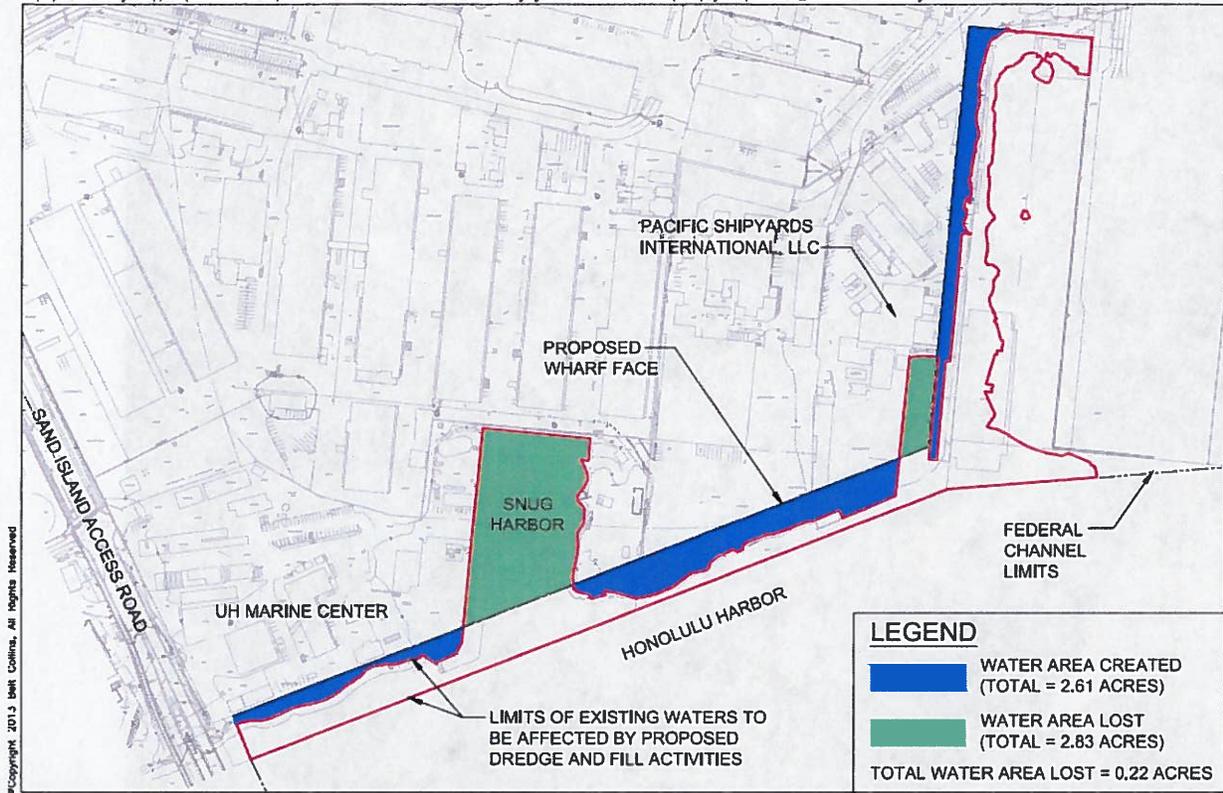


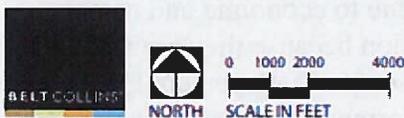
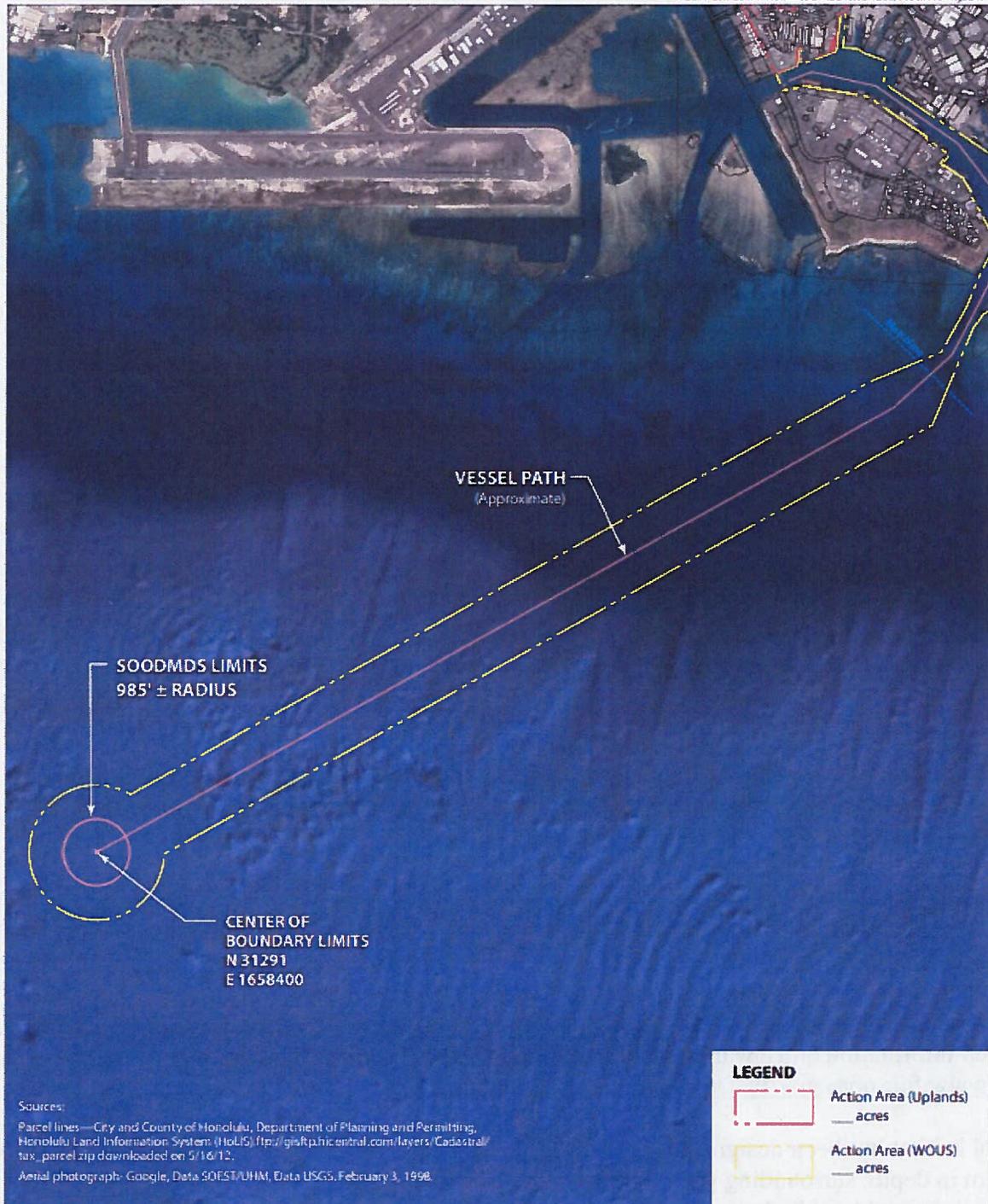
Figure 2  
**PROJECT WATERS**  
 KAPĀLAMA CONTAINER TERMINAL WHARF AND DREDGING  
 DEPARTMENT OF THE ARMY PERMIT APPLICATION  
 Department of Transportation, Harbors Division  
 November 2013

**Figure 2:** Existing and Proposed New Shoreline and Makai Boundary of Project Area. Green areas would be filled, blue areas would be excavated. Source: USACOE 2018.



**Figure 1**  
**PROPOSED ACTION AREA – 1**  
Kapalama Container Terminal Wharf and Dredging

**Figure 3:** Expected vessel transit path through Honolulu Harbor to the ocean disposal site  
Source: USACOE 2018.



**Figure 2**  
**PROPOSED ACTION AREA – 2**  
Kapālama Container Terminal Wharf and Dredging

**Figure 4.** Approximate expected vessel travel path from dredging location to the offshore dumping site. Source: USACOE 2018.

## Listed Species

The Corps determined that the ESA-listed and proposed threatened and endangered species under NMFS jurisdiction listed in Table 1 can be expected to occur in waters of the action area and may be present in the area at the time of the proposed actions.

**Table 1.** Scientific name, ESA status, listing date, and Federal Register reference for ESA-listed species considered in this consultation for the waters off Hawaii.

Species	Scientific Name	ESA Status	Listing Date	Federal Register Reference
Hawaiian Monk Seal <sup>1</sup>	<i>Neomonachus schauinslandi</i>	Endangered	11/23/1976	41 FR 51612
Green Sea Turtle Central North Pacific DPS	<i>Chelonia mydas</i>	Threatened	7/28/1978	43 FR 32800
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	Endangered	7/28/1978	43 FR 32800
False Killer Whale Main Hawaiian Insular DPS <sup>2</sup>	<i>Pseudorca crassidens</i>	Endangered	11/28/2012	77 FR 70915
Blue Whale	<i>Balaenoptera musculus</i>	Endangered	12/02/1970	35 FR 18319
Fin Whale	<i>Balaenoptera physalus</i>	Endangered	12/02/1970	35 FR 18319
Sei Whale	<i>Balaenoptera borealis</i>	Endangered	12/02/1970	35 FR 18319
Sperm Whale	<i>Physeter macrocephalus</i>	Endangered	12/02/1970	35 FR 18319
Oceanic Whitetip Shark	<i>Carcharhinus longimanus</i>	Threatened	3/1/2018	83 FR 4153
Giant Manta Ray	<i>Manta birostris</i>	Threatened	1/22/2018	83 FR 2916

<sup>1</sup>Critical Habitat was designated for Hawaiian monk seals on 5/26/1988 (53 FR 18990) and revised on 8/21/2015 (80 FR 50925)

<sup>2</sup>Critical Habitat was designated for the Main Hawaiian Island insular false killer whale on 7/24/18 (83 FR 35062)

Detailed information describing the biology, habitat, and conservation status for ESA-listed species discussed in this consultation can be found in the status, recovery plans, and other sources at <http://www.fisheries.noaa.gov/pr/species/>.

## Critical Habitat

In designated areas of the Main Hawaiian Islands (MHI), critical habitat for monk seals includes the marine environment with a seaward boundary that extends from the 200 m depth contour line (relative to mean lower low water), including the seafloor and all subsurface waters and marine habitat within 10 m of the seafloor, through the water's edge 5 m into the terrestrial environment. Detailed information on Hawaiian monk seal critical habitat can be found at: [http://www.fpir.noaa.gov/PRD/prd\\_critical\\_habitat.html](http://www.fpir.noaa.gov/PRD/prd_critical_habitat.html).

Critical habitat has been designated for the MHI insular false killer whale in waters from 45 m to 3,200 m in depth, surrounding the main Hawaiian Islands from Ni'ihau to Hawai'i Island. This designation would not include most bays, harbors, or coastal in-water structures. Within this area, NOAA Fisheries excluded nine areas from the designation due to economic and national security impacts. In addition, two areas are ineligible for designation because they are managed under the Joint Base Pearl Harbor-Hickam Integrated Natural Resource Management Plan that was found to benefit MHI insular false killer whales. Detailed information on designated MHI insular false killer whale critical habitat can be found at: [http://www.fpir.noaa.gov/PRD/prd\\_mhi\\_false\\_killer\\_whale.html#critical\\_habitat](http://www.fpir.noaa.gov/PRD/prd_mhi_false_killer_whale.html#critical_habitat)

### Analysis of Effects

In order to determine that a proposed action is not likely to adversely affect ESA-listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or completely beneficial. As defined in the joint USFWS-NMFS Endangered Species Consultation Handbook, beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs<sup>3</sup>. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed actions on ESA-listed marine species, as described in the PIFSC consultation request.

The Corps concluded that the following potential stressors resulting from these proposed actions may affect ESA-listed marine species identified in Table 1:

1. Exposure to elevated noise levels;
2. Disturbance from human activity and equipment operation;
3. Exposure to waste and discharges;
4. Exposure to elevated turbidity;
5. Direct physical impact;
6. Collisions with vessels;
7. Entrapment;
8. Loss of Habitat; and
9. Anchoring (and associated entanglement with anchor lines).

#### *Exposure to elevated noise levels*

Man-made sounds can affect animals exposed to them in three ways: non-auditory damage to gas-filled organs, hearing loss expressed in permanent threshold shift (PTS) or temporary threshold shift (TTS), and behavioral responses or changes. The primary cause of potential effects to ESA-listed marine resources from this proposed action is from underwater sound generated by impact pile driving activities. The loss of hearing, even if only temporary, may adversely affect marine mammals. They may also experience reduced hearing by masking (i.e. the presence of one sound affecting the perception of another sound). Of these physical effects, the one measurable effect that is most likely to occur at the lowest noise intensity, would be TTS hearing loss. Therefore, we used TTS as a surrogate for all physical effects from noise from the proposed activities in order to assess the likelihood or extent of take.

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<sup>3</sup> Take” is defined by the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. NMFS defines “harass” as to “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.” NMFS defines “harm” as “an act which actually kills or injures fish or wildlife.” Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Take of species listed as endangered is prohibited at the time of listing, while take of threatened species may not be specifically prohibited unless NMFS has issued regulations prohibiting take under section 4(d) of the ESA.

The Corps and their applicants have agreed to conduct a concurrent sound study using hydrophones to determine the proper standoff distances required for phocid pinnipeds and so an adaptive management strategy can be implemented for proper observer coverage of the expected isopleths. This will be the first study of its kind for these specific piles and can potentially guide future management decisions within the Region or across the Nation. As piles will be driven at different locations, placement of observers will not be defined, but variable to adjust to the onsite conditions and resultant isopleth ranges.

When analyzing the auditory effects of noise exposure, noise is generally categorized as either impulse or non-impulsive. Acoustic thresholds for impulsive sounds use dual metrics: sound exposure level ( $SEL_{cum}$ ) and peak sound pressure in decibels ( $dB_{peak}$ ). For non-impulsive sounds, acoustic thresholds are presented using the  $SEL_{cum}$  metric (NOAA 2016). The green sea turtle, hawksbill sea turtle, and Hawaiian monk seal would be the only species from Table 1 expected to occur in the inner harbor where pile driving activities will take place. Hawksbill turtles have been documented in the harbor with minimal frequency and are considered uncommon to rare (USACE 2018). A stranding of a hawksbill sea turtle occurred in Honolulu Harbor in May of 2011, which was recovered alive (PIFSC MTBAP unpublished data). In general, we know that hawksbills use harbors in Hawaii with sightings throughout the State (I. Kelly pers. comms. 2018) Therefore, we would expect hawksbill sea turtles may be exposed to the proposed activities but in low numbers and for very limited amounts of time. In contrast, green sea turtles are known to occur in the vicinity of the harbor and are expected to be the most common species in the area.

The various whale species under consideration are all considered Mid-frequency (MF) cetaceans (Thomas et al. 1988; NOAA 2016). Expected TTS levels are the same as Phocids with a minimum isopleth of 257 m and maximum isopleth distance of 1,291.3 m As this range would not meet the harbor mouth, the blue, fin, sei, sperm whale, and Main Hawaiian Island insular false killer whale would not be expected to be present within the inner harbor or within range of expected auditory effects from TTS and are not considered further.

Effects to either monk seal critical habitat or Main Hawaiian insular false killer whale critical habitat would not be expected either as the auditory range of the proposed activities would not reach the boundary demarcations of those habitats.

Elasmobranchs, like all fish, have an inner ear capable of detecting sound and a lateral line capable of detecting water motion caused by sound (Hastings and Popper 2005; Popper and Schilt 2009). Data for elasmobranch fishes suggest they are capable of detecting sounds from approximately 20 Hz to 1 kHz with the highest sensitivity to sounds at lower ranges (Casper et al. 2012; Casper et al. 2003; Casper and Mann 2006; Casper and Mann 2009; Ladich and Fay 2013; Myrberg 2001). However, unlike most teleost fish, elasmobranchs do not have swim bladders (or any other air-filled cavity), and thus are unable to detect sound pressure (Casper et al. 2012). Particle motion is presumably the only sound stimulus that can be detected by elasmobranchs (Casper et al. 2012). Particle motion dynamics and effects to species are poorly understood and merit further research (Popper and Hawkins 2018). Given their assumed hearing range, elasmobranchs are anticipated to be able to detect the low frequency sound from the

proposed pile driving activities if exposed. Furthermore, although some elasmobranchs have been known to respond to anthropogenic sound, in general, elasmobranchs are not considered particularly sensitive to sound (Casper et al. 2012). Like the various whale species, the oceanic whitetip shark and the giant manta ray, are not expected to be present within the inner harbor, or within range of the modeled isopleth for low frequency sounds. Thus will not be considered further. Potential impacts from vessel noise generation through pelagic waters where these species are present will be discussed in the following section.

Impact pile driving creates a distinctly different sound than vibratory pile driving, the former of which are described as impulse sounds with high wave forms that spike and fall rapidly. These impulsive sounds from impact pile driving are what is commonly associated with fish kills in pile driving by barotrauma or rupturing of gas-filled organs (Popper et al. 2014; Woodbury and Stadler 2008). This mechanism of injury can occur to any animal with gas filled organs, including the lungs and ear drums of mammals and reptiles (Popper et al. 2014). However, impact pile driving is not likely to create sound intensities great enough to rupture lungs or ear drums in sea turtles and monk seals, but could cause PTS and TTS, and behavioral responses.

To assess the maximum auditory effects of the construction generated noise, we will analyze the impulsive sounds of the impact hammer used to drive king sheet piles as a worst-case scenario, as these sounds would be the most intense likely to be produced by the proposed activities. Noise from other proposed activities would be less intense, and thus less likely to adversely affect sea turtles or Hawaiian monk seals.

Underwater sound would be generated by impact driving 2,930 linear feet of sheet piles and king piles to define the new shoreline. Approximately 2,060 linear feet of piles will be driven, and 870 linear feet of sheet piles will be installed across and enclosing the open water sections of Snug Harbor (approximately 300 feet, 30-foot water depth), the Rail Slip (360 feet, 20-foot water depth), and Pier 40F (approximately 210 feet, 20-foot water depth). According to design specifications, the piles may be inserted using vibratory pressure for all but the final 10 feet of each pile that must be impact-driven.

The sound energy generated by impact driving of sheet piles is lower than that generated by the King piles, which in turn, is lower than with concrete piles or hollow steel piles. Characteristics that factor into pile driving sound generation include pile material, geometry, equipment, and physical site characteristics. King piles driven in open water have the capacity to generate sound energy as high as 205 dB<sub>peak</sub> and 189 dB RMS (Illingworth & Rodkin 2007). However, sound levels vary greatly between sites depending upon geology, site geometry, and equipment used. In addition, monitoring tests have not been conducted on the specified sheet pile. To establish a baseline, a preconstruction hydro-acoustic study was conducted (SEI 2016) to discern the baseline and acoustic attenuation characteristics of the harbor. Ambient sound levels in the harbor range from 123 dB RMS at Snug Harbor to 127 dB RMS at Pier 27 (SEI 2016). Anticipated sounds from driving king piles from this study specific to Honolulu Harbor was 208 dB<sub>peak</sub> and 193 dB RMS which is slightly elevated from Illingworth and Rodkin's (2007) results (SEI 2016).

Due to the action area being confined by breakwaters, we expect sounds to be blocked or absorbed within the marina or ground sediments and we predict the zone of influence to be contained within the inner marina. Although the NOAA acoustic threshold exists for behavioral responses, it is less understood or studied than hearing loss and non-acoustic injury.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds	sea turtles
SEL <sub>cum</sub> Threshold	183	185	155	185	203	204
SEL <sub>lim</sub> Threshold (TTS)	168	170	140	170	188	189
Barotrauma	237	237	237	237	237	237
Behavioral response	160	160	160	160	160	175
Ambient				140		140
PTS Isopleth to threshold (meters)	44.1	2.3	51.5	25.4	2.5	0.1
TTS SEL <sub>lim</sub> Isopleth to threshold (meters)	337.0	257.0	14,950.4	257.0	22.4	19.6
Isopleth for Barotrauma	0.0	0.0	0.0	0.0	0.0	0.0
PK Threshold	219	230	202	218	232	232
PK Threshold (TTS)	213	224	196	212	226	226
PK Barotrauma	237	237	237	237	237	237
PTS PK Isopleth to threshold (meters)	2.3	NA	22.5	2.6	NA	NA
TTS PK Isopleth to threshold (meters)	5.1	1.1	50.8	5.8	NA	NA
Isopleth for Barotrauma PK	NA	NA	NA	NA	NA	NA

**Figure 5.** Sound pressure thresholds in decibels (dB) and stand-off distances in meters as determined by NMFS<sup>4</sup> for minimum threshold values.

The TTS level for 8-hours of exposure to noise for phocid pinnipeds is 212 dB<sub>peak</sub> and 170 dB SEL<sub>cum</sub> (NMFS 2016) and for sea turtles is 232 dB<sub>peak</sub> and 204 dB SEL<sub>cum</sub> (U. S. Navy 2017). We do not expect ESA-listed animals to be exposed to this level of sound continuously for 8 hours. Further, the distance from the noise of the impact hammer that would cause PTS would be approximately 0.1 m and TTS 19.6 m in the case of the green and hawksbill sea turtles. PTS for Hawaiian monk seals was determined to be 25.4 m and TTS of 257 m. This resultant isopleth conclusion was based on the following characteristics: SEL<sub>cum</sub>- 193 RMS SPL, 5 piles driven per day, 0.001 strike duration<sup>Δ</sup> (seconds)<sup>5</sup>, 250 strikes per pile, 17 x LogR (propagation) and with a PK SPL of 208, 10 m from the source. Based on the proposed BMPs, we expect that construction will cease when sea turtles and Hawaiian monk seals are within 50 yd (45 m) of the work area. This is considered the most significant area for observation to occur and is within the primary

<sup>4</sup> Key: Light red – threshold levels as defined by NMFS 2018 and U.S. Navy 2018 (sea turtles); dark teal – resultant isopleths of calculations; Light pink – PK thresholds; and light blue – PTS and TTS PK Isopleth threshold levels.

<sup>5</sup>ΔWindow that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005.

observation zone. The 257m isopleth determination (phocid TTS isopleth) is considered the bare minimum distance that must be observed.

Due to the uncertainty of the King pile driving characteristics, values for the strike duration have been quantified as 0.025 (SEI and Belt Collins pers. comm. 2018) as a maximum expected threshold value. The remaining variables in the chart remain the same as previously defined. The resultant isopleth from this additional calculation is 1,291.3 m for phocid pinnipeds, and 4.8 m for sea turtles. This is considered the absolute maximum TTS isopleth which must be observed based on a modification in the strike duration parameter. By implementing an adaptive management strategy with a concurrent sound study, realized results can determine the actual range which will need to be monitored for these ESA-listed species.

On September 6, 2018 NMFS, the Corps, DOT-Harbors, SEI, and acoustic experts from Belt Collins, determined and agreed upon, that 5 king piles was a reasonable number of pilings which can be installed in a full work day. Isopleth calculations are dependent on this variable and any alteration can significantly alter the projected isopleth and thus alter effects to ESA-listed species in the area. Installation of more than 5 king piles in a given day is not covered under this consultation (see re-initiation notice).

We understand little about the impacts of noise or the underwater noise thresholds for sea turtles, but their hearing ranges are generally limited and they are noted as being less reliant on hearing than marine mammals who regularly communicate by vocalization (NOAA 2016). Sea turtle ears are also more primitive than that of marine mammals and less capable of detecting sound pressures (Popper et al. 2014). For these reasons, sea turtles are less likely to detect and avoid sound pressures from underwater noise that could injure them, and less likely to behaviorally respond.

To reiterate, NMFS calculates the bare minimum TTS isopleth threshold of 257.0 m using the above defined characteristics for phocid pinnipeds (i.e. Hawaiian monk seal). NMFS has determined the distance based on the resultant isopleth as shown in Figure 5. A maximum isopleth threshold of 1,291.3 m for phocid pinnipeds, and 4.8 m for sea turtles was calculated using 0.025 as the modified strike duration value. Due to the uncertainty in King pile characteristics, 0.025 is considered an assumption by SEI and Belt Collins. Concurrent sound studies will quantify the proper isopleth and observation zone based on where 170 dB SEL<sub>cum</sub> projects from the source.

Although this projected range appears significant, this does not necessarily equate to take as defined by the ESA, but is influenced by a number of variables. This range is a prediction of the expected geographical marker whereby the sound is expected to dissipate from the source to the level of TTS. Essentially this metric defines the area an action agency would need to observe for possible effects to ESA-listed species. However, Hawaiian monk seals are rarely reported in or around Honolulu Harbor, with the last confirmed sighting in 2009 (Wurth 2009; Mercer 2017a, 2017b; Mercer pers. comms. 2018; NMFS unpublished data 2018). An anecdotal unconfirmed record was also reported in 2013 (Mercer 2017a). Hawaiian monk seals appear to avoid this area, likely because it is a heavily used commercial shipping port where significant vessel traffic and anthropogenic disturbances occur on a daily basis. Observers may also be able to identify seals at

the surface at a larger range than at comparable sites or for similar projects, as the inner harbor has extremely calm water conditions and the opposing shoreline (Matson Pier 51B; Sand Island) is within visual range. Currently, the entire shoreline within the Harbor is considered modified for human use and no natural features exist. As such, the Harbor does not provide significant habitat characteristics for foraging, hauling out and resting, or pupping, and therefore was not considered designated critical habitat for the Hawaiian monk seal. It should also be noted that Harbor operations will continue as normal during the projects life span, meaning typical maritime traffic in the area will persist.

Marine turtles and the Hawaiian monk seal may respond to noises by avoiding, halting their activities, experiencing reduced hearing by masking, or approaching source noises. Although the true causes of those anticipated behavior responses are unclear since animals can use other cues such as vision to trigger behavior response. Avoidance is most likely, a common natural reaction by sea turtles and Hawaiian monk seals and considered low risk. With the BMPs in place for the proposed permit, ESA-listed species will avoid effects associated with attraction because construction will stop when sea turtles and Hawaiian monk seals are observed within 50 yd, and will not restart until the animal is no longer present. This observation zone also includes the area where significant potential effects could occur and include work stoppages. Additionally, a turbidity curtain will have already been installed providing a physical barrier. Moreover, it is expected that sufficient numbers of observers will be utilized to adequately observe the area, and soft starts will be implemented where lower hammer energy levels will be used initially and ramp-up to full operational speed and force. This will provide an opportunity for an animal to become aware of the noise disturbance and move away from the source on their own accord before higher operational sound levels are reached. Furthermore, piles near Pier 40F will be installed first. As this area is furthest away from the open waters of the inner harbor, this will provide notification to animals in the area well before piles are driven in locations where more open water will be affected. Thus, acting as an early warning system that sounds are present in the area and comparable to the function of soft start BMPs.

As the last confirmed record of the Hawaiian monk seal was nine years ago, and considering the daily activities which normally occur in the port, along with the expected containment of generated sounds to the inner harbor, we do not expect the noise produced from these activities will rise to the level where “take” would occur. An adaptive management strategy will be implemented based on a concurrent hydro-acoustic study allowing the proper observation of the largest isopleth range for each location. Not only will a minimum of two dedicated observers be present, but all staff will be trained to identify sea turtles and Hawaiian monk seals as well, thereby increasing the number of possible observers while activities are conducted. We do not expect the action to change due to this strategy, as piles will still be driven. However the area observers will be required to monitor for listed species may be adjusted accordingly. The largest isopleth of 1,291.3 m must be observed at the start of the pile driving activities. As the results allow, contraction of the observed isopleth may occur until the range of the 170 dB SEL<sub>cum</sub> isopleth can be determined. However, the minimum isopleth of 257 m must be observed at all times. Therefore, effects to ESA-listed green and hawksbill sea turtles and Hawaiian monk seals exposed to sounds generated by driving sheet piles from this proposed action are extremely unlikely to occur and are considered discountable.

### *Disturbance from human activity and equipment operation*

Responses by an ESA-listed species to any potential disturbance by vessel or land-based noise generation or vessel movements expected to be implemented in this project would be limited to temporary avoidance with no injury to the individual. Only the green and hawksbill sea turtles, and the Hawaiian monk seal would be expected to be present in the inner harbor area where work is being conducted and exposed to potential disturbance from the proposed activities. While dockside machinery may have the potential to create loud noises; due to the expected land based operations, established BMPs, frequency and duration of time these species spend at the surface, dissipation of sound from the source, and the poor transference of generated sounds from the land to ocean water; we believe it is highly unlikely noises generated from construction operations would illicit significant behavioral reactions from ESA-listed species considered in this consultation. Any potential behavioral effects from these specific stressors would never rise to the level of take and would thus be insignificant.

The majority of the sounds generated from this project will be from dredging and pile driving. Hawaiian monk seals or sea turtles will be exposed to long periods of noises from moving parts of the equipment, contact of the clamshell dredge head with the sediments, vessel motors, and other common construction noises. Hawaiian monk seals and sea turtles may respond to these noises by avoiding, halting their activities, experience reduced hearing by masking, or attraction to source noises. Although the true cause of those anticipated behavior responses are unclear since animals can use other cues such as vision to trigger behavior response. Avoidance is most likely, and a common natural reaction by ESA-listed species and considered low risk. Hawaiian monk seals and sea turtles are large and agile, and capable of swimming away safely from any disturbance that would harm them. Seminoff et al. (2003) and Balazs et al. (1987) have also demonstrated that sea turtles may shift their foraging to night in order to avoid human disturbances. However, considering the environmental baseline of the harbor, the duration of this project's activities which would potentially cause these effects, and the expected exposure interval, we do not expect this type of behavioral shift in the temporal use of the immediate habitat by these species to occur. Attraction to sounds are unusual, but sometimes occurs. With the BMPs in place, the Corps will avoid effects associated with attraction by halting work when Hawaiian monk seals or sea turtles are observed within 50 yd of the work area and will not restart until the animal is no longer observed within range. We expect minimal risk from behavioral changes by Hawaiian monk seals and sea turtles exposed to sounds generated during dredging activities. We expect the sounds generated by dredging will have insignificant effects to sea turtles and Hawaiian monk seals, other species would not be subjected to this portion of the action as they are pelagic in nature and not expected to be in the action area where dredging occurs.

Regarding in-water personnel, these species may experience a startle reaction should they encounter divers which may result in active avoidance or fleeing of the area (Meadows 2004). Behavioral responses can be influenced by a number of factors (Andersen et al. 2012). However, the most frequent response to this type of interaction is a low energy behavioral avoidance leading to the animal temporarily leaving the area which may temporarily displace normal feeding and resting activities, and should never rise to the level of take. This response is more likely for sea turtles given their wariness of humans. If startled, green and hawksbill sea turtles may turn their head toward the human presence/noise to identify the origin before resuming their activity or fleeing. Conversely, animals may calmly approach the activity to investigate or even attempt to interact with personnel (Jenkinson 2010). Thus, if an interaction occurs, the effects to

its behavior from in-water personnel will not affect these species in any meaningful way. No harm to any ESA-listed species under NMFS' jurisdiction is expected. For these reasons, effects from disturbance from in-water human activity are considered to be insignificant.

#### *Exposure to wastes and discharges*

Equipment spills, discharges, and run-off from the project area could contain chemicals such as fuel oils, gasoline, lubricants, hydraulic fluids and other toxicants, which could expose ESA-listed species. Depending on the chemicals and their concentration, the effects of exposure may range between animals temporarily avoiding an area to death of the exposed animals. Local and Federal regulations prohibit the intentional discharge of toxic wastes and plastics into the marine environment and a storm water prevention plan permit is required for this project to move forward. Vessel staff are expected to adhere to applicable BMPs pertaining to the elimination of discharges and waste, and would have contingency response protocols for accidental leaks, spills, and discharges aboard their vessels.

In the unlikely event of a leak, the vessel's crew will act accordingly to quickly minimize and contain the problem. It is anticipated that leaks or spills would be infrequent, small, and quickly cleaned. Any resulting discharges would be at extremely low concentrations, exposure to which is expected to cause no effect on an exposed individual's health, and result in no behavioral response. Potential exposure to wastes and discharges resulting from the proposed project would therefore have insignificant effects on ESA-listed marine species under NMFS' jurisdiction identified in Table 1.

Regarding the containment of spoils from the dredge site to the disposal site. The Contractor(s) will be required to follow the Standard Conditions and Additional Project-Specific Conditions for Use of the SOODMDS stipulated in the USEPA letter dated July 14, 2015 (on file) that will become conditions of any final Corps authorization. The conditions are very specific in regards to the Disposal Vessel Automatic Tracking and Reporting requirements. In addition to the reporting, the contractor must check the operations of the barges prior to operation; and is only allowed to use the SOODMDS when weather and sea state conditions will not create risk of spillage, leak or other loss of dredged material during transit. The Corps have noted some unusual instances of a failure of the hydraulic system when a dump scow suddenly opened, but that is considered highly unlikely, and it is typically caught before the dump scow exits the dredging site. Due to the strict procedures to maintain dredge spoils on board, constant monitoring of the vessel and spoils, low transit speed, weather condition requirements, NMFS considers the risk of spoils going overboard to have insignificant effects on ESA-listed marine species and applicable critical habitats under NMFS' jurisdiction identified in Table 1.

#### *Exposure to elevated turbidity*

Turbidity is a term which describes the optical properties that cause light to be observed or scattered within the water column and is related to the concentration of suspended sediments whether inorganic, organic, or artificial (Birtwell 1999). Kjellad et al. (2015) determined after extensive literature review that the long term affects to aquatic species are not well understood but are important to determine exposure limits and thresholds which could potentially alter relevant population dynamics. By understanding these principles, mitigation strategies and measures can be employed to reduce the affects to these populations (Kjellad et al. 2015). It

should be noted that much of the literature on the effects of suspended sediments and turbidity to aquatic animals focuses on fresh water systems and biota, particularly salmonids. However, some resounding themes provide clarity on the important aspects which affect aquatic organisms. As Birtwell (1999) describes, the European Inland Fisheries Advisory Committee (EIFAC) determined five mechanisms which can deleteriously affect aquatic organisms which in turn established defined threshold levels based on concentrations of suspended sediments and can be applicable to marine species as well. These mechanisms are (EIFAC 1964):

- The reduction in the resistance to disease, growth rate, or mortality of the individual animal subjected to the concentration;
- the prevention of the normal developmental processes of eggs and/or larvae;
- modification of an animal's migration or movement patterns;
- decrease in the abundance or quality of forage; and
- affecting the ability of an animal to successfully capture prey.

These mechanisms are further substantiated by literature produced by the U. S. EPA (Berry et al. 2003; U.S. EPA 2012). Furthermore, turbidity can also reduce the concentration of dissolved oxygen in the water, and increase water temperatures as suspended particles absorb heat. Reductions in dissolved oxygen can cause behavioral responses such as increased air breathing or surface respiration, alterations in an animal's activity, or changes in the vertical or horizontal use of the habitat (Kramer 1985).

In relation to the species under consideration in this consultation, sub-lethal effects must be considered as well. These effects can be a result or reflection of stress and could pertain directly to the individual, the species, or to a mechanism of their survival by alteration in their respective trophic pathway(s). Sub-lethal effects would be more applicable to the species under consideration as they are higher on the food chain and may not be subjected to direct impacts of increased sedimentation in the water column. Sub-lethal effects have been described in detail and include variables such as gill trauma to fish (Servizi and Martens 1987; Hess et al. 2015), increased chance of predation (Mesa et al. 1994; Birtwell et al. 1999; Chivers et al. 2013), decreased feeding efficiency and growth rates of invertebrates (i.e. food sources) (Hynes 1970; Tjensvoll et al. 2015; Pineda et al. 2017), alterations in social behaviors, disrupted feeding patterns, displacement, and increased susceptibility to disease (Scrivener et al. 1994), delayed coral reef fish larval development (Wenger et al. 2014), transgenerational effects (Kjellad et al. 2015), alterations of habitat complexity by the reduced ability for coral recruitment (i.e. effects to coral larvae, shading, etc.) to occur (Rogers 1990; Jones et al. 2013), coral reef community responses (Pastorok and Bilyard 1985; Erftemeijer et al. 2012), and finally, the compromise of an individual's normal physiological performance (Farrell et al. 1998; Jain et al. 1998). Many sub-lethal effects can be considered trait mediated indirect interactions and are described in an ecological context by Peacor and Werner (2001) and Werner and Peacor (2003). While not an exhaustive review of all literature on this topic, this consultation attempts to define mechanisms and pathways which can potentially affect those species listed in Table 1 using the best scientific data available.

Species considered in this consultation would potentially be exposed to increased sediment loads and thus higher levels of turbidity within the water column by the proposed action. Which could cause a range of effects such as these, if mitigation measures were not implemented. It is

important to also clarify that natural events such as rain, floods, tidal events and cycles, storms, etc., occur regularly which increase sediment loads to the nearshore environment and/or ocean. Effects to these species could be variable depending on the length of exposure, the concentration of the sediment within the water column - referring to the severity of the exposure, and the frequency of exposure. Or as Wilber and Clarke (2001) declare as the “scope, timing, duration, and intensity.”

Regarding the direct effects of increased turbidity, given that sea turtles and marine mammals breathe air, increased turbidity will not affect their respiration. Although turtles are sometimes observed in turbid areas, it is possible that they will temporarily avoid any localized turbidity plumes in favor of clearer water, reducing exposure risk. Marine mammals are also capable of quickly leaving unsuitable areas if they so choose. Determining whether an animal moves from an area based on an increased turbidity concentration or a conscious decision for various other reasons is speculative at best.

We would not expect turbidity or increased sediment loads to affect the development process of eggs, larvae, or the reproductive capacities of the species under consideration. The exposure interval for this proposed activity is expected to be of minimal duration in context of the species life histories and may or may not coincide with reproduction activities either temporally or spatially when considering species like the oceanic whitetip shark, or the giant manta ray. Elasmobranches, like the giant manta ray have been known to congregate for reproduction or pupping purposes (Duncan and Holland 2006; Miller and Klimovich 2006). However, we do not expect the turbidity created by the proposed action to interfere or affect those species in those areas during the time interval they congregate for these purposes as BMPs will reduce movement of sediments to potential offshore locations. Additionally, neither the giant manta ray nor the oceanic whitetip shark have documented congregations for reproduction purposes in the proposed action area or adjacent region.

Sea turtles lay eggs onshore, marine mammals either pup onshore or give live-birth in an open ocean environment, and the ESA-listed elasmobranches are viviparous. We would not expect these species to produce offspring or mate within the action area during the proposed event. Furthermore, we would not expect the concentration of sediments to elicit mortality in the species under consideration as they are regularly exposed to natural events of greater severity and are not affected.

Due to the proposed action’s footprint, short duration of activities that would cause turbidity, and the species’ ranges and distributions, we do not expect the action to produce an affect that would alter or prevent any ESA-listed animal from altering their migration or movement patterns. While species may avoid perturbations, such as those resulting from the proposed activities, we would not expect the action to create a situation that would stop an animal from foraging or traveling. The species under consideration typically have ample opportunities and large ranges to forage and we would not expect migration activities or corridors to be affected by the proposed action. Thus, we would not expect turbidity created from this proposed project to alter migration or movement patterns of these species.

Additionally, we would not expect any elevated turbidity resulting from this proposed action to affect any ESA-listed animal's ability to capture prey. Elevated turbidity levels such as those expected from the proposed action are not expected to create long-term effects to these species by altering the normal trophic structure within the immediate area (i.e. alterations in algae composition or species, reduced ability to identify prey, etc.) (Weiffen et al. 2006; Chivers et al. 2013). In addition, we would not expect this proposed activity to produce significantly more turbidity than the amount which occurs on a regular basis after a typical rain event or is present from other variables. Furthermore, we would not expect this proposed activity to create a significant effect based on use of all established BMPs and adherence to Federal mandates (i.e. The Clean Water Act, etc.) required for this project to be implemented.

Furthermore, we do not expect this activity to produce such extreme shifts in the habitat structure or complexity based on the defined parameters of the action and the BMPs that will be implemented that will create any appreciable or large-scale detrimental effects other than to the immediate local environment where the action takes place. Several sub-lethal effects noted above, could be possible in theory. However, the duration, intensity, and short frequency of the action would preclude these events from maturing to tangible and recognizable outcomes. Hypothetically, changes to the ecosystem resulting from increased turbidity that may result in shifts to an algal community may actually assist species like green sea turtles, whereas reductions in coral communities or sponges could affect hawksbill sea turtles' foraging, based on their respective diets. It's also possible turbidity could cause mortality in some fish species. Nevertheless, regarding this specific action, we do not expect a shift in prey composition to occur or for a significant reduction in prey availability and wouldn't affect the ESA-listed species under consideration in Table 1, except for perhaps a short-term avoidance of that area while work is actively conducted.

A possible short-term effect could be created by reducing the opportunity for the individual animal to recognize a predator (Chivers et al. 2013). Sharks, like the tiger shark (*Galeocerdo cuvier*), are apex predators which are known to predate on sea turtles and marine mammals (Heithaus 2001; Heithaus and Dill 2002), and particularly in Hawaiian waters (Lowe et al. 1996; Papastamatiou et al. 2006). Thus, this mechanism could be considered a viable threat to the species under consideration. However, sharks are now considered rare within Hawaiian waters after large scale shark removals were conducted over long time periods (Wetherbee et al. 1994). Meaning the likelihood that the specific activity will produce any measurable outcomes greater than the baseline predation events that occur naturally within the area, is extremely remote and most likely unquantifiable.

In conclusion, sea turtles and monk seals may encounter localized, temporary turbidity increases generated during the proposed activity within the inner harbor area. Additional pelagic species under consideration would not be expected to encounter effects from turbidity unless an extremely unlikely event such as dredge spoils being lost overboard during transit, or a barge getting swamped or grounding thereby introducing dredged material in an area where spoils were not expected to be disposed of. To minimize turbidity and siltation within the inner harbor, full length, full surround silt curtains will be installed to contain any sediment generated by work activities, and work will be curtailed during adverse weather and extreme high tide conditions. The amount of material (i.e. sediment) mobilized is expected to be localized, short-lived, and

given limited exposure, potential effects would be unlikely to result in take or a quantifiable effect, as such effects would be within the range of normal behaviors that would not alter their ability to grow and reproduce for those species under consideration. Such effects from turbidity from the proposed action are therefore insignificant to ESA-listed species listed in Table 1.

#### *Direct physical impact*

Pelagic ESA-listed species from Table 1, like the various whales, oceanic whitetip shark, and giant manta ray would not be expected to be affected by this potential stressor. Green and hawksbill sea turtles and Hawaiian monk seals would be the species within Honolulu Harbor this stressor could potentially affect. However, we expect sea turtles and Hawaiian monk seals may enter the action area on an infrequent basis based on previous sighting records (Wurth 2009; Mercer 2017a, 2017b; Mercer pers. comms. 2018; NMFS unpublished data 2018). If they do, they should be visible to observers as the harbor when they surface to breathe. Thus, exposure to this potential stressor will easily be avoided, because work will be stopped until any such observed animals leave the harbor. It is possible a dredge could fall and contact a submerged ESA-listed marine animal, though the chance of this occurring is very small in accordance with the established conservation measures. For example, anchors or clamshell dredge implements will have a controlled descent by crane, full-depth turbidity curtains will be installed providing a physical barrier, observers will be present for ESA-listed species under NMFS' jurisdiction, and work will stop if ESA-listed species under NMFS' jurisdiction are sighted. Additionally, considering the depth of the water column and that the expected time for the equipment to reach the bottom is extremely short, the potential for direct physical impact to ESA-listed species under NMFS' jurisdiction is highly unlikely and therefore discountable.

#### *Collision with vessels*

The proposed action would expose all ESA-listed marine species under NMFS' jurisdiction found in Table 1 to the risk of collision with the vessels. Depending on the severity of contact, the collision could cause injuries including bruising, broken bones or carapaces, lacerations, or even death in severe cases. Research suggests that sea turtles cannot be expected to consistently notice and avoid vessels that are traveling faster than 2 miles per hour (Hazel et al. 2007). Consequently, vessel operators must be responsible to actively watch for and avoid ESA-listed species and to adjust their speed based on expected animal density.

While specific studies have not been conducted for oceanic white tips or giant manta rays for vessel avoidance, they are elasmobranchs and are highly mobile species. Giant manta rays in particular are known to rest near the surface. However, while the function of the lateral line in manta rays is poorly understood, they also have a suite of other biological functions which are considered highly sophisticated sensory systems (Bleckmann and Hoffmann 1999; Deakos 2010). This suggests that they possess capabilities of detection and could avoid slow moving vessels as well.

Given the high vessel traffic volume around Hawaii, collisions between turtles and vessels are relatively rare events. NMFS conservatively estimated 37.5 sea turtle and 0.45 Hawaiian monk seal vessel strikes and mortalities per year from an estimated 577,872 vessel trips per year in Hawaii. This includes fishing and non-fishing vessels (NMFS 2008). This calculates to a 0.006%

probability of a vessel strike with sea turtles for all vessels and trips, many of who are not reducing speeds or employing lookouts for ESA-listed species.

Vanderlaan and Taggart (2007) report that the severity of injury to larger whale species is directly related to vessel speed. They found that the probability of lethal injury increased from 21% for vessels traveling at 8.6 knots, to over 79% for vessels moving at 15 knots or more. We assume collisions at higher speeds would result in more severe injuries for all animals.

There are data suggesting that the probability of vessel collisions between whales and vessels associated with this action would be more uncommon than that of sea turtle vessel strikes. Lammers et al. (2013) estimated at most, the risk was 7 humpback whale strikes per year, which is less than 1/5 of the number reported for sea turtles (or 2/5 if you consider that humpback whales are in Hawaii for half the year). Lammers et al. (2013) noted that most strikes occurred in February and March, which is the peak of the humpback whale season in Hawaii. This increases the odds of a vessel strike. Furthermore, most recorded vessel strikes occurred with calves. These trends are relevant because they represent a biased rate of collision.

The Hawaii humpback whale DPS is no longer listed under the ESA and are by far, more common than any ESA-listed whale species in the region or species under consideration in this consultation. The trends of this study are not comparable to the West North Pacific DPS where there are no breeding grounds in U.S. territorial waters, or peak seasons where they are common and concentrated around islands. Most ESA-listed baleen whales in the action area during the proposed timing of the cruise will be solitary, and the rate of vessel strikes for these species will be likely lower than the rate of strikes documented by Lammers et al. (2013) as the cruise does not take place during these months.

False killer whales commonly travel in pods and are known to approach vessels and ride the bows of vessels. We have little to no data on vessel strikes on false killer whales, but false killer whales are much more agile than baleen whales and few have been reported. The density of MHI insular false killer whales is expected to be very low along the transit routes since these whales are generally found in deeper areas just offshore, (median preferred depth is 1679 m) rather than nearshore areas (Baird et al. 2010; Baird et al. 2012). In addition, the transit routes are in low-use areas according to Baird et al. (2012) who describe the north side of the island of Hawaii, a broad area extending from north of Maui to northwest of Molokai, and a small area to the southwest of Lanai as high-use areas preferred by MHI insular false killer whale. Thus, we expect the probability of vessel strikes of false killer whales to be lower than reported in Lammers et al. (2013).

All workers associated with this project are required to adhere to Best Management Practices (BMPs) (Appendix B Section 7.1) for the duration of their involvement in this project. These BMPs require that constant vigilance shall be kept for the presence of ESA-listed species during all aspects of the proposed action, particularly in-water activities such as boat operations and during transit from Oahu Hawaii to the offshore disposal site, including local transiting throughout the harbor by small craft. Tug boats are the primary vessel type to be used for this proposed activity with a maximum expected velocity of 5 knots.

Given the slow speeds to be used during most operations, the adherence to established BMPs, the expectation that ESA-listed marine species would be widely scattered throughout the proposed areas of operation, and the limited populations of the ESA-listed species in these areas, the potential for an incidental boat strike is extremely unlikely to occur. Thus, the effects of this stressor to any ESA-listed marine species under NMFS' jurisdiction identified in Table 1 are discountable.

### *Entrapment*

All in-water activities will be encircled by full-depth turbidity curtains. The enclosures will be adaptively managed (opened, closed, re-located, re-sized) to minimize spread of suspended sediments to adjacent marine waters. Enclosing and filling Snug Harbor, the Rail Slip, and Pier 40F with sheet piles will physically and permanently sever 2.49 acres of open water to create an artificial shoreline. Both use of turbidity curtains temporarily in the marine environment and permanent enclosure of Snug Harbor, the Rail Slip, and Pier 40F with sheet piles results in the potential for entrapment of ESA-listed species, particularly sea turtles and the Hawaiian monk seal. Pelagic species such as the various whales, oceanic whitetip and giant manta ray would not be expected to be affected by the potential stressor as they would not be present within the portion of the action area.

Full-depth turbidity curtains will be used extensively throughout the proposed action area as a measure to minimize turbidity within the harbor. Encircling work areas could potentially trap ESA-listed species. Constant visual surveys for ESA-listed species throughout the action area should ensure animals are not trapped within a turbidity curtain.

The enclosing of Snug Harbor, the Rail Slip and Pier 40F will involve the temporary construction of an in-water, sub-surface rock dike across the entrance to permit in-water filling activities and also contain fill material within the fill area. In addition, a turbidity curtain will be erected across the entrance of the enclosure and water-ward of the rock dike to act as a secondary barrier to contain suspended sediments. The turbidity curtain will be opened to permit entry by vessels and closed behind the vessel(s) prior to in-water filling. The process of driving sheet piles in order to enclose these currently open-water areas could, upon completion, trap ESA-listed species in the enclosure. The enclosures will then be filled for permanent conversion to uplands and any animals within the enclosure would be buried.

The risk for entrapment is higher for sea turtles than for monk seals that are expected to entirely avoid the active work area. If a sea turtle swims into the enclosure prior to driving the final pile and upon closing is entrapped, the entrapped turtle, if not removed from the enclosure, will be buried and die in place. However, the likelihood of this occurrence happening is extremely unlikely. It is known that noise may attract sea turtles that are curious of the origins of the sound, however, it is expected that most ESA-listed species will evacuate the area due to the elevated noise levels and human activity.

Prior to driving the final pile to close off each of these areas, a final diver or boat sweep of the enclosure will occur to ensure the area is void of any ESA-listed species. If a species is discovered within the enclosure prior to final closure, the final pile will not be driven until the species vacates the enclosure of its own accord. If after the final sweep and the final pile is

driven, an ESA-listed species is observed within the closed enclosure, DOT-Harbors will immediately cease work within the enclosure and will contact both the Corps and NMFS to devise a plan for removal. No work may occur within the enclosure until the plan for removal is agreed upon by DOT-Harbors, the Corps and NMFS. In the extremely unlikely event this scenario will actually be realized, however a contingency plan is established as a safeguard. The Corps would be required to initiate formal consultation at that time as take of an ESA-listed species would occur. However, a response would be mobilized to care for the animal which we'd expect would suffer from auditory injury from close range impact driving of the last pile.

Due to the low occurrence of ESA-listed species in the harbor, the anticipated avoidance of the construction area by ESA-listed species, the constant surveying for ESA-listed species and final sweeping prior to final enclosure, NMFS anticipates that the risk for entrapment is extremely unlikely and therefore discountable.

#### *Loss of Habitat*

The Corps may expose ESA-listed species to long-term habitat changes associated with deepening of the water column in the harbor and conversion of U.S. waters to upland, and by the increase of U.S. waters. Pelagic species like the various whales, oceanic whitetip shark and giant manta ray are not considered for this stressor as dredging will not occur within their expected habitat. This stressor would be applicable to the green and hawksbill sea turtles, and the Hawaiian monk seal, which use the inner harbor where dredging will occur.

Of the 82,324 coral colonies to be impacted by the project, 82,157 (205 m<sup>2</sup>) are less than 40 centimeters (cm) in diameter and are not likely to be transplanted. Of these, 25,467 (34 m<sup>2</sup>) are affixed to man-made substrates, and 56,691 (171 m<sup>2</sup>) are affixed to other hard substrates (not on piles or sheet piles), and would be lost (Paahana pers. comm. 2018). However, it should be noted that no ESA-listed coral species are present within Hawaiian waters at this time and are not considered in this consultation. Conversely, the modification of habitat is pertinent to ESA-listed species that do occur within the action area, primarily the hawksbill sea turtle.

The action area where dredging is expected to take place is characterized by high densities of infauna including tunicates, sponges, bryozoans, and bivalves (AECOS 2014). Additionally, the area has approximately twenty sponge species within the project footprint which may provide possible forage for hawksbill sea turtles (AECOS 2014). As NMFS and USFWS (2018) note, in Hawaii, hawksbills have been observed foraging on a variety of prey including octopus, algae, fire worms, black sponges, urchins, frogfish, and more (King 2011, 2015; King and McLeish 2016). Additional research on hawksbill turtle diet is needed to quantify foraging resource requirements. Further, the identification of hawksbill foraging sites remains an important management requirement in order to better protect the species and their key habitats (NMFS and USFWS 2018). Although we do not expect this heavily used commercial shipping port to provide sufficient habitat characteristics required by the species or expect hawksbills to utilize this area of the harbor with any regularity, and sponges are fast growing and would quickly recolonize the area, it's recognized that data gaps occur in the Region.

In addition to the AECOS study of the harbor (2014), the USFWS (2014) surveyed a 19.62-acre study area in Honolulu Harbor. The major habitat structures consist of 0.13 acres of hard bottom and 19.49 acres of unconsolidated sediment. Within the unconsolidated sediment major structure

habitat, approximately 14.95 acres is mud, 1.77 acres is mud rubble, 0.91 acres is sand, 0.99 acres is sand mud, 0.01 acres is sand rubble, and 0.84 acres is rubble (USFWS 2014). Within the hard bottom major structure habitat, approximately 0.13 acres is pavement habitat, 1.93 acres is scattered coral rock in unconsolidated sediment, and 17.56 acres is unconsolidated sediment habitat. While the AECOS (2014) study did not identify sea turtle presence, the USFWS (2014) observed one adult green sea turtle in the entrance channel area foraging on seagrass during their survey. An extensive, well developed, non-native and potentially invasive seagrass (*Halophila decipiens*) meadow was observed on a sand flat in the entrance channel, and another meadow on the east portion of the harbor. While the USFWS (2014) observed no corals or areas of biological importance for large areas of Honolulu Harbor, they also observed numerous corals, macroalgae, invertebrates, and other resources scattered throughout the study area. Most of the observations were associated with hard structure and few isolated locations on sand where seagrass was abundant. This study provides acknowledgement of the species within the general vicinity of the action area.

Green sea turtles and hawksbill sea turtles use the nearshore foraging locations throughout the MHI. Juvenile, sub-adult, and adult sea turtles often take residence in those locations where they forage. While green sea turtles graze primarily on algae and sea grasses, and hawksbill sea turtles graze primarily on sponges, both species have displayed an omnivorous diet in the MHI. Nothing prevents sea turtles from entering the harbor or taking residence inside or in the entrance channel. Green sea turtles are notably present, and two hawksbill sea turtles have been observed in the entrance channel of Pearl Harbor, taking refuge under ledges of hard substrate bordering the channel (Smith et al. 2006). Resident sea turtles could also be common where similar ledges were created when hard surfaces were carved out during original dredging of Honolulu Harbor as corals are present on hard surface borders of the entrance channel as well. With the exception of non-native seagrass beds, none of the dredging areas for this action feature favorable forage areas for green sea turtles, which generally prefer hard bottoms and structure (NMFS 2003). Dredging actions are not expected to take place in the portion of the harbor which contains the sea grass beds.

Unconsolidated sediments host a number of infauna species within the sediments which have minimal forage value for both sea turtle species and Hawaiian monk seals. Some macroalgae could be present in small amounts within the dredging footprint, upon which green sea turtles can forage. The loss of infauna within the dredged and removed sediments will likely have minimal short-term effect to ESA-listed species because they do not forage on them directly. Since macroalgae will be limited to growing on cobbles and small boulders, the amount of macroalgae impacted by dredging will be minimal within the action area and most individual sea turtle foraging ranges. Long-term effects to ESA-listed species will likely be minimal because most infauna and algae are resilient to recruitment and replenishment into new and/or disturbed areas.

The existing action area is a developed and heavily used harbor that is regularly dredged and is a relatively homogenized environment. While the action area provides aquatic habitat for sea turtle species and Hawaiian monk seals, the area is not unique nor does it provide any type or quantity or quality of forage that cannot be found nearby within Pearl Harbor or elsewhere throughout the species range. Deepening of the channels will have no measurable effect on sea turtles and Hawaiian monk seals because the age classes of sea turtles and monk seals that would use the action area are

not depth dependent and effects to the forage capacity of the habitat would only be temporally altered until recolonization of infauna organisms occurs. Furthermore, nearby reefs provide better foraging habitats. Additionally, NMFS would not expect an increase in baseline predation events to ESA-listed species within the action area after dredging and modification of benthic features occurs. We expect alterations of forage habitat to be short-term in nature for green and hawksbill sea turtles, and the Hawaiian monk seal. Additionally, compared to the geographic expanse of each species range and other opportunities for better forage opportunities, we conclude effects of habitat loss from this proposed action will be insignificant.

### *Anchoring*

Ocean conditions are dynamic and unforeseen issues with vessels can potentially occur. While operations are not expected to take place in harsh ocean conditions, vessels will be anchored for safety reasons and would be permissible as long as the BMPs are properly implemented, and the anchors would be removed at the conclusion of the operation. These BMPs include all objects being lowered in a controlled manner during the setting of the anchor, anchorage only occurring in sand with periodic visual observations to monitor dragging and to identify if proper tension is being maintained on the line thereby reducing opportunities for entanglements by ESA-listed species, and monitoring of ocean conditions that might affect the anchors functionality. Spuds will not be used for this proposed action and vessels must be tied off to existing landside features first.

The mooring design for this action, consists of anchors that would use the minimum line length necessary to account for expected fluctuations in water depth due to tides and waves from the vessel(s) to the ocean floor. While intact, the anchor line is expected to be held tight by the combination of buoyancy of the vessel, the pressure exerted on the line by currents and waves, and the anchors holding power. Thus the potential for loops to form in the line is extremely remote. Honolulu Harbor is a protected embayment so large wind waves and swells are not present.

Sea turtles, elasmobranchs and Hawaiian monk seals are highly mobile species which can avoid anchor lines. The remaining vertebrate ESA-listed species under NMFS' jurisdiction that could potentially interact with anchor lines are extremely unlikely to be present near anchor lines. In the extremely unlikely event that an interaction were to occur, the combined weight of the anchor and the pressure exerted on the line by currents make the potential for entanglement extremely unlikely. A taut anchor line would pass harmlessly along the body of a marine animal should an animal encounter one. Further, failed anchors would sink to the seafloor such that any loose line would be short, and the risk of an encounter during the descent of the line with an ESA-listed marine animal is extremely unlikely. Anchor lines could then be manually recovered by a dive team.

Because anchoring would be preferred from a land-based moorage, and the established BMPs, including active monitoring of the anchor system in the unlikely event that it is, any adverse effects to the various sea turtle species, oceanic whitetip sharks, giant manta rays; fin, blue, humpback, sei, sperm, and Main Hawaiian Island insular false killer whales; are extremely unlikely to occur, and are therefore discountable.

### Conclusion

NMFS concurs with your determination that conducting the proposed Kapalama Container Terminal Wharf and Dredge Project is not likely to adversely affect ESA-listed green sea turtles (Central North Pacific Distinct Population Segments (DPS)), hawksbill sea turtles; Hawaiian monk seals; Hawaiian monk seal critical habitat; oceanic whitetip shark; giant manta ray; fin, blue, sei and sperm whales; Main Hawaiian Island insular false killer whale and their designated critical habitat. This concludes your consultation responsibilities for the proposed action under the ESA for species under NMFS's jurisdiction. If necessary, consultation pursuant to Essential Fish Habitat would be completed by NMFS' Habitat Conservation Division in separate communication.

### Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and 7 endangered species. Specifically, conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on ESA-listed species or designated critical habit (50 CFR 402.02).

NMFS recommends the Corps provide monitoring reports to NMFS Pacific Island Regional Office Protected Resources Division in regards to the adaptive management placement and observation zones of project observers as the hydrophone acoustic assessment is conducted to ground-truth metrics of sound exposure effects (isopleths).

### Reinitiation Notice

ESA consultation must be reinitiated if: 1) take occurs; 2) new information reveals effects of the actions that may affect ESA-listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified actions are subsequently modified in a manner causing effects to ESA-listed species or designated critical habitat not previously considered; 4) a new species is listed or critical habitat designated that may be affected by the identified actions; or 5) more than five king piles are driven within a single day as this would significantly alter the resultant isopleths and could result in PTS and TTS levels that would require formal consultation initiation as take would be expected without proper monitoring.

If you have further questions, please contact Joshua Rudolph on my staff at (808) 725-5147 or [joshua.rudolph@noaa.gov](mailto:joshua.rudolph@noaa.gov). Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,



Ann M. Garrett  
Assistant Regional Administrator

NMFS File No. (PCTS): PIR-2018-10336  
PIRO Reference Nos.: I-PI-18-1622-AG

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