

U.S. Department of  
Homeland Security

United States  
Coast Guard



# Request for Incidental Harassment Authorization for Pier Maintenance and Bank Stabilization at Air Station Port Angeles

Revision 3

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## ACRONYMS AND ABBREVIATIONS

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%	percent
μPa	microPascal(s)
4MP	Marine Mammal Monitoring and Mitigation Plan
BMP	best management practice
CalTrans	California Department of Transportation
cm	centimeter(s)
CV	Coefficient of Variation
dB	decibel(s)
DDT	dichlorodiphenyltrichloroethane
DPS	distinct population segment
ESA	Endangered Species Act of 1973
EZ	exclusion zone
FR	Federal Register
ft	foot (feet)
HDG	hot-dip galvanize
Hilcorp	Hilcorp Alaska, LLC
Hz	hertz
kHz	kilohertz
km	kilometer(s)
km <sup>2</sup>	square kilometer(s)
L <sub>max</sub>	maximum rms level
L <sub>pk</sub>	peak received sound pressure level
m	meter(s)
mi	mile(s)
MLLW	mean lower low water
NMFS	National Marine Fisheries Service
N <sub>min</sub>	minimum population estimate
NOAA	National Oceanic and Atmospheric Administration
OPR	Office of Protected Resources
PCZ	Pre-Clearance Zone
PBR	Potential Biological Removal
PSO	protected species observer
PTS	permanent threshold shift
re	relative
rms	root-mean-square

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## ACRONYMS AND ABBREVIATIONS (CONTINUED)

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SFPA	Southern Forest Products Association
SPTA	Southern Pressure Treaters' Association
SRKW	southern resident killer whale
SZ	safety zone
TPS	Transit Protection System
TTS	temporary threshold shift
UME	unusual mortality event
U.S.	United States
U.S. Navy	United States Department of the Navy
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USCG Project	Pier Maintenance and Bank Stabilization at Air Station Port Angeles Project
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WPC	Wood Preservation Canada
WWPI	Western Wood Preservers Institute

# 1. DESCRIPTION OF SPECIFIED ACTIVITY

## 1.1 BACKGROUND AND LOCATION

The United States Coast Guard (USCG) proposes to conduct pier maintenance and bank stabilization on a portion of the shoreline at Air Station Port Angeles, Ediz Hook, Port Angeles, Washington, in Clallam County, Washington (Figure 1). The USCG's proposed Pier Maintenance and Bank Stabilization at Air Station Port Angeles Project (USCG Project) is necessary to protect vital mission support infrastructure from continued tidal action erosion and storm events. This USCG Project will repair up to 372 feet (ft) (113.4 meters [m]) of eroded riprap shoreline, replace 37 degraded timber piles with steel piles, jacket up to 98 timber piles, permanently remove 11 abandoned timber piles, demolish 3 steel camel barrier piles and 2 camels, replace a 300-ft (91.4-m) wave abatement boom, and make other repairs to the pier and wave attenuation wall.

## 1.2 DESCRIPTION OF ACTIVITIES

The USCG Project includes shoreline stabilization and pier maintenance activities as described in the following subsections.

### 1.2.1 Pier Maintenance & Rehabilitation

The USCG proposed the following pier maintenance activities:

1. The Contractor will hand-remove any crabs, sea stars, anemones, sea cucumbers, or similar invertebrates that are at least 3 inches (in.) (7.62 centimeters [cm]) in diameter prior to sea floor excavation, water jetting, or other in-water maintenance and repair work, and prior to placing pulled piles in the barge. All collected animals will be relocated to a suitable kelp bed or area with fringe kelp at least 300 feet (91.44 m) up current of the USCG Project area.
2. Replace 37 timber pier piles with steel piles. Restore wavescreeen strakes and rub blocks attached to piles that are replaced. Existing timber piles are 12 to 14 in. (30.5 to 35.6 cm) in diameter and up to 80 ft (24.4 m) long; new steel piles are 12.75 in. (32.4 cm) in diameter and up to 80 ft (24.4 m) long. Pile tips are typically installed to a depth of 30 ft (9.1 m) below the mudline.
3. Permanently remove 11 "abandoned" 12-to-14-in. (30.5-to-35.6-cm) timber piles.
4. Permanently remove 3 camel barrier piles and 2 camel logs. Existing camel barrier piles are 18-inch (45.7 cm)-diameter steel; the camel logs are 24-in. (61 cm)-diameter high-density polyethylene.
5. Structurally wrap ("jacket") up to 98 timber piles, 53 of which are part of an optional bid. Contractor-selected methods may vary, but the process to jacket a pile typically entails the following steps:
  - a. Excavate the sea floor to approximately 2 ft (0.6 m) below the current mudline. Stockpile excavated material next to the pile and replace after jacket installation is complete.



- b. Use water to blast the pile clean of marine growth, oil, grease, and any other material that could interfere with bonding between the pile and grout.
  - c. Place a carbon-fiber reinforcement sheet and 0.125-inch (0.32-cm)-thick fiberglass jacket around the pile or beam.
  - d. Seal all longitudinal and transverse seams with an epoxy grout designed for underwater application.
  - e. Inject a foam seal at the bottom of the jacket to prevent cementitious grout from leaking out.
  - f. Inject cementitious grout in ports evenly spaced up the side of the jacket, from bottom to top.
  - g. After the grout has cured, seal the top of the jacket with epoxy grout.
6. Remove and re-install existing pier utility systems, decking, stringers, and pile caps as necessary to facilitate replacing, jacketing, or repairing piles.
7. Replace 78 missing, damaged, or broken timber wavescreen boards with marine-approved plastic lumber boards to restore continuity and functionality to the wavescreen attached to the fender piles at the wood pier face.
8. Repair or tighten all pier, pier-pile, and wavescreen connections as needed. Replace bolts, nuts, and washers as required.
9. Remove all marine growth and peeling paint and prepare metal surfaces for marine-grade protective coating, from minus 5 ft mean lower low water (MLLW) to the top of the pile, for each of 17 vertical H-piles and 17 batter H-piles supporting the wave attenuation wall. Remove steel retention plates, apply coating to the underlying pile from 2 ft MLLW to the top of the pile, and coat and re-install the retention plates. Use hand tools to remove material and capture all debris in floating debris nets and dispose of appropriately off site. NOTE: Existing pile coatings vary and surface preparation shall be adjusted to meet existing conditions.
10. Remove all marine growth and peeling paint and prepare metal surfaces for protective coating, from MLLW to the top of the piles, for each of 18 floating dock piles. Remove and re-install bracing assemblies for each pile set to allow coating of underlying pile from 2 ft (0.61 m) MLLW to 12 ft (3.66 m) MLLW. Use hand tools to remove material and capture all debris in floating debris nets and dispose of appropriately off-site. NOTE: Existing pile coatings vary and surface preparation shall be adjusted to meet existing conditions.
11. Individually remove and completely replace each guide pile assembly on Floating Docks #1 and #3 with new to match existing. Hot-dip galvanize (HDG) all metal members and connections. Install new ultra-high-molecular-weight polyethylene rub blocks and spacer assemblies in lieu of rollers. Replace all connecting through-rods with new HDG steel rods.

Replace all end bolts, nuts, and washers with HDG materials. Provide temporary float-to-pile attachments to act in place of the hardware when removed and until replaced.

12. Replace 74 linear ft. (23 m) of stringers, 22 linear ft. (6.7 m) of shims, 10 linear ft. (3 m) of stringers, 102 linear ft. (31.1 m) of deck boards, 14 linear ft. (4.3 m) of pile caps, and 2 linear ft. (0.61 m) of blocks at the pier.

Hand tools, such as a water jet, may be used during pier maintenance and rehabilitation to wash away debris. One example of a hydraulic hand tool, a water jet, is a zero-thrust water compressor used for underwater removal of marine growth or rock debris underwater. The system operates through a mobile pump drawing water from the work location. Hydraulic hand tools, like a CaviDyne CaviBlaster<sup>®</sup> water jet or similar, will be used in very short duration (30 minutes or less at any given time) and intermittent.

Figure 1. USCG Project Action Area (Red Threshold) and Monitoring Zones, Port Angeles Harbor, WA



Because of the short duration of use, ability to immediately cease water jet operations, and small Level B threshold, USCG is not requesting take associated with hand tool or water jet use. As such, use of hand tools, like a water jet, are not further discussed in this application.

### **1.2.2 Pile Removal and Installation and Disposal**

The USCG will conduct pile removal, jacketing, and installation work from a 1,000-ton (2,000,000-pound) barge, attended by a tug hosting the crane and pile drivers/extractors. The barge will also be the platform used for replacement pile and removed pile storage. Pile fabrication will occur off site prior to barge loading.

Pile removal will occur by direct pull. If direct pull is not feasible, crews will use vibratory extraction. Pile removal will be implemented slowly to minimize turbidity and sediment disturbance.

Pile installation will occur by vibratory hammer until refusal is encountered, requiring approximately 30 minutes per pile.

Depending on substrate conditions, final installation will then occur by impact hammer. The number of strikes will vary depending on the substrate and pile. The maximum number of blows per pile by impact hammer will be 100.

All treated wood, including timber piles removed, will be handled consistent with the Western Wood Preservers Institute's (WWPI) *Specifiers Guide to Best Management Practices For the Use of Preserved Wood in Aquatic and Sensitive Environments* (Western Wood Preserver's Institute et al. 2018).

Level B take is being requested as a result of sound generated from pile removal and installation activities as discussed in Section 6, *Take Estimates for Marine Mammals*.

### **1.2.3 Wave Abatement Boom Replacement**

The original wave abatement boom at the west end of the USCG Project area disappeared during a storm within the last year, leaving behind the piles, chain, and a concrete anchor. The process to replace the abatement boom entails the following steps:

1. Install new stainless-steel shackles at the connection points to steel piles, a steel wire rope connection at the timber dolphin, and a new steel chain connecting to the end of the existing chain at the concrete anchor.
2. Install a double wrap of new steel wire rope around the existing timber dolphin for the boom connection point. Secure wire rope to dolphin using galvanized steel eye hooks.
3. Install a new, heavy-duty containment boom consisting of 18-in (46-cm) diameter logs of polystyrene foam wrapped in high-density, double-walled polyethylene.

### **1.2.4 Wave Attenuation Wall Maintenance**

The wave attenuation wall east of the pier will be maintained as follows:

1. Remove all marine growth and peeling paint and prepare metal surfaces for marine-grade protective coating, from minus 5 ft (1.5 m) mean lower low water (MLLW) to the top of the pile, for each of 17 vertical H-piles and 17 batter H-piles supporting the wave attenuation wall.
2. Remove steel retention plates, apply coating to the underlying pile from 2 ft (0.61 m) MLLW to the top of the pile, and coat and re-install the retention plates.
3. Use hand tools to remove material and capture all debris in floating debris nets and dispose of appropriately off site. NOTE: Existing pile coatings vary and surface preparation shall be adjusted to meet existing conditions.

### **1.2.5 Shoreline Stabilization**

Ten discrete shoreline portions will be repaired and stabilized as part of the USCG Project. According to unit personnel, the shoreline began to experience serious erosion and collapse over the past 10 years. Several events with high storm tides and wind driven waves eroded fill behind the shoreline riprap, causing significant collapse. Due to shoreline failure during storm events, the adjacent road, parking areas, and a large portion of the aircraft hangar apron are covered with water, rock, and detritus, requiring frequent clearing. According to a Waterfront Inspection Report conducted at Air Station Port Angeles in June 2018, the remaining life of the shoreline riprap is 5 years if repairs/stabilization activities are not conducted. Additionally, the report states water depth of the riprap is 8.69 ft (2.65 m) at mean higher high water.

The proposed USCG Project will repair 10 discrete areas of damaged riprap shoreline, totaling up to 372 linear ft (113.4 m). Upland structures potentially impeding equipment access will be temporarily relocated. Before placing any riprap, all driftwood and other non-rock materials will be removed from the work area. All large driftwood will be relocated past the east end of the work area and integrated with existing driftwood. Garbage and other non-natural materials will be disposed of appropriately.

The rock used for repairs will be taken from an on-shore stockpile leftover from a previous project. Larger pieces of rock may need to be broken down to provide the correct rock sizes for shoreline stabilization; rock breaking will occur onshore in the dry. Prior to placement, the angular rock will be sorted and sized to provide manageable loads of properly graded stone for placement on the damaged shoreline. Sorting and sizing will occur at the location where the material is currently stored onshore to the east of the aircraft runway.

All work will be conducted from upland areas; no work will be conducted from a barge and no equipment will be operated in the water. The work will be completed at lower tides when repair areas are dry. As a result, no takes are requested for shoreline stabilization activities, and these activities are not further discussed in this application.

## 2. DATES, DURATION, AND SPECIFIED GEOGRAPHIC REGION

Figure 1 presents the USCG Project Action Area in Port Angeles Harbor on Ediz Hook, Port Angeles, Washington in Clallam County. The USCG Project is anticipated to begin as soon as November 2023 and last approximately 90 days. Work will be conducted following the in-water work window (July 16 to February 15; United States Army Corps of Engineers [USACE] 2017) for the Strait of Juan de Fuca and associated bays and inlets, to minimize impacts on salmon and bull trout. In-water work will not be conducted outside of that work window unless otherwise modified in coordination with NMFS and USFWS, as applicable.

Pile driving activities will occur during lowest possible tide conditions over approximately 2 weeks. In-water construction will occur during daylight hours. Lighting on the construction barge may remain on throughout non-daylight hours for safety. USCG requests authorization from National Marine Fisheries Service (NMFS) for the time period of November 15, 2023, through November 14, 2024 to allow for maximum flexibility within the in-water work window.

### 3. SPECIES AND NUMBERS OF MARINE MAMMALS

The seven marine mammal species, including eight stocks, known to occur in or near the Action Area are listed in Table 1. They include humpback whales (*Megaptera novaeangliae*), killer whales (*Orcinus orca*), harbor porpoises (*Phocoena phocoena*), harbor seals (*Phoca vitulina*), northern elephant seals (*Mirounga angustirostris*), Steller sea lions (*Eumetopias jubatus*), and California sea lions (*Zalophus californianus*). Two of the stocks are listed as Endangered under the Endangered Species Act of 1973 (ESA): the California/Oregon/Washington stock of humpback whales and the Southern Resident stock of killer whales. All of these marine mammals are managed by the NMFS, a division of the National Oceanic and Atmospheric Administration (NOAA). Each species is described in detail in Section 4, *Affected Species Status and Distribution*.

Although humpback whales and killer whales occur in the Strait of Juan de Fuca, these species are a rare occurrence in Port Angeles Harbor. Port Angeles Harbor is a semi-enclosed embayment with no through access and high levels of vessel traffic, which presumably deter these larger whales from regularly occurring in the area. However, given their listed status under the ESA, they were included in this IHA request. Non-listed large whales have not been included in this request given their remote likeliness to occur in the Action Area.

**Table 1. Marine Mammals with a Reasonable Potential to be Present in the Action Area**

Species	Stock	ESA/MMPA Status	Known Spatially/Temporally Important Areas	Stock Abundance	Density Near the Action Area (animals per square kilometer)	PBR	Stock Status Factors (UMEs, spills, etc.)
Humpback Whale (Megaptera novaeangliae)	California/Oregon/Washington <sup>1</sup>	Endangered/Strategic	1 BIA in Washington – Calambokidis et al. 2015	2,784 (N <sub>min</sub> ) <sup>1</sup>	0.0108 (summer/fall) <sup>2</sup> – not in strait, but directly outside – no density for winter/spring	33.4 <sup>1,3</sup>	Fisheries, vessel collisions, entanglement <sup>1</sup>
Killer whale (Orcinus orca)	Southern Resident <sup>4</sup>	Endangered/Strategic	Core summer habitat in the Salish Sea <sup>4</sup>	73 (N <sub>min</sub> ) <sup>4</sup>	0.00070 (Spring) <sup>2</sup> 0.00124 (Summer) <sup>2</sup> 0.00097 (Fall) <sup>2</sup> 0.00038 (Winter) <sup>2</sup>	0.13 <sup>4</sup>	Fisheries, vessel collisions, prey decline, DDT contamination <sup>4</sup>
Killer whale (Orcinus orca)	Eastern North Pacific Transient <sup>5</sup>	None/Not Depleted	N/A	346 (N <sub>min</sub> ) <sup>5</sup>	0.0208 (Spring) <sup>2</sup> 0.0146 (Summer) <sup>2</sup> 0.0119 (Winter) <sup>2</sup> 0.0208 (Fall) <sup>2</sup>	2.8 <sup>5</sup>	Fisheries, vessel collisions <sup>5</sup>
Harbor porpoise (Phocoena phocoena)	Washington Inland Waters <sup>6</sup>	None/Not Depleted	Densely localized aggregations and increased seasonal densities have been reported in the Strait of Juan de Fuca, near Victoria. <sup>7</sup>	8,308 (N <sub>min</sub> ) <sup>6</sup>	2.16000 (Annual) <sup>2</sup>	66 <sup>6</sup>	Fisheries, entanglement, strandings <sup>6</sup>
Harbor seal (Phoca vitulina)	Washington Northern Inland Waters <sup>8</sup>	None/Not Depleted	Haulouts located 2.19 mi (3.52 km) west and 1.49 mi (2.4 km) southwest of project location (Figure 2)	11,036 <sup>9</sup>	0.76000 (Annual) <sup>2</sup>	N/A	Shooting, vessel strikes, entanglement <sup>8</sup>
Northern elephant seal (Mirounga angustirostris)	California Breeding <sup>10</sup>	None/Not Depleted	Major breeding rookeries occur along the west coast of Baja California and the California coast <sup>11</sup>	81,368 <sup>10</sup>	0.00240 (Spring) <sup>2</sup> 0.00250 (Summer) <sup>2</sup> 0.00290 (Fall) <sup>2</sup> 0.00060 (Winter) <sup>2</sup>	4,882 <sup>10</sup>	Shooting, vessel strikes, entanglement, fisheries <sup>10</sup>
Steller sea lion (Eumetopias jubatus)	Eastern DPS <sup>12</sup>	None/Not Depleted	Haulout sites located primarily along the outer coast from the Columbia River to Cape Flattery. Smaller numbers use the Strait of Juan de Fuca. <sup>13</sup>	43,201 (N <sub>min</sub> ) <sup>12</sup>	0.00030 (Spring/Summer) <sup>2</sup> 0.00270 (Fall/Winter) <sup>2</sup>	2,592 <sup>12</sup>	Fisheries, marine debris, shooting, vessel strike, subsistence <sup>12</sup>
California sea lion (Zalophus californianus)	United States <sup>14</sup>	None/Not Depleted	Major breeding rookeries located on islands located in southern California, western Baja California, and the Gulf of California. <sup>14</sup>	233,515 (N <sub>min</sub> ) <sup>15</sup>	0.00840 (March/April) <sup>2</sup> 0.15040 (May/June) <sup>2</sup> 0.00100 (July/August) <sup>2</sup> 0.30080 (September) <sup>2</sup> 0.01050 (October/November) <sup>2</sup> 0.01070 (Winter) <sup>2</sup>	14,011 <sup>14</sup>	Shootings, hook and line fisheries, power plant entrainment, marine debris entanglement, oil exposure, vessel strikes, dog attacks. <sup>14</sup> UME during 2013-2017 <sup>16</sup>

**Notes:**

<sup>1</sup> Carretta et al. 2020

<sup>2</sup> U.S. Navy 2019

<sup>3</sup>PBR is calculated for each marine mammal stock and is the maximum number of animals, not including natural mortality, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population, which is a goal of the MMPA. For more information on how PBR is calculated for marine mammal stocks, see *NOAA's Guidelines for Preparing Stock Assessment Report* (NOAA 2023).

<sup>4</sup> Carretta et al. 2021

<sup>5</sup> Forney et al. 2000

<sup>6</sup> Carretta et al. 2017

<sup>7</sup> Hall et al. 2002

<sup>8</sup> Carretta et al. 2014

<sup>9</sup> Jefferies et al. 2003

<sup>10</sup> Carretta et al. 2015

DDT – Dichlorodiphenyltrichloroethane

DPS – distinct population segment

Nmin – minimum population estimate

<sup>11</sup> Lowry et al. 2014

<sup>12</sup> Muto et al. 2020

<sup>13</sup> Wiles 2015

<sup>14</sup> Carretta et al. 2019

<sup>15</sup> Laake et al. 2018

<sup>16</sup> Cavole et al. 2016

PBR – Potential Biological Removal

UME – unusual mortality event



## 4. AFFECTED SPECIES STATUS AND DISTRIBUTION

### 4.1 HUMPBACK WHALE

#### 4.1.1 Status and Management

Humpback whales (*Megaptera novaeangliae*) occur throughout the Pacific Ocean, with one recognized stock occurring along the United States (U.S.) west coast, including the Action Area (the California/Oregon/Washington stock). Figure 2 shows overlap of the humpback whale's range with the Action Area. The hatch marked area shown in the upper lefthand portion of the figure is designated critical habitat for this stock. The stock includes two separate feeding groups: a California and Oregon feeding group of whales that includes whales from an endangered Central American distinct population segment (DPS) and a threatened Mexican DPS and a Northern Washington and Southern British Columbia feeding group that includes whales from the threatened Mexican DPS and also whales from the unlisted Hawaii and endangered Central American DPSs (Carretta et al. 2020). Whales from three different DPSs (Hawaii, Mexico, and Central America) are included in the California/Oregon/Washington stock.

#### 4.1.2 Distribution

Humpback whales occur widely in the North Pacific Ocean and migrate between feeding areas in the spring through the fall that range from the U.S. west coast in the eastern Pacific to Russia in the western Pacific; low latitude winter breeding areas extend from Central America in the eastern Pacific to the Philippines in the western Pacific. Adult humpback whales, which may be approximately 50 ft (16 m) and weigh up to 36 metric tons, feed primarily on krill, herring, sardine, anchovy, and other small forage species. Strong site fidelity has been shown by humpback whales to both specific feeding grounds and breeding areas (Ivashchenko et al. 2016). The California-Oregon-Washington stock is estimated at 2,784 whales (Carretta et al. 2020). Entanglements with fishing gear (e.g., Dungeness crab gear and gillnets) present the most frequently documented sources of serious injury and mortality to humpback whales along the U.S. west coast (Carretta et al. 2013, 2019). Observed ship strikes account for serious injury or death to approximately 2.2 whales per year from the California-Oregon-Washington stock, though humpback whale mortality based on models of whale density, vessel traffic characteristics, and whale movement patterns due to ship strikes was estimated at 22 deaths per year (Becker et al. 2016).

#### 4.1.3 Site-Specific Occurrence

Humpback whales have returned to the Salish Sea, an area that they occupied prior to whaling but had been largely vacant of these animals until recently (Calambokidis et al. 2017). The most current estimate of humpback whale abundance in Washington and southern British Columbia is 526 whales (Coefficient of Variation [CV]=0.23) based on a 2-year period from 2013 to 2014 (Calambokidis et al. 2017). From 1988 to 2015, 154 unique individual humpback whales were identified within Washington-British Columbia inside waters, with 500 or more sighting reports of humpback whales in the Salish Sea in both 2014 and 2015. Humpback whales are most often spotted in the Port Angeles area from May to June and from September to October, during their migration (Patry 2022). During a 2016-2017 U.S. Navy Department of the Navy (U.S. Navy) Pier and Support Facilities for Transit Protection System (TPS) project in Port Angeles (U.S. Navy TPS Port Angeles Project), three "possible" whale sightings were recorded; however, species and confirmation could not be obtained (Northwest Environmental Consulting, LLC., 2018).

## 4.2 KILLER WHALE – SOUTHERN RESIDENT STOCK

### 4.2.1 Status and Management

Southern Resident Killer Whales (*Orcinus orca*) (SRKWs) inhabit the waters of Washington's Puget Sound during the summer and fall months each year. This stock is the most likely to occur in or near Port Angeles. The population, consisting of three family groups of whales known as J, K, and L pods, have been listed as endangered under the ESA since 2005. Figure 2 shows the overlap of the SRKW's range with the Action Area. The entire shaded area shown on the figure is also designated critical habitat for this stock.

### 4.2.2 Distribution

The current population of SRKWs is 73 and has been slowly declining since 1996 when 96 whales were counted (Carretta et al. 2021). The main reasons for the population decline are believed to be reduced quantity and quality of prey, noise and disturbance from vessels, and persistent organic pollutants that bioaccumulate and cause immune or reproductive system dysfunction. Additionally, the whales' small population size may lead to poor health through inbreeding (NMFS 2021). In 2021 NMFS revised the critical habitat designation for the SRKW DPS by expanding it to include habitat along the U.S. west coast, while maintaining the whales' current critical habitat in inland waters of Washington. The newly designated habitat includes approximately 16,000 square miles of marine waters (ranging in depth from 6.1 m to 200 m) from the U.S. border with Canada to Point Sur, California. Efforts are currently underway to recover chinook salmon, the whales' main food source, in Puget Sound and other inland and coastal waters. Recommendations for the recovery of SRKWs over the next 5 years includes: protection from harmful vessel impacts; conservation of critical prey; improvement in our knowledge of SRKW health to advance recovery and support emergency response; and raising awareness about the needs of SRKWs through education and outreach (NMFS 2021).

### 4.2.3 Site-Specific Occurrence

The SRKW is a trans-boundary stock that includes whales in inland Washington and southern British Columbia. Residency patterns vary by year, month, area, and pod (Hanson and Emmons *in prep* as cited in U.S. Navy 2019). Along the Strait of Juan de Fuca, the density of SRKWs is estimated at 0.00038 animals per square kilometers (km<sup>2</sup>) during the winter and increases to 0.00124 animals per km<sup>2</sup> in the summer (U.S. Navy 2019). During the 2016-2017 U.S. Navy TPS Port Angeles Project, three "possible" whale sightings were recorded; however, species and confirmation could not be obtained (Northwest Environmental Consulting, LLC., 2018).

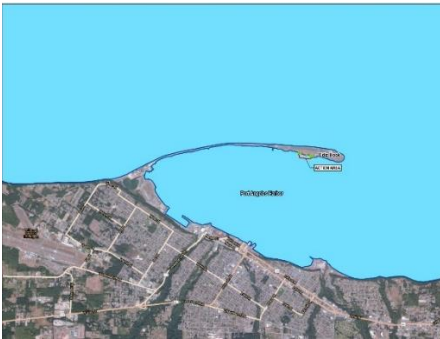
**Figure 2. Overlapping Ranges of Marine Mammals with the Action Area**



**Humpback Whale**



**Killer Whale (Southern Resident)**



**Killer Whale (Eastern North Pacific Transient)**



**Harbor Porpoise**



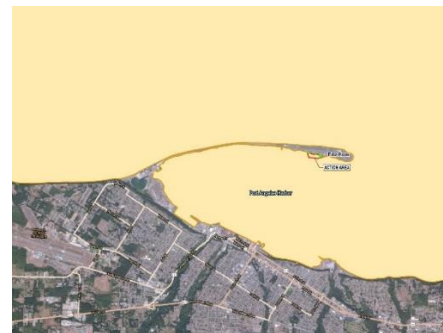
**Harbor Seal (shows past haulout distances)**



**Northern Elephant Seal**



**Steller Sea Lion**



**California Sea Lion**

## 4.3 KILLER WHALE – EASTERN NORTH PACIFIC TRANSIENT STOCK

### 4.3.1 Status and Management

Populations of transient killer whales occur in the Salish Sea in the vicinity of Port Angeles. Transient or Bigg’s killer whales, which prey exclusively on marine mammals, are part of a single population ranging from southeastern Alaska to California, the Eastern North Pacific Transient stock. Unlike the SRKW, transient killer whales do not migrate and can be found in any part of their range at any time of year. In recent years, transient killer whale visits to the Salish Sea have increased substantially (Houghton et al. 2015). Transient killer whales are not currently listed under the ESA but are protected under the MMPA. Figure 2 shows the overlap of the Eastern North Pacific Transient stock of killer whales’ range with the Action Area.

### 4.3.2 Distribution

The west coast transient killer whale population is estimated to number approximately 346 whales (Forney et al. 2000) and may be near carrying capacity (WDFW 2022). Although their habitats overlap, SRKWs and transient killer whales are genetically distinct and do not interact or interbreed, and generally avoid one another (The Seadoc Society 2022). Approximately 350 individual transient killer whales have been identified as likely to occur within coastal regions, and over 200 individuals are known to use the Salish Sea on a regular basis (Shields et al. 2018). In Puget Sound, transient killer whales are commonly seen hunting in small groups (two to six individuals) for harbor seals, while in other parts of their range transient whales prey on Dall’s porpoises, Steller sea lions, minke whales, grey whales, and occasionally birds (WDFW 2022). One group of transients (matrilineal group T065A) has been observed intentionally stranding in order to scare seals they are hunting into the water (The Seadoc Society 2022).

Similar to SRKWs, transient killer whales are impacted by high contaminant loads of persistent organic pollutants, which include polychlorinated biphenyls, dichlorodiphenyltrichloroethane (DDT), and other pesticides. These contaminants bioaccumulate in their tissues to concentrations that are among the highest of any marine organism. Transient killer whales are also impacted, though to a lesser degree than SRKWs, by noise from vessels and other human-made noises resulting from underwater construction, drilling, and resource exploration. Anthropogenic noise pollution can impact the whales by inhibiting their ability to navigate, hunt, and communicate with other members of their pod (NMFS 2021).

### 4.3.3 Site-Specific Occurrence

Transient killer whales have an estimated density in Washington’s Inland Waters ranging from 0.01188 animals per km<sup>2</sup> in winter to 0.02079 animals per km<sup>2</sup> in spring and fall based on monthly occurrence data from 2004 to 2010 (U.S. Navy 2019; Houghton et al. 2015). They can be found during all times of year in the Salish Sea and are occasionally observed near Port Angeles. During the Navy TPS Port Angeles Project in 2016-2017, three “possible” whale sightings were recorded, however species and confirmation could not be obtained (Northwest Environmental Consulting, LLC., 2018).

## 4.4 HARBOR PORPOISE

### 4.4.1 Status and Management

Harbor porpoises are protected under the MMPA but are not listed as “depleted.” Under the ESA, they are not listed as either “threatened” or “endangered.” NMFS recognizes two distinct stocks of harbor porpoises in Washington: the Oregon Washington Coast stock, which occupies the coastal area from approximately Lincoln City, OR to Cape Flattery, WA, and the Washington Inland Waters stock, which is the stock expected to occur in the vicinity of Port Angeles and its surrounding areas (NMFS 2013). Figure 2 shows the overlap of the Washington Inland Waters stock of harbor porpoises’ range with the Action Area.

### 4.4.2 Distribution

Harbor porpoises (*Phocoena phocoena*) residing in the eastern North Pacific Ocean have a range that extends from Point Barrow Alaska to Point Conception, California, occurring year-round in the inland trans-boundary waters of Washington and British Columbia. The most recent stock estimate for the population inhabiting Washington Inland Waters is 11,233 porpoises (CV = 0.37) based on aerial line-transect surveys from 2013 and 2015 in Puget Sound, the Strait of Juan de Fuca, and the San Juan Islands (Jefferies et al. 2016). During these surveys the highest densities of harbor porpoises occurred around the San Juan Islands and in northern Puget Sound. A previous stock estimate of 10,682 animals was reported for Washington Inland Waters in 2002 to 2003 (CV=0.38) (J Laake, unpublished data, *as cited in* Carretta et al. 2013).

### 4.4.3 Site-Specific Occurrence

Harbor porpoises may have a regular presence in the Strait of Juan de Fuca; however, they are only rarely present in the waters around Port Angeles Harbor. Observers reported sightings of six harbor porpoises during pile driving activities associated with the Navy TPS Port Angeles Project in 2016 to 2017 (Northwest Environmental Consulting, LLC., 2018).

## 4.5 HARBOR SEAL

### 4.5.1 Status and Management

While protected under the MMPA, harbor seals (*Phoca vitulina richardii*) are not considered to be “depleted” or “strategic” under the MMPA or “threatened” or “endangered” under the ESA. Five harbor seal stocks are recognized along the west coast of the continental United States: the Southern Puget Sound stock, the Washington and Northern Inland Waters stock, the Hood Canal stock, the Oregon/Washington Coast stock, and the California stock. The Northern Inland Waters stock is the stock that occupies the area around Port Angeles (Jefferson et al. 2021) and is the stock expected to potentially enter the project area. Figure 2 shows the overlap of the harbor seal’s range with the Action Area.

### 4.5.2 Distribution

Harbor seals, which occur along the entire U.S. west coast, are non-migratory animals and exhibit site fidelity for haulout sites (Carretta et al. 2014). Harbor seals are one of the most adaptable seals in existence and can haul out in a variety of terrestrial environments. In some locations in Alaska, they are known to inhabit freshwater lakes (Riedman and Estes 1990). Threats to the continued

survival of harbor seal stocks in the inland waters of Washington include climate change, which can affect water conditions and prey, incidental deaths associated with local fisheries, water pollution, and disturbance and displacement associated with human activities and underwater noise (Jefferson et al. 2021).

#### **4.5.3 Site-Specific Occurrence**

The population residing in Washington's inland waters was estimated to be 11,036 (CV=0.15) in 2003 (Carretta et al. 2014). However, a more recent aerial-line transect study from 2013 to 2016 on behalf of the U.S. Navy estimated the Washington Northern Inland Waters stock at 7,513 seals (CV= 0.12) (Jefferson et al. 2021). The current population trend is unknown but may have declined since 1999 due to increased predation by killer whales in the Salish Sea (Jefferson et al 2021). Harbor seals have haulouts throughout Puget Sound and the Strait of Juan de Fuca (Jefferies 2000) and some of their haulouts are in close proximity to the Action Area. They haul out year-round on log booms and beach areas. Known haulout locations near the Action Area are indicated in Figure 2. One is approximately 11,572 ft (3,527 m) west and the other is approximately 7,877 ft (2,401 m) south of the project area. Haulout locations may change, and harbor seals may also use other undocumented haulout sites near the Action Area.

As a result, harbor seals are expected to forage within the Port Angeles Harbor. Observers reported sightings of 261 harbor seals during pile driving associated with the Navy TPS Port Angeles Project in 2016-2017 (Northwest Environmental Consulting, LLC., 2018).

### **4.6 NORTHERN ELEPHANT SEAL**

#### **4.6.1 Status and Management**

Northern elephant seals (*Mirounga angustirostris*) are not listed as “threatened” or “endangered” under the ESA, and while they are protected under the MMPA, they are not listed as either “depleted” or “strategic”. The California Breeding stock ranges into the Action Area and may be present during proposed activities. Figure 2 shows the overlap of the California Breeding stock of northern elephant seals' range with the Action Area.

#### **4.6.2 Distribution**

Northern elephant seals occur in the eastern and central North Pacific Ocean, ranging along the U.S. west coast from southern California to southern Alaska. NMFS recognizes a single stock in U.S. waters; a separate breeding population in Baja California, Mexico is considered to be demographically isolated from the California Breeding stock (Carretta et al. 2017). The seals in the U.S. stock typically breed and give birth in California in December and January, after which males migrate to the Gulf of Alaska and western Aleutian Islands in the spring to feed on benthic prey; females migrate to the Gulf of Alaska and the central North Pacific Ocean to feed on pelagic prey (Carretta et al. 2016). The stock population is estimated to be 81,368 (Carretta et al. 2014). The population has been estimated to have an annual growth rate of 3.8 percent (%) since 1988 (Lowry et al. 2014).

#### **4.6.3 Site-Specific Occurrence**

Seasonal abundance estimates for northern elephant seals in the inland waters of Washington (Strait of Juan de Fuca) range from 3 animals in winter to 12 animals in fall (U.S. Navy 2019).

Haulouts for Northern elephant seals are located on offshore islands or islands and spits in the Strait of Juan de Fuca (Jefferies et al. 2000). Observers reported no sightings of northern elephant seals during pile driving activities associated with the Navy TPS Port Angeles Project in 2016 through 2017 (Northwest Environmental Consulting, LLC., 2018).

## **4.7 STELLER SEA LION**

### **4.7.1 Status and Management**

There are two DPSs of Steller sea lion based on genetic differences, phenotypic traits, little genetic exchange, and disparate population trajectories (Stocking and Wiles 2021). The Western DPS is listed as “endangered” under the ESA and “depleted” under the MMPA; the Eastern DPS, while protected under the MMPA, is not listed as either “strategic” or “depleted”, nor is it listed as “threatened” or “endangered” under the ESA. Any Steller sea lions residing in the vicinity of Port Angeles are presumed to be from the Eastern DPS. Figure 2 shows the overlap of the Eastern DPS of Steller sea lions’ range with the Action Area.

### **4.7.2 Distribution**

Steller sea lions (*Eumetopias jubatus*) occur along the U.S. west coast from northern California to southern Alaska and reside year-round in Washington’s nearshore waters. There are two distinct populations of Steller sea lions that differ both genetically and morphologically: the Western DPS, which includes all Steller sea lions originating from rookeries west of Cape Suckling, Alaska (144° west longitude), and the Eastern DPS, which includes all Steller sea lions originating from rookeries east of Cape Suckling, Alaska (Muto et al. 2020). Steller sea lions are known to track abundant prey over long distances, resulting in patchy seasonal distributions. Their haulouts for resting and rookeries for breeding and pupping in the Eastern DPS are typically located on islands and offshore rocks (Stocking and Wiles 2021). The Eastern DPS minimum population estimate ( $N_{\min}$ ) estimated at 43,201 animals (Muto et al. 2020).

### **4.7.3 Site-Specific Occurrence**

The closest known haulout for Steller sea lions is approximately 15 mi (24.14 km) away from Port Angeles on the Canadian side of the Strait of Juan de Fuca (Jefferies et al. 2000). Thus, although Steller sea lions may occasionally use the waters around Port Angeles to pursue local prey, their presence in Port Angeles harbor is likely limited due to the long transit involved in returning to their haulout site. Observers reported sightings of two Steller sea lions during pile driving activities associated with the Navy TPS Port Angeles Project in 2016-2017 (Northwest Environmental Consulting, LLC., 2018).

## **4.8 CALIFORNIA SEA LION**

### **4.8.1 Status and Management**

California sea lions (*Zalophus californianus*) are protected under the MMPA and are not listed as “threatened” or “endangered” under the ESA. They belong to the “eared seal,” or *Otariidae*, family. Animals from the Pacific Temperate DPS range into the Action Area and may be seen during the proposed activities. Figure 2 shows the overlap of the Pacific Temperate DPS of California sea lions’ range with the Action Area.

#### **4.8.2 Distribution**

California sea lions range from Baja California and the Gulf of Mexico to southeast Alaska and occur in five genetically distinct populations. The Pacific Temperate DPS resides along the entire U.S. west coast as well as the coastal waters of British Columbia, Canada and includes rookeries within U.S. waters (Carretta et al. 2021). California sea lions breed mainly in rookeries located in the California Channel Islands of Santa Barbara, San Nicolas, San Miguel, and San Clemente, as well as in Baja California. Following breeding, which occurs in the summer months, most adult and sub adult California sea lions migrate northward to central and northern California, Oregon, Washington, British Columbia, and southern Alaska. In the spring, the southward migration generally peaks in Washington in March and April and by June, most sea lions have left the Northwest (NMFS 1997). California sea lions are known to enter harbors, estuaries, and river mouths, and can be found hauling out on buoys, docks, boats, jetties, and other man-made structures. The current population estimate is 233,515 (Laake et al. 2018). The California sea lion population for Puget Sound was estimated as ranging from 58 animals during the summer months to 601 animals during the winter months (U.S. Navy 2019).

#### **4.8.3 Site-Specific Occurrence**

California sea lions spend approximately 56% of the time in the water and are hauled out 44% of the time (DeLong et al. 2017). In Port Angeles Harbor there are no known California sea lion haul outs and the nearest known haulout is at Sombio Point, which is approximately 45 mi (72.4 km) from Port Angeles (Jefferies et al. 2000). As a result, their use of Port Angeles Harbor is likely be limited. However, occasional foraging forays may bring them into the area as surveys at Navy facilities indicate a few individuals are present in the area through mid-June to July with some arrivals in August (U.S. Navy 2019). Observers reported sightings of 12 California sea lions during pile driving activities associated with the Navy TPS Port Angeles Project in 2016 and 2017 (Northwest Environmental Consulting, LLC 2018).



## 5. TYPE OF INCIDENTAL TAKE AUTHORIZATION BEING REQUESTED

The MMPA defines “harassment” as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but that does not have potential to injure a marine mammal (Level B harassment) (50 Code of Federal Regulations, Part 216, Subpart A, Section 216.3-Definitions). USCG requests an authorization from the NMFS, under Section 101(a)(5)(D) of the MMPA for incidental takes by Level B harassment (as defined by Title 50 Code of Federal Regulations, Part 216.3) of small numbers of marine mammals as described in Section 6, *Take Estimates for Marine Mammals*. Level B harassment is expected to occur during removal of existing piles and driving of new piles, as described in Section 1, *Description of Specified Activity*.

With implementation of the measures outlined in Section 11, *Mitigation Measures to Protect Marine Mammals and their Habitat*, of this request and the attached Marine Mammal Monitoring and Mitigation Plan (4MP), no injury to marine mammals (i.e., Level A harassment) is anticipated, and no Level A takes are requested.

The analysis included in Section 6, *Take Estimates for Marine Mammals*, estimates the number of marine mammals potentially exposed to levels of sound that may result in Level B harassment.

## 6. TAKE ESTIMATES FOR MARINE MAMMALS

Activities associated with the proposed USCG Project having potential to harass small numbers of marine mammals in the Action Area include extraction of existing piles and driving of new piles using a vibratory hammer and pile proofing using an impact hammer, as described in Section 1, *Description of Specified Activity*. This section provides information on the applicable sound criteria, a description of the sound sources, and a description of the methods used to calculate numbers of marine mammals expected to be encountered during activities included in the scope of this IHA request.

Exposure estimates of each species were determined, as detailed in the sections that follow, by:

- Estimating the area of impact where noise levels exceed acoustic thresholds for marine mammals;
- Evaluating the number of marine mammals of each species likely to be present in the Action Area, based on density; and
- Estimating potential underwater Level B harassment exposures by multiplying the density of each marine mammal species by its probable duration of exposure (i.e., number of days) during pile driving and removal.

### 6.1 APPLICABLE SOUND CRITERIA

#### 6.1.1 Underwater Sounds

NOAA's 2018 Revision to: *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts* separates marine mammals into functional hearing groups as presented in Table 2.

For Level A harassment from underwater sounds, the NOAA Technical Memorandum (NMFS 2018) provides guidelines for assessing the onset of permanent threshold shifts (PTS) from anthropogenic sound. Source types are separated into impulsive (e.g., impact hammer) and non-impulsive (e.g., vibratory hammer). Similar to other projects in the area, USCG does not expect Level A harassment to occur.

The current underwater threshold used by NMFS to estimate Level B harassment is 160 dB re 1  $\mu$ Pa rms for impulsive sound (e.g., impact hammer) and 120 dB re 1  $\mu$ Pa rms for non-impulsive sound (e.g., vibratory hammer) for all marine mammals. Table 2 provides a summary of the disturbance guidelines. For purposes of this section, all underwater sound pressure levels are reported as dB re 1  $\mu$ Pa.

#### 6.1.2 Airborne Sounds

In addition to underwater sounds, pile driving, and removal generates airborne sounds potentially resulting disturbance to pinnipeds hauled out onshore or swimming/resting at the water's surface. NMFS has not established a threshold for Level A injury for airborne sound for marine mammals.

As a result, the USCG analyzed the potential for seals to be exposed to airborne sounds potentially resulting in Level B harassment. The airborne noise threshold for behavioral harassment for harbor seals is 90 dB rms re 20  $\mu$ Pa (unweighted) and 100 dB rms re 20  $\mu$ Pa (unweighted) for other pinnipeds (see Table 2).

**Table 2. Summary of NMFS Acoustic Thresholds<sup>1</sup>**

Marine Mammals	Injury (Level A) Underwater Threshold <sup>2</sup>		Disturbance (Level B) Underwater Threshold <sup>2</sup>		Disturbance (Level B) Airborne Threshold <sup>3</sup>
	Impulsive (Impact Hammer)	Non-Impulsive (Vibratory Hammer)	Impulsive (Impact Hammer)	Non-Impulsive (Vibratory Hammer)	Impulsive (Impact Hammer) and Non-Impulsive (Vibratory Hammer)
Low-Frequency Cetaceans	219 dB Lpk 183 dB SEL	199 dB SEL	160 dB rms	120 dB rms	N/A
Mid-Frequency Cetaceans	230 dB Lpk 185 dB SEL	198 dB SEL	160 dB rms	120 dB rms	
High-Frequency Cetaceans	202 dB Lpk 155 dB SEL	173 dB SEL	160 dB rms	120 dB rms	
Phocid Pinnipeds	218 dB Lpk 185 dB SEL	201 dB SEL	160 dB rms	120 dB rms	90 dB rms (unweighted) for harbor seals 100 dB rms (unweighted) for all other phocids
Otariid Pinnipeds	232 dB Lpk 203 dB SEL	219 dB SEL	160 dB rms	120 dB rms	100 dB rms (unweighted)

**Notes:**

<sup>1</sup> NMFS 2018

<sup>2</sup> Underwater thresholds reported in dB re 1  $\mu$ Pa.

<sup>3</sup> Airborne thresholds reported in dB re 20  $\mu$ Pa.

dB = decibel(s)

Lpk = peak received sound pressure level

SEL = sound exposure level

rms = root-mean-square

N/A = Not Applicable

## 6.2 SOUND SOURCES

Two primary methods of pile installation and removal are proposed: vibratory and impact. Vibratory hammers are not impact tools. They use vibration to install piles into the substrate. Impact hammers use a heavy piston to strike the top of the pile, driving it into the substrate from the downward force of the hammer. The vibratory method is the primary technique proposed for pile installation (estimate of 90% of pile driving) and removal for this project. In some substrates, a vibratory driver may be insufficient to advance a pile until it reaches the required depth. In these cases, an impact hammer may be used to complete installation. For load-bearing piles, an impact hammer may be used to ensure it has met load-bearing specifications; this is referred to as “proofing.” Because impact driving of piles can produce underwater sound levels known to be harmful to fish and wildlife, piles will be installed to the extent practicable with a vibratory driver

and only impact driven when required for proofing or when a pile cannot be advanced with a vibratory driver due to hard substrate conditions.

Vibratory pile drivers have relatively low sound levels compared to impact drivers (Table 3) and are not expected to cause injury to marine mammals. Table 3 presents proxy sound sources used for underwater and airborne analysis and calculations. The U.S. Navy reviewed airborne sound pressure levels from multiple sources of pile driving activity to determine an appropriate proxy for its Navy TPS Port Angeles project for steel piles ranging in size from 24 to 36 in. (U.S. Navy 2015). The sound pressure level closest to pile type and size proposed for this USCG Project was recorded from driving of 24-in. steel pipe piles using vibratory hammer (92 dB) and impact hammer (110 dB) techniques. Since sound levels from driving piles for the proposed USCG Project would be less due to smaller diameter, mostly vibratory driven with impact driving only for final depth attainment and proofing purposes, these proxy values are considered conservative.

As described in Section 11, *Mitigation Measures to Protect Marine Mammals and their Habitat*, PSOs will monitor exclusion zones (EZs) and safety zones (SZs), implementing mitigation measures when appropriate.

**Table 3. Sound Source Levels from Use of Vibratory and Impact Pile Drivers**

Source	Underwater Sound Levels (dB)		Airborne Sound Levels (dB)	
	Vibratory Pile Driver Source Level (rms)	Impact Pile Driver Source Level (SEL/rms)	Vibratory Pile Driver Source rms $L_{max}$ (unweighted impact)	Impact Pile Driver Source Level rms $L_{max}$ (unweighted impact)
12- to 14-in. Timber Piles	160 <sup>1</sup>	N/A	92 <sup>4</sup>	110 <sup>4</sup>
12-in. Steel Piles	155 <sup>1</sup>	166 <sup>2</sup> /177 <sup>3</sup>		
18-in. Steel Piles	158 <sup>3</sup>	N/A		

**Notes:**

<sup>1</sup> The Greenbush Group 2018

<sup>2</sup> Laughlin 2006

<sup>3</sup> CalTrans 2020

<sup>4</sup> After reviewing 22 sources, US Navy (US Navy) determined these were the max sound pressure levels recorded (for impact and vibratory driving of 24-inch steel piles) (US Navy 2015)

dB – decibel(s)

in. – inch(es)

rms – root-mean-square

SEL – sound exposure level

$L_{max}$  – maximum rms level

A maximum of 5 piles driven using an impact hammer and 5 to 8 piles driven and removed (10 to 16 total) by the vibratory hammer is assumed in a 24-hour period. The impact hammer is assumed to require up to 100 strikes per pile. The vibratory hammer is assumed to take no more than 30 minutes per pile (maximum of 8 hours of vibratory pile driving per day). The same Single Strike sound exposure level (SEL) and rms used for the underwater Level A calculations was used in underwater Level B calculations.

### 6.3 MARINE MAMMAL DENSITY ESTIMATES

Density estimates provided in the Navy Marine Species Density Database of U.S. Pacific and Gulf of Alaska were used for exposure estimate calculations. As described in Section 2, *Dates, Duration, and Specified Geographic Region*, the proposed in-water activities are expected to occur as soon as November 2023 and within the in-water work window (July 16 – February 15). The highest density values during the in-water work window, as presented in Table 1, were used for exposure estimates, as summarized below in Table 4.

**Table 4. Densities of Marine Mammals Anticipated to be Present in the Action Area During the USCG Project**

Species	Density Near the Action Area <sup>1</sup>
Humpback Whale	0.0027(Summer-Fall)
Killer whale (Southern Resident stock)	0.0012 (Summer)
Killer whale (Eastern North Pacific stock)	0.0208 (Fall)
Harbor porpoise	2.1600 (Annual)
Harbor seal	0.7600 (Summer-Fall)
Northern elephant seal	0.0029 (Fall)
Steller sea lion	0.0027 (Winter-Fall)
California sea lion	0.3 (September)

Notes:

<sup>1</sup>U.S. Navy 2019

### 6.4 THRESHOLD DISTANCES, AREAS OF ENSONIFICATION, AND DURATION

Distances to underwater Level A and Level B thresholds and ensonified areas for continuous (i.e., vibratory hammer) and impulsive (i.e., impact hammer) noise sources were calculated using the Exposure Calculation Spreadsheet submitted in tandem with this application and based on the NMFS User Spreadsheet. Sound level measurements used for calculations are presented in Table 3. The Level A and Level B threshold distances for pile driving and removal activities are presented in Table 5. Based on threshold distances, areas of Level A and Level B ensonification were calculated and are presented in Table 6 and on Figures 3 through 8. For underwater sounds, the ensonified areas were clipped to the shoreline. The duration of exposure was calculated based on a maximum of 16 timber piles removed per day and 10 steel piles installed per day. Each pile removal or installation is assumed to require 30 minutes of vibratory equipment use (i.e., maximum of 8 hours of equipment use for timber removal per 24 hours and 5 hours for steel pile removal/installation). The maximum number of days pile driving will occur is assumed to be 14 days.

For airborne threshold distances were calculated using a spherical spreading loss model, assuming average atmospheric conditions, The transmission loss equation is:

$$TL = 20 \log_{10} \left( \frac{R_1}{R_2} \right)$$

Where:

- TL is the transmission loss in dB
- R1 is the distance of the modeled SPL from the driven pile
- R2 is the distance from the driven pile of the initial measurement

In practice, this equation can be rearranged to solve for the distance at which sound attenuates to an acoustical threshold (NMFS 2013):

$$R_2 = R_1 * 10^{((dB_{at R_1} - dB_{acoustic threshold})/20)}$$

The following values were used for calculating the distance at which sound attenuates to the airborne acoustic thresholds for harbor seals and other pinnipeds:

- R1 = 50 ft
- dB<sub>at R1</sub> = 110 dB for impact driving; 92 dB for vibratory driving
- dB<sub>acoustic threshold</sub> = 100 dB rms re 20 μPa (unweighted) for all pinnipeds except harbor seals; 90 dB rms re 20 μPa (unweighted) for harbor seals

Calculated distances to airborne Level B zones are presented in Table 5. Based on threshold distances and clipped to the shoreline, underwater areas of Level B ensonification were calculated and are presented in Table 6. Because the airborne distances to the Level B threshold zones are smaller than the underwater Level B threshold zone, and because the distance to which sound attenuates to below the Level B airborne threshold levels does not reach to either of the two known harbor seal haulout locations near the Action Area, a separate analysis of Level B take was not conducted for the airborne zones. Given that, animals in the airborne zones would already have been exposed within a Level B underwater zone and considered a Level B exposure.

**Table 5. Distances to Level A and Level B Thresholds (m) for Pile Driving and Removal Activities Associated with the USCG Project**

Activity <sup>1</sup>	Diameter and Composition of Piles	Underwater Distances						Airborne Distances		
		Level A <sup>1</sup>						Level B <sup>1</sup>	Level B Airborne <sup>2</sup>	
		Low Frequency Cetaceans (Humpback whales)	Mid Frequency Cetaceans (Killer whales)	High Frequency Cetaceans (Harbor porpoises)	Phocids (Harbor seals, northern elephant seals)	Otariids (Steller sea lions, California sea lions)	All Marine Mammals	Harbor Seals	Other Pinnipeds	
		199/183 dB SEL (vibratory/impact)	198/185 dB SEL (vibratory/impact)	173/155 dB SEL (vibratory/impact)	201/185 dB SEL (vibratory/impact)	219/203 dB SEL (vibratory/impact)	120/160 dB rms (vibratory/impact)	90 dB rms	100 dB rms	
Vibratory Pile Driving/Removal	12-to-14-in. Timber Piles	23.42	2.08	34.64	14.24	1.00	4,641.59	19.2	6.1	
	12.75-in. Steel Piles	7.95	0.70	11.75	4.83	0.34	2,154.43			
	18-in. Steel Piles	4.31	0.38	6.37	2.62	0.18	3,414.55			
Impact Pile Driving/Removal	12.75-in. Steel Piles (24-in. steel piles as proxy for airborne sounds)	46.27	1.65	55.12	24.77	1.8	135.94	152.4 <sup>4</sup>	48.2 <sup>4</sup>	

**Notes:**

<sup>1</sup>Underwater thresholds reported in dB re 1 µPa

<sup>2</sup>Airborne thresholds reported in dB re 20 µPa

<sup>4</sup>for 24-in. steel piles

dB – decibels

in. – inch(es)

m – meters

rms – root-mean-square

SEL – sound exposure level

**Table 6. Level A and Level B Areas of Ensonification (km<sup>2</sup>) for Pile Driving and Removal Activities Associated with the USCG Project**

Activity	Diameter and Composition of Piles	Underwater Areas						Airborne Areas	
		Level A					Level B	Level B	
		Low Frequency Cetaceans (Humpback whales)	Mid Frequency Cetaceans (Killer whales)	High Frequency Cetaceans (Harbor porpoises)	Phocids (Harbor seals, Northern elephant seal)	Otariids (Steller sea lions, California sea lions)	All Marine Mammals	Harbor Seals	Other Pinnipeds
		199/183 dB SEL (vibratory/impact)	198/185 dB SEL (vibratory/impact)	173/155 dB SEL (vibratory/impact)	201/185 dB SEL (vibratory/impact)	219/203 dB SEL (vibratory/impact)	120/160 dB rms (vibratory/impact)	90 dB rms	100 dB rms
Vibratory Pile Driving/Removal	12-to-14-in. Timber Piles	0.010942	0.002269	0.015341	0.007385	0.001795	17.587633	0.0011	0.0001
	12.75-in. Steel Piles	0.004803	0.001664	0.006353	0.003476	0.001506	7.740467		
	18-in. Steel Piles	0.003248	0.001523	0.004148	0.002505	0.001436	14.51868		
Impact Pile Driving/	12.75- in. Steel Piles	0.020273	0.002080	0.024298	0.011454	0.002146	0.070202	0.0726	0.0072

**Notes:**  
 km<sup>2</sup> – square kilometers  
 m – meters  
 dB – decibels  
 SEL – sound exposure level  
 rms – root-mean-square



Figure 3. Level A Threshold Distances for Low Frequency Cetaceans



Figure 4. Level A Threshold Distances for Mid-Frequency Cetaceans



Figure 5. Level A Threshold Distances for High Frequency Cetaceans



Figure 6. Level A Threshold Distances for Phocids

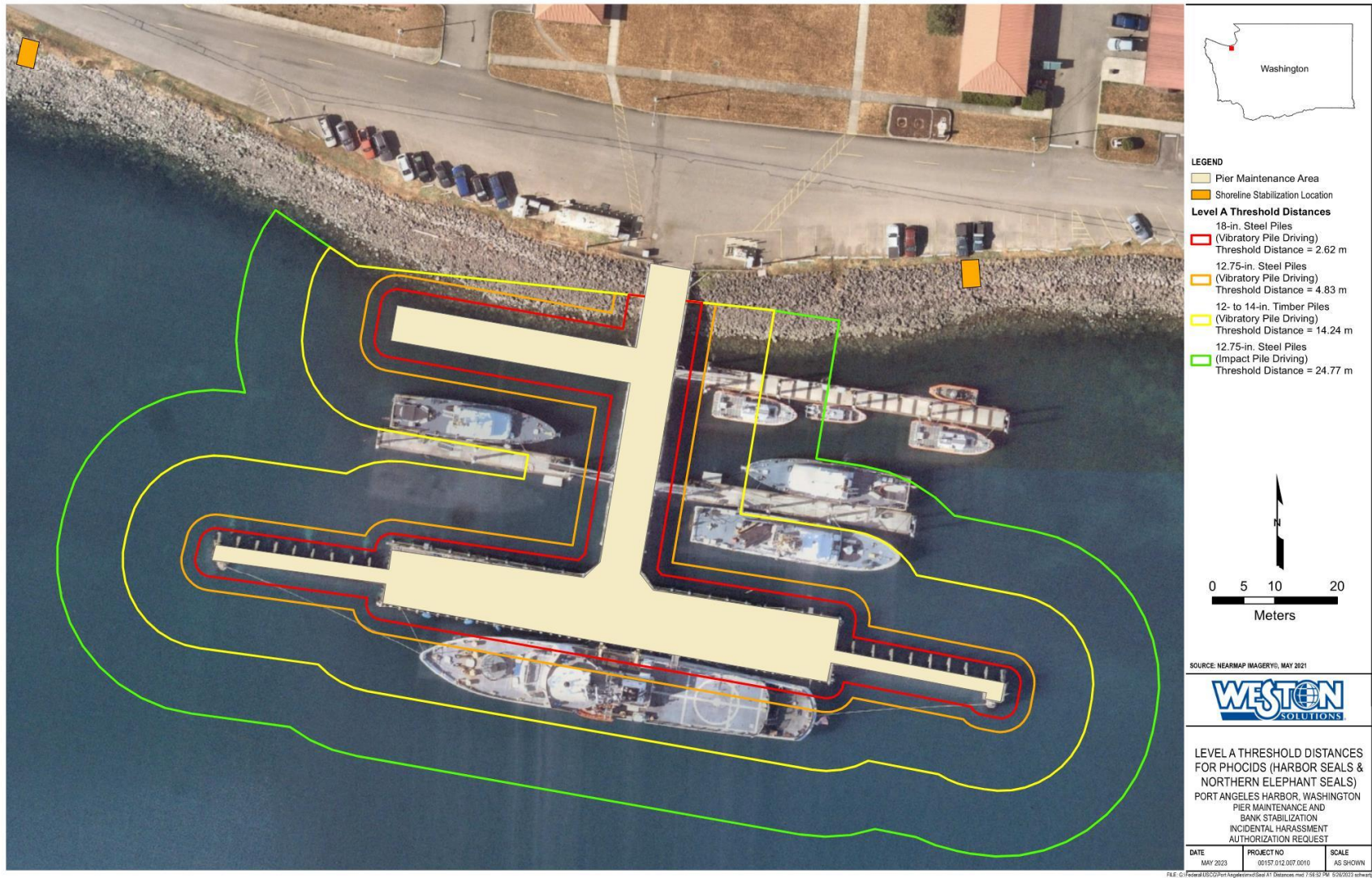


Figure 7. Level A Threshold Distances for Otariids



Figure 8. USCG Project Underwater Level B Zones for All Marine Mammals



## 6.5 EXPOSURE ESTIMATES AND TAKE REQUESTS

The number of each marine mammal species that could potentially be exposed to sound expected to exceed NMFS acoustic harassment criteria were estimated using methods described below. The area of ensonification (km<sup>2</sup>), duration of activity, and density of marine mammals (number of marine mammals per km<sup>2</sup> during summer) (Table 4) were multiplied.

The acoustic characteristics of pile driving are described in Sections 6.2 *Sound Sources* and were used to evaluate potential for Level A and B harassment. Figure 8 shows the extent to the modeled Underwater Level B zones, or SZ. This is the largest zone of impact and defines the boundaries of the Action Area.

Table 7 presents calculated underwater Level A and B exposure estimates as well as the number of underwater Level B takes requested. Due to the small Level A thresholds and low or nil Level A exposure estimates, Level A take is not requested for proposed activities. Airborne takes of harbor seals are also not requested, as the largest Level B zone for airborne sounds extends only 152 m and does not reach to either of the two haulouts in the Action Area.

**Table 7. Calculated Underwater Exposures and Take Requests**

Species	Level A Harassment Exposure Estimate	Level A Total Takes Requested	Level B Exposure Estimate	Level B Takes Requested
Humpback whale	0.00	0	0.51	0
Killer whale (Southern Resident stock)	0.00	0	0.23	0
Killer whale (Eastern North Pacific Transient stock)	0.00	0	3.94	0
Harbor porpoise	0.73	0	408.93	409
Harbor seal	0.13	0	143.88	210
Northern Elephant seal	0.00	0	0.55	1
Steller sea lion	0.00	0	0.51	1
California sea lion	0.01	0	56.8	57

Based on sightings reported during the 2016-2017 Navy TPS Port Angeles project (Northwest Environmental Consulting, LLC 2018), USCG anticipates the number of harbor seals present in the Action Area during the proposed in-water activities may exceed exposure estimates calculated. Therefore, the number of takes requested exceeds the number of exposures estimated. USCG is requesting 210 Level B takes of harbor seals. During the 2016-2017 Navy TPS Port Angeles project, 275 harbor seals were observed in the Level B zone over approximately 45 days, during which pile driving occurred (Northwest Environmental Consulting, LLC., 2018). The USCG Project is anticipated to take a longer duration of time; however, less overall pile driving will occur. As a result, USCG is requesting 210 Level B takes, approximately half the difference in sightings between the 2016-2017 Navy TPS Port Angeles project and the exposure estimate for this USCG Project. All other Level B takes requested align with the calculated exposure estimates.

## 7. ANTICIPATED EFFECTS ON MARINE MAMMAL SPECIES OR STOCKS

### 7.1 POTENTIAL EFFECTS OF PILE DRIVING ON MARINE MAMMALS

Serious injury to or mortality of marine mammals as a result of USCG’s proposed activity is not anticipated; therefore, no Level A takes are being requested. For all species, Level B take is requested for less than 1% of each stock; less than 5% and 2% are being requested for harbor porpoise and harbor seals, respectively. These take requests constitute a small number of marine mammals. Table 8 lists Level B requested takes relative to each species’ stock assessment.

**Table 8. Percent of Stock for Level B Takes**

Species	Stock Abundance	% of Stock (take/abundance*100) For Level B Takes
Humpback Whale	2,784 (N <sub>min</sub> ) <sup>1</sup>	0.00
Killer whale (Southern Resident stock)	73 (N <sub>min</sub> ) <sup>2</sup>	0.00
Killer whale (Eastern North Pacific Transient stock)	346 (N <sub>min</sub> ) <sup>3</sup>	0.00
Harbor porpoise	8,308 (N <sub>min</sub> ) <sup>4</sup>	4.92
Harbor seal	11,036 <sup>5</sup>	1.90
Northern elephant seal	81,368 <sup>6</sup>	0.00
Steller sea lion	43,201(N <sub>min</sub> ) <sup>7</sup>	0.00
California sea lion	233,515 (N <sub>min</sub> ) <sup>8</sup>	0.02

**Notes:**

<sup>1</sup> Carretta et al. 2020

<sup>2</sup> Carretta et al. 2021

<sup>3</sup> Forney et al. 2000

<sup>4</sup> Carretta et al. 2017

<sup>5</sup> Jefferies et al. 2003

<sup>6</sup> Carretta et al. 2015

<sup>7</sup> Muto et al. 2020

<sup>8</sup> Carretta et al. 2019

% – percent

N<sub>min</sub> – minimum population estimate

#### 7.1.1 Potential Effects from Underwater Noise

Potential impacts from pile driving activities on marine mammals would be expected to result primarily from acoustic pathways. Pile driving is a source of high amplitude, low frequency sound, which occurs in predominantly shallow coastal waters where local conditions can have a substantial effect on how the sound travels (Robinson et al. 2007). Noise levels produced from this activity depend upon pile size, hammer strike energy, and the substrate into which the pile is being driven. (Todd et al. 2015). The degree of effect these noise levels would have on marine mammals is related to the received level and duration of sound exposure, which would be substantially influenced by the distance between the animal and source of the noise. Thus, at increasing distance from the source of sound, the intensity of sound attenuates significantly. Variables such as the type of substrate and depth of water also affect sound propagation properties. Shallow, structurally



complex environments can attenuate sound rapidly. Similarly, soft substrates, such as sand or mud, will absorb or dampen sound more rapidly than hard substrates such as rock. It should also be noted that due to several varying factors, ambient sound levels at a given frequency and location can vary by 10 to 20 dB from day to day (Richardson et al. 1995).

Potential impacts from impulse sound exposure can range from Level B harassment such as behavioral disturbance, temporary physiological disturbance such as temporary threshold shift (TTS), disturbance to tactile perception, and physical discomfort to Level A harassment that includes injuries to the auditory system, PTS and potentially death (U.S. Navy 2015). Accumulated noise doses over an extended period can also result in permanent auditory system impairment. The most likely effect on marine mammals occurring in the Action Area during pile driving and removal activities is temporary and localized disruption of behavior resulting from introduced sound levels rising to Level B harassment. Given the distance to acoustic thresholds presented in Section 6 *Take Estimates for Marine Mammals*, any effects greater than those resulting from Level B harassment are not expected. A PSO will be monitoring exclusion and safety zones and implementing mitigation measures when appropriate in accordance with USCG's 4MP (Appendix A) and Section 11 of this IHA request, *Mitigation Measures to Protect Marine Mammals and their Habitat*. Any effects will be limited to individual marine mammals and are not anticipated to have significant stock level or population level effects.

### 7.1.2 Behavioral Response

Marine mammals are known to alter several important behaviors in response to anthropogenic noise. These altered behaviors include reduction in feeding, leaving quality habitat, reduction in vocalizations, active avoidance of areas with the highest sound levels, and subtle changes in surfacing and breathing patterns, including shorter dives and longer surface intervals (National Research Council 2003). Marine mammals as a group have functional hearing ranges of 10 Hz to 200 kHz, which can be divided into infrasonic baleenids (probable functional ranges of 15 Hz to 20 kHz; good sensitivity from 20 Hz to 2 kHz); sonic to high-frequency species (100 Hz to 100 kHz; widely variable peak spectra), and ultrasonic dominant species (200 Hz to 200 kHz general sensitivity; peak spectra 16-120 kHz) (Wartzok and Ketten 1999).

One of the most common behavioral responses exhibited by marine mammals subject to excessive noise exposure is displacement (Nowacek et al. 2007). To assess this behavioral response, one must know the areas to which the animals relocate, the quality of that habitat, and the duration of time displacement occurs. Short-term or even longer-term displacements may not necessarily be detrimental to a population if a suitable replacement habitat is available. However, if suitable replacement habitat is not available or if a key migratory path or foraging area is repeatedly disturbed, displacement could result in undetermined detrimental effects. It is anticipated most marine mammals encountering noise-related discomfort in the vicinity of the USCG Project would likely avoid the area during construction operations, which would limit their ability to rest or forage in those waters during that time. However, since construction and maintenance activities will only occur during daylight hours, marine mammals swimming, foraging, or resting in or near the project area at night would not be affected. The use of clearance zones, impact hammer ramp up procedures, and shutdown zones will be used to mitigate against potential Level B harassment.

Research has shown sound avoidance in marine mammals can be situational and variable, with effects ranging from temporary interruptions of behavior to longer-term behavioral responses,

depending on the species, behavioral state, tolerance levels, social status, and age of the individual as well as the location, and the frequency and sound intensity (Richardson et al. 1995). Long-term responses to anthropogenic noise have been observed in killer whales, which avoided their use of Broughton Archipelago in British Columbia when high-amplitude acoustic harassment devices were installed to deter harbor seal predation at salmon farms. Almost no killer whales were observed in the archipelago from 1993 to 1999 when the devices were in operation. However, upon their removal in 1999, killer whales repopulated the area within 6 months (Morton and Symonds 2002).

Behavioral disruptions in harbor porpoises to vibratory and impact hammering to install and remove 23 piles at Naval Base Kitsap in Bangor, WA in fall 2011 were considered minor as no consistent behavioral patterns were observed relative to 120-, 160-, 180- or 190-dB noise thresholds (Ampela et al. 2014). Harbor porpoises were sighted less often on construction days, however. Harbor seals (particularly juveniles) appeared to be attracted to the pile driving noise and often moved closer to the 50-m shutdown zone. Mitigation measures during this project included the installation of an underwater bubble curtain for noise attenuation, use of ramp ups prior to pile driving, and implementation of a 50-m shutdown zone (Ampela et al. 2014). Mixed responses to noise generated from pile driving at the San Francisco to Oakland Bay Bridge East Span Seismic Safety Project were observed in two pinniped species (harbor seals and California sea lions). Harbor seals observed in the water at distances of 400 to 500 m from pile driving activity did not exhibit alarm responses, although several exhibited alert reactions. In contrast, California sea lions observed in the water at distances of 500 to 1000 m exhibited avoidance behavior by rapidly swimming and porpoising away from in-water pile driving activity (CalTrans 2004).

Factors affecting an animal's individual response may include previous exposures or experience, auditory sensitivity, age, sex, and the particular behavior the animal is engaged in at the time of exposure. In the event pile driving results in disruption of marine mammal behaviors, the temporary and relatively short duration of pile driving activities will allow typical behaviors to resume quickly and are not expected to result in significant effects on survival or reproduction of any marine mammal species. Although temporary displacement or avoidance may occur, disruption to important behavioral patterns such as migration, breathing, nursing, feeding, or sheltering is expected to be minimal given the temporary nature of the activities and the project location at Port Angeles.

### **7.1.2.1 Physiological Response**

Sounds introduced into the marine environment, depending on received sound levels, could result in tissue responses such as mechanical vibration or compression. Such tissue responses may or may not result in injury. Hearing threshold shifts may occur, which could be either temporary or permanent. TTS has occurred from sound levels as low as 153 dB (cumulative SEL) for high-frequency cetaceans (NMFS 2018). TTS represents primarily tissue fatigue and is reversible (Southall et al. 2007). NOAA does not consider TTS to constitute physical injury (NOAA 2023), because it is within the normal bounds of physiological variability and tolerance (Ward 1997). Because it is non-injurious, NMFS considers TTS as Level B harassment that is mediated by physiological effects on the auditory system (77 Federal Register [FR] 59904). Temporary loss of hearing sensitivity has been documented in controlled settings using captive marine mammals exposed to strong SELs at various frequencies (Ridgway et al. 1997; Kastak et al. 1999; Finneran

et al. 2005). Potential TTS is already encompassed within the Level B harassment estimates provided in Section 6, *Take Estimates for Marine Mammals*.

PTS is a moderate injury resulting in partial hearing loss. PTS can be caused by very loud received sound levels or by prolonged exposure to loud sounds. Sounds loud enough to induce PTS are considered Level A exposures and are not anticipated as a result of pile driving for the proposed project. The greatest distance to the Level A threshold, as presented in Section 6, *Take Estimates for Marine Mammals*, is for high frequency cetaceans during impact pile driving of steel piles at 180.4 ft. (55 m) from the sound source. A PSO will monitor the EZs and SZs and implement mitigation measures when marine mammals are present, in accordance with USCG's 4MP (Appendix A) and Section 11 of this IHA request, *Mitigation Measures to Protect Marine Mammals and Their Habitat*.

### **7.1.3 Potential Effects from Airborne Noise**

Construction activities producing sounds outside of the marine environment (in air, not water) are expected to minimally affect marine mammals. Sound does not transmit well through the air-water interface (Richardson et al. 1995). Pinnipeds hauled out or looking out of the water with their ears above the surface may be exposed to airborne sounds, which could cause behavioral harassment, depending on factors such as distance from the source. Sounds from pile driving and removal could cause hauled out pinnipeds to enter the water or avoid the area; however, studies have shown seals can be tolerant of airborne sounds as a result of habituation (Blackwell et al. 2004; Moulton et al. 2005). The extent to the Level B threshold for airborne sounds during construction is less than the extent for underwater sounds and does not reach the two known haulout locations near the Project Area. Cetaceans are not expected to be affected by in-air sounds. Any impacts from airborne noise from pile driving and removal are expected to be temporary and localized and are not expected to cause population level effects.

### **7.1.4 Summary of Anticipated Impacts**

Serious injury to or mortality of marine mammals as a result of the USCG Project is not anticipated. Marine mammals exposed (harassed) to noise from the project may change their normal behavior patterns (e.g., swimming speed, foraging habits, communication) or be temporarily displaced from the area during construction activity. Any Level B harassment of marine mammals will likely have only a minor effect on individuals and will not impact any distinct populations. Mitigation protocols will be implemented (SZs, EZs, ramp up procedures for impact pile driving, PSOs strategically located to view entire project footprint, etc.) to prevent animals from entering Level A exposure zones and avoid most potential adverse underwater impacts from vibratory/impact pile driving. The maximum level of exposure (defined as acoustic harassment) is presented in Section 6, *Take Estimates for Marine Mammals*, for each class of marine mammal.

## **8. ANTICIPATED EFFECTS ON SUBSISTENCE USES**

There are no known subsistence uses of marine mammals in Port Angeles Harbor or the Strait of Juan de Fuca. This section is only applicable to projects occurring in Alaska in areas where subsistence hunting of marine mammals by Alaska Natives occurs.

## 9. ANTICIPATED EFFECTS ON HABITAT

Impacts on the aquatic habitat would include temporary increases in suspended sediments; possible effects on pH and water quality by chemicals used to clean, treat, or jacket piles and other in-water structures; and elevated in-water noise. The project is limited to existing structure replacement, and would not include new structures, or a resulting notable increase in boat traffic. Conditions within the Action Area would remain the same after project completion. Creosote pile removal would eliminate a source of leached contaminants into the habitat, thereby potentially improving the habitat for both prey species and marine mammals. Temporary impacts on marine mammal habitat would result from increased noise levels, increased turbidity and resulting changes in water quality, and changes in prey availability near the Action Area. The proposed project would not result in permanent impacts on habitats such as rookeries, sea grass, haulouts, or foraging hotspots that may be used by marine mammals.

### 9.1 EFFECTS FROM CONSTRUCTION ACTIVITY AND NOISE

Existing noise within the habitat is primarily due to vessel traffic and industrial activity in and around the Action Area. Temporary increases in noise from pile driving and other project activities are expected within the Action Area periodically throughout the project duration. Effects to underwater marine mammal habitat from pile driving noise may reach as far as 2.88 mi (4,641.59 m). Effects to airborne marine mammal habitat may reach as far as 0.09 mi (152 m). The increased noise would temporarily result in changes in habitat during construction and pile driving activities. These habitat changes could result in behavioral changes in marine mammals as described in Section 7, *Anticipated Effects on Marine Mammal Species or Stocks*.

### 9.2 EFFECTS ON WATER QUALITY

Removal and installation of piles along with use of a water jet to clean piles to be jacketed would cause disturbance to sediment and an increase in water turbidity. Water blasting piles prior to jacketing may also introduce small wood particles and other detritus that may include creosote into the water column. Turbidity increases are likely to be small in magnitude and extent and will likely dissipate to background within 300 ft (91.44 m) of the activity. The Washington State Department of Ecology requires water quality standards be met throughout construction duration and, therefore, habitat effects due to turbidity are expected to be short-term and not result in measurable effects on marine mammals. This disturbance would only affect a small amount of available Port Angeles Harbor habitat and would be temporary. Marine mammals would be expected to exhibit behavior modifications during the temporary and localized increase in turbidity as described in Section 7, *Anticipated Effects on Marine Mammal Species or Stocks*.

Shoreline stabilization work would only take place from land, and during times when the shoreline is exposed. Therefore, the shoreline stabilization would not have any effects on water quality during construction.

### 9.3 EFFECTS ON MARINE MAMMAL PREY

The prey base for pinniped species includes a wide variety of fish species and crustaceans. The endangered resident killer whales feed primarily on chinook salmon, but also prey on other

salmonids and a small proportion of their diet may include other fish species (Hanson et al. 2010). Transient killer whales prey primarily on pinniped species. The Port Angeles Harbor, including Ediz Hook and the Action Area, provides habitat for Chinook salmon including designated critical habitat, and habitat for a variety of other fish species and benthic invertebrates that serve as important prey to marine mammal populations.

Positioning and anchoring construction barges and pile removal and installation would result in temporary disturbance to fish and benthic species habitats. Pile work would disturb sediment, increase turbidity, disturb benthic habitats, and potentially disturb or damage fish within the Action Area. Benefits to prey species habitat would result from the removal of creosote piles and reduction of contaminants in the aquatic habitat.

Increased turbidity could disperse prey fish from the area and make it difficult for predators to locate prey. Disturbed sediment would settle soon after work is completed and would be localized to the immediate area around piles. During construction, foraging and refuge habitat quality for prey species would be temporarily degraded over localized areas.

Shoreline stabilization work would only take place from land and would not include any in water work. Activities would be coordinated to be completed above the tideline.

To minimize impacts to prey fish species populations, in-water work would be completed during the designated in-water work period (July 16 to February 15) and is expected to last 45 days. The project is not expected to have measurable effects on the distribution or abundance of marine mammal prey species, because any adverse effects on prey species will be localized and short term.

### **9.3.1 Effects of Underwater Sound on Fish**

Both marine mammals and their prey may be expected to disperse from the Action Area due to noise generated by project activities. USCG Project related in-water noise would result from the jacketing of up to 98 timber piles, replacement of 37 piles associated with the waterfront facility, and removal of 11 “abandoned” timber piles and 3 steel camel barrier piles. Vibratory and impact hammer during pile extraction and installation would result in the highest overall number of decibels.

Pile driving impacts resulting from underwater sound pressure waves can injure or even kill fish if they are close to the source. An EZ for bull trout was calculated for the project using United States Fish and Wildlife Service (USFWS)’s SEL Calculator (USFWS 2017). The resulting EZs was 32.8 ft (10-m) during impact pile driving. Physiological damage to juvenile Chinook salmon has been shown at cumulative sound exposure level of 210 dB, (1920 strikes at 177 dB) (Halvorsen et al. 2012). USCG Project related strikes are expected to total up to 500 per 24-hour period. The greatest potential impact to prey fish during the project would occur during impact pile driving because pile driving would exceed the established underwater noise injury thresholds for fish (U.S. Navy 2015). However, 90 percent of pile driving would be completed with a vibratory driver; this method results in lower amplitude sound levels and is not typically associated with fish kills. An impact hammer would be primarily used where piles cannot be advanced further with a vibratory driver due to hard substrate conditions or to proof piles. Physiological effects on prey fish species are unlikely because individual fish would disperse from the area due to the disturbance in the water prior to the commencement of in water hammering. Fish species’

behavioral response to in-water hammering is qualitatively high within tens of meters, intermediate within hundreds of meters, and low at thousands of meters (Popper et al. 2014).

To reduce potential effects to salmonids, the project will adhere to the in-water work window (July 16 to February 15) for pile extraction and installation.

Prey availability for marine mammal predators could be reduced temporarily in localized areas during pile driving. However, the in-water noise is also expected to result in dispersal of marine mammals from the area, and, therefore, they would not be foraging within the vicinity of the noise disturbance.

### **9.3.2 Effects on Prey Species Habitats/Abundance**

No long-term changes to prey species habitat would be expected because the dock (shade, underwater structures, boat traffic) would remain the same as existing conditions. The project has only temporary in-water habitat alterations during pile removal, replacement, and repair, and, therefore, would not result in a permanent net gain or loss of substrate or space within the water column after project completion.

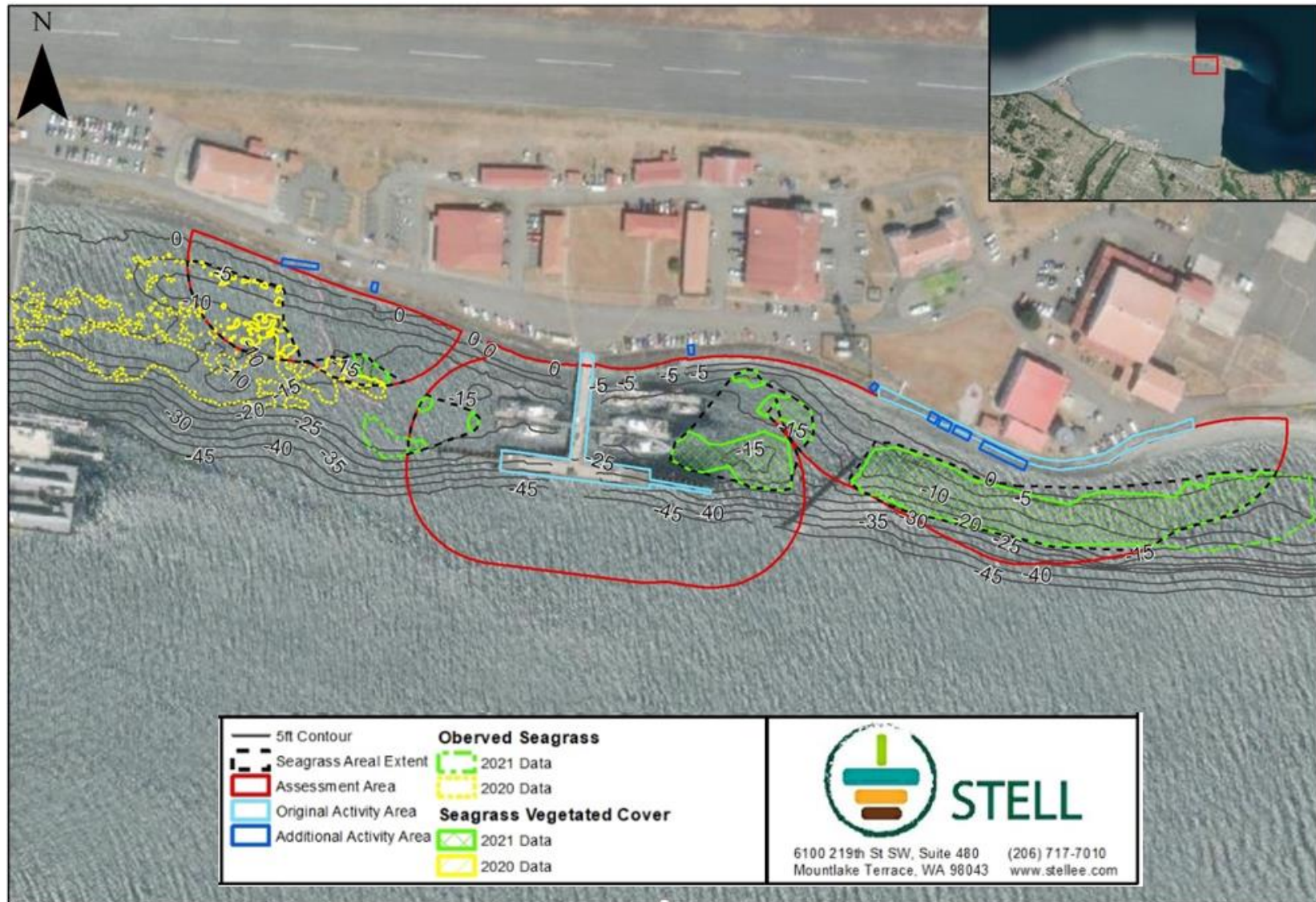
The existing habitat within the Action Area contains eelgrass beds that provide valuable habitat for fish and benthic species, including salmonids. Eelgrass distribution within the Action Area extends parallel to the shoreline (Figure 9) and contains patches of varying densities throughout the dock area. Pile work could result in disturbance or uprooting of eelgrass. A greater abundance of eelgrass habitat is available in areas adjacent to the dock both to the east and west. Eelgrass disturbed during construction would be expected to recolonize areas around the dock.

Localized invertebrate communities that currently reside on existing piles would be disturbed during removal and pile jacketing, along with cleaning of other piles. However, it is expected the replacement piles and the newly jacketed or cleaned piles would be recolonized by the same community of species.

The removal of creosote piles would have a long-term beneficial impact to prey species habitat due to a reduction in the source of contaminants into the aquatic environment.

Construction could bury benthic organisms with limited mobility under sediment. This effect would be localized to the sediment area directly impacted by pile removal or replacement. Benthic species would be expected to quickly recolonize disturbed areas.

Figure 9. Eelgrass Survey Results from the Action Area Conducted by Stell (2021) and Merkel (2020)





#### **9.4 LIKELIHOOD OF HABITAT RESTORATION**

The project would not result in permanent impacts to marine mammal habitats. Temporary impacts would be restored at project completion. USCG Project completion will not result in a change in the footprint of existing in-water structures. No new permanent noise sources are included in the proposed project. Disturbances to eelgrass beds and benthic habitats are expected to recover through species colonization. Marine mammals and their prey species are anticipated to use the project area after project completion as they do under existing conditions.

## 10. ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The proposed project is not expected to result in permanent adverse effects to the habitat of marine mammals or their prey species. The project would affect marine mammal habitats through temporary, localized impacts on prey abundance and availability and through an increase in sound and decrease in water quality during pile removal and installation. Pile driving is expected to cause the temporary dispersal of both marine mammals and their prey. The most important effect would be potential temporary impacts on the threatened salmon species and resulting impacts to the endangered resident killer whales that rely on salmon as their primary diet. Based on information presented in Section 6, *Take Estimates for Marine Mammals*, airborne sounds are not expected to reach the Level B threshold at the two known harbor seal haulouts located near the Action Area. Information provided in Section 9, *Anticipated Effects on Habitat*, indicates there may be temporary impacts, but those impacts will be minimized through avoidance measures and limited to the immediate area surrounding the pier. Because the project only includes improvements to the existing pier, long-term impacts to the habitat within the Action Area would not be present.

The proposed activities are not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their larger populations.

## 11. MITIGATION MEASURES TO PROTECT MARINE MAMMALS AND THEIR HABITAT

To address potential effects on marine mammals, mitigation measures will be implemented to reduce incidental harassment to the maximum extent practicable. Level A and Level B zones of effect will be established to distinguish the type of take that would occur if a marine mammal enters those zones during active pile driving. For any “threatened” or “endangered” species under the ESA, the Level B zone will act as the shutdown zone or EZ. For all other marine mammals, the Level A zone will act as the shutdown zone. The following are a summary of the Pre-Clearance Zone (PCZ), SZ, and EZ.

### 11.1 MONITORING ZONES

The PCZ is recognized as the greatest area of potential impacts on marine mammals and defines the boundary of the Action Area. This zone will be the largest recognized zone, and equal to the largest Level B zone (SZ), which is 15,230 ft (4,642 m). It is to be cleared at least 30 minutes prior to any vibratory or impact driving activity. More clarification is provided in Section 3 of the 4MP titled *Monitoring and Mitigation Methods*.

Multiple SZs based on the pile material (wood or steel) and the driving method (vibratory or impact) have been established to provide a buffer to certain permitted marine mammals in the Action Area and are intended to limit potential auditory impacts. The SZ pertains to all permitted animals that are not threatened or endangered under the ESA. Non-listed, permitted species will be documented as a Level B exposure and pile driving activities will continue without disruption. Permitted ESA threatened and endangered marine mammals (humpback whales) will require an operational shutdown. Because pile driving activities will be shut down if a humpback whale is seen within or approaching the SZ, no takes of humpback whales are requested. Killer whales will require a shutdown upon observation no matter location; however, their location will be used to determine whether a Level B take occurred. SZ distances for this USCG Project can be found in Table 9.

**Table 9. Safety Zone Distances Per Pile Material and Pile Driver Type**

Pile Material	Vibratory (m)		Impact (m)	
	Permitted ESA Threatened and Endangered	All Other Permitted Species	Permitted ESA Threatened and Endangered	All Other Permitted Species
Steel	Shutdown	3,414	Shutdown	136
Timber	Shutdown	4,642	Shutdown	N/A

Defined by an area in which sound pressure levels equal or exceed the level that would cause auditory injury to marine mammals present, the EZ is established to prevent occurrences of such injury. Pile-driving operations shall cease if a permitted marine mammal is observed in this zone. Vibratory pile driving distances for the EZ are relative to species and split into two groups; (1) Permitted ESA threatened and endangered marine mammals (humpback whales); and (2) All other

permitted species. A shutdown will occur if a killer whale is observed at any distance. EZ distances for this USCG Project can be found in Table 10.

**Table 10. Exclusion Zone Distances Per Pile Material and Pile Driver Type**

Pile Material	Vibratory (m)		Impact (m)	
	Permitted ESA Threatened and Endangered	All Other Permitted Species	Permitted ESA Threatened and Endangered	All Other Permitted Species
Steel	3,414	11	136	55
Timber	4,642	34	N/A	N/A

Additionally, a 32.8 ft (10-m) EZ will be enforced for construction-related activity where acoustic injury is not the primary concern. This is to ensure animals are not endangered by physical interaction with construction equipment. Circumstances could include (but are not limited to) the following: (1) barge movement to the pile location; (2) pile positioning on the substrate via a crane (i.e., stabbing the pile); and (3) pile removal from the water column/substrate via a crane (i.e., deadpull). For these activities, monitoring shall take place from 15 minutes prior to initiation until the action is complete. This can be monitored by the construction crew or USCG Project staff.

The PCZ will be monitored for 30 minutes prior to the commencement of any vibratory/impact driving activity to ensure all marine mammals are clear of areas in which there exists a potential for acoustic injury. Only after the PCZ is clear for 30 minutes will vibratory or impact pile driving commence.

## 11.2 RAMP UP AND SHUTDOWN PROCEDURES

Once it is determined the PCZ is devoid of marine mammals, the PSO will notify the on-site supervisor that pile driving operations may begin and, for impact pile driving, a “ramp up” procedure will commence. The “ramp up” procedure entails conducting impact pile driving at reduced energy followed by a series of 30-second waiting periods to allow any protected species to vacate the area. Ramp up procedures will occur at the start of in-water pile driving every day after pre-clearance has been established and additionally after any inactive period of 30 minutes or greater.

Impact pile driving will only be used when needed to “proof” load-bearing piles or when substrate conditions require and is estimated to be only 10% of the total operational pile driving time. The impact pile driver will be required to follow a ramp up procedure as follows:

Impact hammer is initiated with one impact drive on the pile (at reduced energy if possible) followed by a 30 second waiting period; this procedure is to be repeated thrice in total, allowing any marine mammals in the Action Area sufficient time to evacuate. Once ramp up is complete, full power and rate of driving may commence.

If unsafe working conditions during ramp ups are reported (e.g., crane failure from excess wear due to the ramp up procedure) by the contractor and verified by an independent safety inspection, the USCG may elect to discontinue impact driver ramp ups. The USCG will inform NMFS Headquarters if the ramp up procedure is discontinued. If use of a variable moment driver is infeasible and the model of impact driver was not specifically designed for ramp up procedures, then the USCG will not employ impact ramp up procedures due to personnel safety concerns.

A team of independent and qualified PSOs will be stationed on site at monitoring locations with optimal visibility to monitoring zones and construction areas to survey the water for marine mammals. During active operations, observers will monitor the and the EZ continuously for marine mammals. If a marine mammal enters the SZ, the PSO will document behavior and travel trajectory. Work will be stopped if an animal enters or appears likely to enter the EZ.

Shutdown of the pile driving equipment will be performed as quickly as is safely possible if a marine mammal is sighted entering or within its respective EZ. The lead PSO will place a call to the equipment operator to comply immediately with the shutdown request. Subsequent restart of the pile driving equipment can be initiated only after the animal has been observed exiting its respective EZ of its own volition or until an additional time period has elapsed (i.e., 15 minutes for all marine mammals). Permitted activities must cease if a non-permitted species is observed within the Level B SZ range. Level A take is not permitted for any species for this project.

A 32.8 ft (10-m) EZ will be enforced for all construction-related activity where acoustic injury to marine mammals is not the primary cause for concern. This is to ensure animals are not endangered by physical interaction with construction equipment. Circumstances in which this may arise include barge movement to the pile location, positioning the pile on the substrate via a crane (i.e., stabbing the pile), and pile removal from the water column/substrate via a crane (i.e., deadpull). Additionally, if weather or sea conditions restrict the observer's ability to observe the EZ and approaching area, pile driving activities must cease until conditions are favorable for observations to resume.

Observations will continue for an additional 30 minutes following the end of the pile-driving period to document marine mammal activity/behavior and to observe if or when animals return to their usual behavior. In the event a marine mammal injury is observed, the PSO will immediately place a call to inform USCG who will contact NMFS personnel of the situation as outlined in the 4MP (Appendix A).

### **11.3 SPECIAL PROVISIONS FOR KILLER WHALES**

Any sighting of a killer whale in the USCG Project vicinity will result in a shutdown. The USCG Project activity will resume only after the killer whale is not observed for 15 minutes or has been observed leaving the Action Area.

### **11.4 GENERAL IMPACT AVOIDANCE AND MINIMIZATION MEASURES**

In order to adhere to the IHA and 4MP objectives and to reduce overall impact on the waters surrounding Port Angeles and beyond, best management practices (BMPs) will be followed. USCG Project design has developed the following measures in accordance with BMPs:

- All treated wood will be handled consistent with the WWPI *Specifiers Guide to Best Management Practices for the Use of Preserved Wood in Aquatic and Sensitive Environments* (Western Wood Preservers Institute et al. 2018).
- Care will be taken to minimize non-organic debris from entering water during all pier maintenance activities, and debris will be removed promptly if it does enter the water. Materials and construction methods shall be used that avoid or minimize introduction of toxic materials, petrochemicals, and other pollutants from entering surface water during and after construction. Appropriate equipment and material for hazardous material cleanup must be kept at the site.
- Absorbent materials must be employed if petrochemical sheen is observed. Materials shall remain in place until all pollutants have been collected to the extent feasible and sheens dissipate. Used absorbent materials shall be stored in an appropriate upland facility until transported to a permitted treatment, storage, and disposal facility. The contractor shall notify all required regulatory agencies and comply with reporting requirements.
- The USCG or its contractor shall dispose of all hazardous materials in a landfill that meets liner and leachate standards of Washington State. The contractor shall provide a pile extraction and installation plan that maximizes removal of piles in the dry, at lowest practical tide condition, and at slack water in that order to the extent practicable. The barge and tug may not ground.
- Vibratory extraction is preferred if direct pull is not feasible. Pile driving will primarily use a vibratory pile driver; impact pile driving will only be used when needed to “proof” load-bearing piles or when necessary due to substrate conditions.
  - The operator shall “wake up” the pile to be removed to break the bond with the sediment.
    - Vibrate to break the skin friction bond between the pile and sediment.
    - Bond breaking avoids pulling out a large block of sediment – possibly breaking off the pile in the process.
    - Usually there is little sediment attached to the pile skin during withdrawal. In some cases, material may be attached to the pile tip, in line with the pile.
    - Crane operator shall be trained to remove pile slowly. This will minimize turbidity in the water column as well as sediment disturbance.
- Piling must not be broken off intentionally by twisting, bending, or other deformation.
- Work surface on the barge deck shall include a containment basin for extracted piles and any sediment removed during pulling.

- Basin may be constructed of durable plastic sheeting with sidewalls supported by hay bales or other structure to contain all sediment.
- Upon removal from substrate, the pile shall be moved expeditiously from the water into the containment basin. The pile shall not be shaken, hosed off, left hanging to drip dry, or any other action intended to clean or remove adhering material from the pile.
- Work surface shall be cleaned by disposing of sediment or other residues along with cut-off piling.
- Containment basin shall be removed and disposed of in accordance with BMPs or in another manner complying with applicable federal and state regulations.

### **11.5 MEASURES CONSIDERED BUT NOT ADOPTED**

Bubble curtains were considered but ultimately decided against as a mitigation measure for this project. The rationale for eliminating the use of bubble curtains includes reduced turbidity associated with the pile-driving process and a smaller EZ. On-site monitoring and impact driver “ramp up” procedures will be employed as mitigative measures.

## 12. MITIGATION MEASURES TO PROTECT SUBSISTENCE USES

As stated in Section 8, *Anticipated Effects on Subsistence Uses*, effects on subsistence uses are an issue only relevant for projects occurring in Alaska.



## 13. MONITORING AND REPORTING

The comprehensive 4MP (Appendix A) goes into greater detail to fully ensure all standard requirements of an IHA have been met. The 4MP will be updated to include any additional mitigation or monitoring requirements in the issued IHA. The key goals of the plan are to:

- Monitor the mitigation zones, estimate the number of marine mammals exposed to noise at (or exceeding) established thresholds, and document animal responses and behaviors;
- Minimize impacts to marine mammal species present in the project area through implementation of mitigation procedures; and
- Collect data on takes, occurrence, and behavior of marine mammal species in the project area and record and report any potential impacts from the project.

### 13.1 PROTECTED SPECIES OBSERVERS

Based on NMFS requirements, the 4MP incorporates mitigation procedures included in Section 11, *Mitigation Measures to Protect Marine Mammals and their Habitat* and will be conducted by a team of independent and qualified PSOs whose sole job is observing for marine mammals. Monitoring will occur during daylight hours and before, during, and after all in-water activity. In addition, PSOs will be located at the best vantage point to see the entirety of the active zone. Preliminary PSO positions, as indicated on Figure 8 were selected based on feedback from NMFS. Additionally, a PSO will be stationed for monitoring on an observation vessel in order to ensure the entire Level B zone can be observed during vibratory pile installation and removal. During all observation periods, observers will employ systematic scanning, alternating between binoculars and naked eye to search continuously for marine mammals. All distances to animals will be based on the best estimate of the PSO, relative to known distances to objects in the vicinity of the PSO; all PSOs must have distance training. Bearings will be determined with a compass or GPS. In-water activities will be delayed under conditions of heavy fog or poor visibility when the active zone is obscured, and the presence of a marine mammal cannot be detected. PSOs' full duties and qualifications are defined in the 4MP.

### 13.2 MONITORING

Monitoring zones are established to best observe the project area. PSOs will collect sighting data and behavioral observations including responses to pile driving activities. Specific ramp up and shutdown procedures associated with Level A and Level B harassment will be implemented in accordance with Section 11.1 *Monitoring Zones* and the attached 4MP. PCZ, SZ, and EZ thresholds are also discussed in Section 11.1 and summarized in Tables 9 and 10.

During active operations, the following monitoring protocol will apply:

- Observers will continue to monitor the SZ and EZs during all pile-driving activity.

- Monitoring will be continuous unless the contractor takes a significant break, in which case, pre-clearance monitoring is required, and the PCZ must be cleared once again for 30 minutes prior to restarting pile removal or installation activities.
- If permitted species are observed within the SZ during permitted activities, PSOs will monitor and document behaviors and pay close attention to their trajectory of travel. Work will not stop unless an animal enters or appears likely to enter the EZ. An exposure will be recorded for each individual detected.

Observers will continue to monitor through the pile-driving period for an additional 30 minutes. No mitigation measures will occur, but standard sighting documentation protocol will be followed.

### **13.3 DATA COLLECTION**

Standardized observations will be collected and entered into a database. A daily QA/QC process will be implemented by the PSO after each shift. This will aid in daily summaries and long-term project reporting and will contribute to the greater collective of marine mammal knowledge. Observational data will include environmental parameters, sighting information, and operational activity.

#### **13.3.1 Environmental Parameters**

The following will be recorded at the start of watch and subsequent PSO rotation and every 30 minutes until the end of watch (or sooner if there is a significant and enduring change):

- Date and time PSO watch begins or ends;
- Cloud cover (%);
- Glare (%);
- Visibility;
- Sea state (using the Beaufort Wind Force Scale);
- Wind; and
- Tidal state (incoming, outgoing, slack, low and high).

#### **13.3.2 Sighting Information**

Approved NMFS sighting forms will be utilized by PSOs for each sighting and will contain the following:

- Species (genus/species when possible), group composition, and, if possible, sex and age class of detections; in the case of unidentified species, a physical description will be recorded;
- Construction activities occurring during each sighting including pile material and pile driving method;
- Marine mammal behavioral patterns observed;
- Bearing and direction of travel relative to the active pile

- Animal's closest point of approach and estimated time spent within the safety and EZs;
- Behavioral reactions right before or during ramp up and/or shutdown procedures including a behavioral assessment to the response as a result of pile driving activity (e.g., no response or a change in behavior such as altered direction of travel, breached, stopped foraging, looked);
- Distance and location of marine mammal from in-water construction activity when active;
- Detailed description of implemented mitigation measures;
- Reason for mitigation action; and
- Any other pertinent information (e.g., non-project boat activity, other human activity in the area).

Additionally, to the best of their ability, PSOs will document same/different individuals per mitigation/exposure event to identify total exposure times to animals.

### **13.3.3 Operational Activity**

Pile driving activities defined as Active/Inactive will be recorded with each environmental sighting entry as well as the following:

- Time and duration of pile driving activity at observation/mitigation event;
- Any issue or delay with mitigation implementation; and
- Any communication between operations crew and PSO.

## **13.4 REPORTING**

By accomplishing the goals of the 4MP, the monitoring program will contribute to a greater understanding of distribution and abundance of marine mammal species in and around the Strait of Juan de Fuca. Reporting on observations will illustrate implications to intermittent and intense sound stressors and the long-term influence on these populations, individuals, and their habitats. Monitoring will further knowledge regarding inter-species interactions or co-occurrence relationships in the presence/absence of pile driving. Efficiency of mitigation techniques and monitoring measures will be refined and may reduce the impacts on marine mammals during future construction projects.

### **13.4.1 Daily/Weekly Reports**

A daily report will be sent to USCG and then compiled into a weekly report that will be submitted to USCG by close of business each Monday for the previous week during pile driving activity. These reports will show data collected including:

- Species and count of all sightings;

- Operational activity at time of sighting;
- Reactional behavior of animal(s) to pile driving activity or lack thereof; and
- Number of potential exposures to harassment level noise.

### **13.4.2 Monthly Reports**

A monthly report will also be submitted to USCG by the 15<sup>th</sup> of the following month. The report will include:

- PSO locations during marine mammal monitoring;
- Dates and times (before, during and after pile driving activity) of all marine mammal monitoring;
- Construction activities during each daily observation period (inactive/active pile driving);
- Environmental data during each monitoring period (e.g., percent glare, percent cloud cover, visibility, Beaufort sea state);
- Number of individuals of each species sighted within the monitoring zone, and estimates of number of marine mammals taken, by species (a correction factor may be applied to total take numbers, as appropriate);
- Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting);
- Description of any marine mammal behaviors observed (e.g., direction of travel, feeding, hauled-out) including perceived reactions due to pile driving activities (if occurring at time of sighting);
- Detailed information about implementation of any mitigation measure (e.g., shutdowns and delays) and specific actions that were carried out including all communication with the operations team and PSOs.

### **13.4.3 Final 90-Day Report**

Within 90 days of completion of the project or 60 days prior to the issuance of any subsequent IHA for this project, a comprehensive draft report will be submitted to NMFS. A final report will be submitted within 30 days of the resolution of comments on the draft report. The draft report will summarize all monitoring and mitigation observations conducted during the USCG Project duration to include:

- Summary of monitoring efforts and environmental observations including dates, times, and all observations collected by PSOs (datasheets with raw sighting data);

- Analyses of environmental conditions that influence detectability of marine mammals (e.g., sea state, fog, glare, visibility, precipitation);
- Construction activities occurring during each daily observation period, including the number, type of piles, and pile driving method (i.e. impact or vibratory);
- Total duration of driving time for each pile (vibratory driving) and number of strikes for each pile (impact driving);
- Species composition, occurrence, and distribution of marine mammal sightings, including age/size/sex classifications when possible;
- Analyses of the effects of pile driving;
- Sighting rates, numbers, and distributions of marine mammals during periods with and without pile driving;
- Sighting distances, behaviors observed, and reactions compared with pile driving activities, including initial sighting distance versus construction activity; observed behaviors and travel directions versus construction activity; and counts of sightings/individuals versus construction activity; and

The draft and final monitoring report will be submitted by USCG to [PR.ITP.MonitoringReports@noaa.gov](mailto:PR.ITP.MonitoringReports@noaa.gov).

#### **13.4.4 Notification of Injured or Dead Marine Mammal**

In the unanticipated event the specified activity clearly causes the take of a marine mammal in a manner prohibited by the issued IHA, such as serious injury or mortality, the USCG must immediately cease specified activities and report the incident to the NMFS Office of Protected Resources (OPR) West Coast Region, West Coast Stranding Network. In this situation, the report will include the following information:

- Time, date, and location (latitude/longitude) of the initial discovery and subsequent updated data if applicable;
- Species identification (if known) or a description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if animal is dead);
- Observed behavior of animal(s) if alive;
- Photographs or video footage if available;
- Environmental conditions at time of discovery; and
- Operational status of USCG Project activities.

Permitted activities may not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with the USCG to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure ESA and MMPA compliance. The Applicant may not resume their activities until notified by NMFS.

In the event project personnel encounter an injured or dead marine mammal, and lead PSO determines death is unknown and is relatively recent (e.g., in less than a moderate state of decomposition), the Applicant will immediately report the incident to the Chief of the Permits and Conservation Division, OPR, NMFS and the West Coast Stranding Network, NOAA, 1-866-767-6114. The lead PSO would provide USCG photographs or video footage (if available) or other documentation of the stranded animal sighting, USCG will provide the same information to NMFS. Activities may continue while NMFS reviews the circumstances of the discovery.

In the event USCG Project personnel discovers an injured or dead marine mammal and the lead PSO determines the injury or death is not associated with or related to activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), USCG must report the incident to the NMFS OPR and NMFS Stranding Coordinator at West Coast Stranding Network, NOAA, 1-866-767-6114 within 24 hours of the discovery. The USCG will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS.

## 14. SUGGESTED MEANS OF COORDINATION

Observations of marine mammals, including any observed reactions to project activities, will be recorded and reported to NMFS in accordance with Section 13.4 *Reporting*. Additionally, prior to the start of project activities, other monitoring programs in Port Angeles Harbor will be identified so information on species sightings can be shared among programs to minimize impacts.

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**APPENDIX A**

**MARINE MAMMAL MONITORING AND MITIGATION PLAN FOR PIER  
MAINTENANCE AND BANK STABILIZATION AT AIR STATION PORT  
ANGELES (4MP)**

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# Marine Mammal Monitoring and Mitigation Plan for Pier Maintenance and Bank Stabilization at Air Station Port Angeles

Revision 3  
July 2023

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## ACRONYMS AND ABBREVIATIONS

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%	percent
4MP	Marine Mammal Monitoring and Mitigation Plan
BMP	best management practice
CalTrans	California Department of Transportation
dB	decibel(s)
ESA	Endangered Species Act of 1973
EZ	exclusion zone
ft	foot (feet)
IHA	Incidental Harassment Authorization
$L_{max}$	maximum rms level
m	meter(s)
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
OPR	Office of Protected Resources
PCZ	pre-clearance zone
PSO	protected species observer
rms	root-mean-square
SEL	sound exposure level
SFPA	Southern Forest Products Association
SPTA	Southern Pressure Treaters' Association
SZ	safety zone
USACE	United States Army Corps of Engineers
U.S. Navy	United States Department of the Navy
USCG Project	Pier Maintenance and Bank Stabilization at Air Station Port Angeles Project
USCG	United States Coast Guard
WDFW	Washington Department of Fish and Wildlife
WPC	Wood Preservation Canada
WWPI	Western Wood Preservers Institute

## **1. INTRODUCTION**

The United States Coast Guard (USCG) proposes to conduct pier maintenance and bank stabilization on a portion of the shoreline at Air Station Port Angeles, Ediz Hook, Port Angeles, Washington, in Clallam County, Washington (Figure 1). USCG’s proposed Pier Maintenance and Bank Stabilization at Air Station Port Angeles Project (USCG Project) is necessary to protect vital mission support infrastructure from continued tidal action erosion and storm events. This USCG Project will repair up to 372 linear feet (ft) (113.4 meters [m]) of eroded riprap shoreline, replace 37 degraded timber piles with steel piles, jacket up to 98 timber piles, permanently remove 11 abandoned timber piles, demolish 3 steel camel barrier piles and 2 camels.

Piles will be removed and installed primarily using a vibratory pile driver; impact pile driving will only be used when needed to “proof” load-bearing piles. Proposed construction activities have potential to incidentally harass marine mammals through underwater noise generated by vibratory and impact pile driving. The purpose of this Marine Mammal Monitoring and Mitigation Plan (4MP) is to support the Incidental Harassment Authorization (IHA) application submitted by USCG and to ensure compliance with the Endangered Species Act of 1973 (ESA) and Marine Mammal Protection Act (MMPA). National Marine Fisheries Service (NMFS)-approved protected species observers (PSOs) will implement the protocols outlined in this monitoring and mitigation plan. The key goals of the plan are to:

- Monitor the mitigation zones, estimate the number of marine mammals exposed to noise at (or exceeding) established thresholds, and document animal responses and behaviors;
- Minimize impacts to marine mammal species present in the Action Area through implementation of mitigation procedures; and
- Collect data on takes, occurrence, and behavior of marine mammal species in the Action Area and record and report any potential impacts from the USCG Project.

### **1.1 PROJECT TIMELINE**

The USCG Project is anticipated to begin as soon as November 2023 and last approximately 90 days. Work will be conducted following the in-water work window (July 16 to February 15; United States Army Corps of Engineers [USACE] 2017) for the Strait of Juan de Fuca and associated bays and inlets, to minimize impacts on salmon and bull trout. In-water work will not be conducted outside of that work window unless otherwise modified in coordination with NMFS and USFWS, as applicable.

Pile driving activities will occur during lowest possible tide conditions over approximately 2 weeks. In-water construction will occur during daylight hours. Lighting on the construction barge may remain on throughout non-daylight hours for safety. USCG requests authorization from NMFS for the time period of November 15, 2023, through November 14, 2024, to allow for maximum flexibility within the in-water work window.

In-water construction will occur during daylight hours.

Figure 1. USCG Project Action Area (Red Threshold), Port Angeles Harbor, Washington



## 2. IHA AUTHORIZATION

### 2.1 PERMITTED SPECIES

This USCG Project’s timing, duration, and nature of activities (pile driving) may result in incidental takes, by Level B harassment, of marine mammals protected by the MMPA. USCG is requesting authorization for Level B takes of seven marine mammals which may occur in the vicinity of USCG Project during pile driving activities. Level B zones for the ESA Endangered and Threatened species are considered shutdown zones for this USCG Project. Additionally, any detection of killer whales, regardless of zone will result in a shutdown. A summary of the species and their federal status is seen in Table 1.

**Table 1. Summary and Federal Status of Species Potentially Impacted by USCG Project**

Common Name ( <i>Genus species</i> )	Federal Status
Humpback whale ( <i>Megaptera novaeangliae</i> )	ESA Endangered
Killer whale ( <i>Orcinus orca</i> )	ESA Endangered
Steller sea lion ( <i>Eumetopias jubatus</i> )	MMPA Protected
Harbor porpoise ( <i>Phocoena phocoena</i> )	MMPA Protected
California sea lion ( <i>Zalophus californianus</i> )	MMPA Protected
Northern elephant seal ( <i>Mirounga angustirostris</i> )	MMPA Protected
Harbor seal ( <i>Phoca vitulina</i> )	MMPA Protected

### 2.2 THRESHOLD DISTANCES, AREAS OF ENSONIFICATION, AND DURATION

Guidance for Level A and Level B harassment was developed to assess marine mammal species under the jurisdiction of NMFS. The following defines the Level A and B harassment thresholds per pile driving method and material type:

Distances to Level A and Level B thresholds and underwater ensonified areas for continuous (i.e., vibratory hammer) and impulsive (i.e., impact hammer) noise sources were calculated using the exposure calculation spreadsheet submitted in tandem with the IHA Request and based on the NMFS User Spreadsheet. Sound level measurements used for calculations are presented in Table 2. The Level A and Level B threshold distances for pile driving and removal activities are presented in Table 3.

The duration of exposure was calculated based on a maximum of 16 timber piles removed per day and 10 steel piles installed per day. Each pile removal or installation is assumed to require 30 minutes of vibratory equipment use (i.e., maximum of 8 hours of equipment use for timber removal per 24 hours and 5 hours for steel pile removal/installation). The maximum number of days pile driving will occur is assumed to be 14 days.

**Table 2. Sound Source Levels from Use of Vibratory and Impact Pile Drivers.**

Source	Underwater Sound Levels (dB)		Airborne Sound Levels (dB)	
	Vibratory Pile Driver Source Level (rms)	Impact Pile Driver Source Level (SEL/rms)	Vibratory Pile Driver Source rms L <sub>max</sub> (unweighted impact)	Impact Pile Driver Source Level rms L <sub>max</sub> (unweighted impact)
12-Inch Timber Piles	160 <sup>1</sup>	N/A	92 <sup>4</sup>	110 <sup>4</sup>
12-Inch Steel Piles	155 <sup>1</sup>	166 <sup>2</sup> /177 <sup>3</sup>		
18-Inch Steel Piles	158 <sup>3</sup>	N/A		

**Notes:**

<sup>1</sup>The Greenbush Group 2018

<sup>2</sup>Laughlin 2006

<sup>3</sup>CalTrans 2020

<sup>4</sup>After reviewing 22 sources, United States Department of the Navy (U.S. Navy) determined these were the max sound pressure levels recorded (for impact and vibratory driving of 24-inch steel piles) (U.S. Navy 2015)

dB – decibel(s)

rms – root-mean-square

SEL – sound exposure level

L<sub>max</sub> – Maximum rms level

**Table 3. NMFS Underwater Noise Thresholds for Injury and Disturbance, and Distance Required for Construction Related Underwater Noise to Attenuate to Disturbance Thresholds**

Activity <sup>1</sup>	Diameter and Composition of Piles	Underwater Distances						Airborne Distances		
		Level A <sup>1</sup>						Level B <sup>1</sup>	Level B Airborne <sup>2</sup>	
		Low Frequency Cetaceans (Humpback whales)	Mid Frequency Cetaceans (Killer whales)	High Frequency Cetaceans (Harbor porpoises)	Phocids (Harbor seals, northern elephant seals)	Otariids (Steller sea lions, California sea lions)	All Marine Mammals	Harbor Seals	Other Pinnipeds	
		199/183 dB SEL (vibratory/impact)	198/185 dB SEL (vibratory/impact)	173/155 dB SEL (vibratory/impact)	201/185 dB SEL (vibratory/impact)	219/203 dB SEL (vibratory/impact)	120/160 dB rms (vibratory/impact)	90 dB rms	100 dB rms	
Vibratory Pile Driving/Removal	12- to 14-Inch Timber Piles	23.42	2.08	34.64	14.24	1.00	4,641.59	19.2	6.1	
	12.75-Inch Steel Piles	7.95	0.70	11.75	4.83	0.34	2,154.43			
	18-Inch Steel Piles	4.31	0.38	6.37	2.62	0.18	3,414.55			
Impact Pile Driving/Removal	12.75-Inch Steel Piles (24-inch steel piles as proxy for airborne sounds)	46.27	1.65	55.12	24.77	1.8	135.9	152.4 <sup>4</sup>	48.2 <sup>4</sup>	

**Notes:**

<sup>1</sup>Underwater thresholds reported in dB re 1 µPa

<sup>2</sup>Airborne thresholds reported in dB re 20 µPa

<sup>3</sup>120 dB rms for vibratory pile driving (non-impulsive); 160 dB rms for impact pile driving (impulsive) for 24-inch steel piles

dB – decibels

SEL – sound exposure level

rms – root-mean-square



## 2.3 MONITORING AND MITIGATION ZONES

USCG has established specific pre-clearance zones (PCZs), safety zones (SZs) and exclusion zones (EZs) zones to accomplish the goals of this 4MP. To help clarify mitigation methods initiated by the PSO team, zones are defined as follows:

### 2.4 PRE-CLEARANCE ZONE

The PCZ is recognized as the greatest area of potential impacts to marine mammals in the Action Area. This zone will be the largest recognized zone. It is to be cleared at least 30 minutes prior to any vibratory or impact driving activity. More clarification is provided in Section 3, *Monitoring and Mitigation Methods*.

#### 2.4.1 Safety Zone

Multiple SZs based on the pile material (timber or steel) and the driving method (vibratory or impact) have been established to provide a buffer to certain permitted marine mammals in the Action Area and are intended to limit potential auditory impacts. The SZ pertains to all permitted animals that are not threatened or endangered under the ESA (all non-listed species included in this request). Non-listed, permitted species will be documented as a Level B exposure and pile driving activities will continue without disruption. Permitted ESA threatened and endangered marine mammals (humpback whales) will require an operational shutdown. Because pile driving activities will be shut down if a humpback whale is seen within or approaching the SZ, no takes of humpback whales are requested. Killer whales will require a shutdown upon observation no matter location; however, their location will be used to determine whether a Level B take occurred. SZ distances for this USCG Project can be found in Table 4.

**Table 4. Safety Zone Distances Per Pile Material and Pile Driver Type**

Pile Material	Vibratory (m)		Impact (m)	
	Permitted ESA Threatened and Endangered	All Other Permitted Species	Permitted ESA Threatened and Endangered	All Other Permitted Species
Steel	Shutdown	3,414	Shutdown	136
Timber	Shutdown	4,642	Shutdown	N/A

#### 2.4.2 Exclusion Zone

Defined by an area in which sound pressure levels equal or exceed the level that would cause auditory injury to marine mammals present, the EZ is established to prevent occurrences of such injury. Pile-driving operations shall cease if a permitted marine mammal is observed in this zone. Vibratory pile driving distances for the EZ are relative to species and split into two groups: (1) Permitted ESA threatened and endangered marine mammals (humpback whales); and (2) All other permitted species (all non-listed species included in this request). A shutdown will occur if a killer whale is observed at any distance. EZ distances for this USCG Project can be found in Table 5.

**Table 5. Exclusion Zone Distances Per Pile Material and Pile Driver Type**

Pile Material	Vibratory (m)		Impact (m)	
	Permitted ESA Threatened and Endangered	All Other Permitted Species	Permitted ESA Threatened and Endangered	All Other Permitted Species
Steel	3,414	12	136	55
Timber	4,642	34	N/A	N/A

Additionally, a 32.8-ft (10-m) EZ will be enforced for construction-related activity where acoustic injury is not the primary concern. This is to ensure animals are not endangered by physical interaction with construction equipment. Circumstances could include (but are not limited to) the following: (1) barge movement to the pile location; (2) pile positioning on the substrate via a crane (i.e., stabbing the pile); and (3) pile removal from the water column/substrate via a crane (i.e., deadpull). For these activities, monitoring shall take place from 15 minutes prior to initiation until the action is complete. This can be monitored by the construction crew or USCG Project staff.

The PCZ will be monitored for 30 minutes prior to the commencement of any vibratory/impact driving activity to ensure all marine mammals are clear of areas in which there exists a potential for acoustic injury. Only after the PCZ is clear for 30 minutes will vibratory or impact pile driving commence.

### 3. MONITORING AND MITIGATION METHODS

The monitoring program will be conducted by a team of independent and qualified PSOs whose sole job is to observe for marine mammals and implementing mitigation measures.

#### 3.1 PROTECTED SPECIES OBSERVERS

All PSOs will satisfy the following minimum qualification requirements:

- Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars or spotting scope may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred).
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Experience or training in field identification of marine mammals (cetaceans and pinnipeds).
- Sufficient training, orientation, or experience with vessel operation and pile driving operations to provide for personal safety during observations.
- Writing skills sufficient to prepare a report of observations. Reports shall include such information as the number, type, and location of marine mammals observed; the behavior of marine mammals in the area of potential sound effects during construction; dates and times when observations and in-water construction activities were conducted; dates and times when in-water construction activities were suspended because of marine mammals, etc.
- Ability to communicate orally, by radio or in person, with USCG Project personnel to provide real time information on marine mammals observed in the area, as needed.

#### 3.2 EQUIPMENT

The following will be required to conduct observations:

- Appropriate personal protective equipment,
- Portable radio to communicate with USCG Project personnel, on-site construction supervisor, and other PSOs,
- Cellular phone as a back up to radio,
- Main points of contact for USCG Project as they pertain to mitigation measures,
- Watch or chronometer,
- Daily tide tables for Action Area,
- Binoculars (7x50 or better) or a spotting scope with built in rangefinder,

- Hand-held GPS, map and compass, or grid map to locate and record sightings,
- Notebook or computer with pre-approved observation recording sheets, and
- Copies of IHA, 4MP, and any other USCG Project relevant materials.

### **3.3 MONITORING LOCATIONS**

A team of land based PSOs will be deployed to cover the requirements of the IHA for this USCG Project. PSOs will be located at the best vantage point to see the entirety of the active zone. Preliminary PSO positions, as indicated on Figure 1 were selected based on feedback from NMFS. Additionally, a PSO will be stationed for monitoring on an observation vessel in order to ensure the entire Level B zone can be observed during vibratory pile installation and removal.

**MONITORING TECHNIQUES AND MITIGATION MEASURES**

The monitoring program will include three observation methods depending on pile driving activity: Pre-Clearance, Active Operations, and Post-Activity. Each period will target pre-established zones (discussed in the section titled *Monitoring and Mitigation Zones*) where specific mitigation methods are employed. The techniques and mitigation measures implemented are explained below.

#### **3.3.1 Pre-clearance Monitoring**

Prior to the start of any pile driving or removal activity, the lead PSO shall contact the Orca Network to ascertain the location of the nearest marine mammal sightings. Additionally, the Orca Network Twitter feed and SeaSound Remote Sensing Network shall be routinely monitored for real-time information on the presence or absence of whales prior to the start of any pile driving or removal activity, including the following:

- PSOs must be informed of the operational activity for the day to monitor the correct zones otherwise the default zone will be the largest zone.
- PSOs will begin monitoring the PCZ at least 30 minutes prior to pile-driving activity
- All monitoring shall take place in daylight and PSOs must be able to see the entirety of the exclusion and safety zones before pre-clearance can begin and permitted activities can be initiated. In the case of inclement weather (e.g. heavy rain) or other situations resulting in reduced visibility (e.g. heavy fog), a delay will occur.
- If no marine mammals are sighted within this period, the PCZ is determined clear of marine mammals. The PSO shall notify on-site construction supervisor of pre-clearance completion and indicate operations may commence.
- If a marine mammal is sighted, the PSO will alert the on-site construction supervisor to initiate a delay to the start of operations and continue with observation and documentation of sighting. The PCZ will be determined clear once the animal is not seen for 15 minutes, or is observed leaving the PCZ on its own accord.

#### **3.3.2 Ramp Up Procedure for Impact Pile Driving**

Once it is determined the PCZ is devoid of marine mammals, the PSO shall notify the on-site supervisor that pile driving operations may begin and, for impact pile driving, a “ramp up”

procedure will commence. The “ramp up” procedure entails conducting impact pile driving at reduced energy followed by a series of 30-second waiting periods to allow any protected species to vacate the area. Ramp up procedures will occur at the start of in-water impact pile driving every day after pre-clearance has been established and additionally after any inactive period of 30 minutes or greater.

Impact pile driving will only be used when needed to “proof” load-bearing piles or when substrate conditions require and is estimated to be only 10 percent (%) of the total operational pile driving time. The impact pile driver will be required to follow a ramp up procedure as follows:

- Impact hammer is initiated with one impact drive on the pile (at reduced energy if possible) followed by a 30-second waiting period; this procedure is to be repeated thrice in total, allowing any marine mammals in the Action Area sufficient time to evacuate. Once ramp up is complete, full power and rate of driving may commence.

If unsafe working conditions during ramp ups are reported (e.g., crane failure from excess wear due to the ramp up procedure) by the contractor and verified by an independent safety inspection, USCG may elect to discontinue impact driver ramp ups. USCG will inform NMFS Headquarters if the ramp up procedure is discontinued. If use of a variable moment driver is infeasible and the model of impact driver was not specifically designed for ramp up procedures, then USCG will not employ impact ramp up procedures due to personnel safety concerns.

Bubble curtains were considered but ultimately decided against as a mitigation measure for this project. The rationale for eliminating the use of bubble curtains includes reduced turbidity associated with the pile-driving process and a smaller EZ. Onsite monitoring and “ramp up” procedures will be employed as mitigative measures.

### **3.3.3 Active Operations Monitoring**

- Observers shall continue to monitor the SZ and EZs during all pile-driving activity.
- Monitoring will be continuous unless the contractor takes a significant break, in which case, pre-clearance monitoring is required, and the PCZ must be cleared once again for 30 minutes prior to restarting pile removal or installation activities.
- If permitted species are observed within the SZ during permitted activities, PSOs shall monitor and document behaviors and pay close attention to their trajectory of travel. Work will not stop unless an animal enters or appears likely to enter the EZ. An exposure will be recorded for each individual detected.
- Exposures will be tracked throughout the season to ensure that the USCG Project remains within the permitted number of takes. NMFS Headquarters will be notified when and if 80 percent of takes of any species are achieved. If takes are exceeded, operations must cease until USCG coordinates with NMFS Headquarters to determine an appropriate path forward.

### **3.3.4 Shutdown Procedure**

Once the observer detects a marine mammal within or about to enter to the EZ, the PSO shall notify the on-site construction supervisor to implement an equipment shutdown (if possible). Pile

driving activity shall not continue until the marine mammal has left the EZ and the on-watch PSOs have determined the zone is clear. A cleared zone is defined as follows:

- The marine mammal(s) is observed leaving the EZ of its own volition; or
- The marine mammal(s) has not been observed within the EZ for 15 minutes.

Permitted activities must cease if a non-permitted species is observed within the Level B SZ range. Level A take is not permitted for any species for this project.

A 32.8-ft (10-m) EZ will be enforced for all construction-related activity where acoustic injury to marine mammals is not the primary cause for concern. This is to ensure animals are not endangered by physical interaction with construction equipment. Circumstances in which this may arise include barge movement to the pile location, positioning the pile on the substrate via a crane (i.e., stabbing the pile), and pile removal from the water column/substrate via a crane (i.e., deadpull). Additionally, if weather or sea conditions restrict the observer's ability to observe the EZ and approaching area, pile driving activities must cease until conditions are favorable for observations to resume.

### **3.3.5 Special Circumstances for Killer Whales**

Any sighting of a killer whale in the Action Area will result in a shutdown. USCG Project activity can only resume once the killer whale is not observed for 1 minutes or has been observed leaving the visual area.

### **3.3.6 Additional Circumstances**

It is understood that some conditions disallow the equipment to shut down completely (mainly safety issues) and may lead to exposure. It is also understood that the construction team will shut down as soon as possible and that a complete record will be documented.

In most circumstances, PSOs shall continuously monitor the occurrence and behavior of marine mammals; however, each PSO will be on duty for no longer than 4 hours with at least a 1-hour break between shifts to reduce observer fatigue. During each 1-hour PSO break, the construction contractor may choose to either cease work or use an alternate PSO for observations.

Monitoring zones do not exist for non-permitted species, as no take of these individuals is permitted. Permitted activities must cease if a non-permitted species is observed within the range of the SZ. Level A take is not requested for any species for this USCG Project. If a species for which authorization has been granted but the authorized take numbers are met is observed approaching or within the SZ, PSOs shall call for a shut down immediately. In both circumstances NMFS needs to be notified as soon as possible.

Pre-Clearance monitoring must be conducted with the visibility requirements described above. However, work that has begun with a fully cleared PCZ may continue during inclement weather (e.g., heavy rain) or other situations resulting in reduced visibility (e.g., heavy fog) with the following limitations:

- The PCZ must have been cleared and visible during the start of work with shutdowns greater than 30 minutes during sound-generating activity.
- If the SZ becomes obscured, an assumed rate of take appropriate to the area of the obscured monitoring zone will be used to estimate the number of sightings to be reported during those periods.
- Total exposures will be recorded. If environmental conditions deteriorate such that marine mammals within the EZ are not visible, permitted activities must be delayed until the PSO is confident marine mammals within the EZ can be detected.

### **3.3.7 Post-Activity Monitoring**

Observers will continue to monitor for 30 minutes following the pile-driving period using standard sighting documentation protocol.

## **3.4 DATA COLLECTION**

Standardized observations will be collected and entered into a database. A daily QA/QC process will be implemented by the PSO after each shift. This will aid in daily summaries and long-term USCG Project reporting and contribute to the greater collective of marine mammal knowledge. Observational data will include environmental parameters, sighting information, and operational activity.

### **3.4.1 Environmental Parameters**

The following environmental parameters will be collected at the start of watch and subsequent PSO rotation and every 30 minutes until the end of watch or sooner if there is a significant and enduring change:

- Date and time PSO watch begins or ends,
- Cloud cover (%),
- Glare (%),
- Visibility,
- Sea state (using the Beaufort Wind Force Scale),
- Wind, and
- Tidal state (incoming, outgoing, slack, low, and high).

### **3.4.2 Sighting Information**

Approved NMFS sighting forms will be used by PSOs for each sighting and will collect the following:

- Species<sup>1</sup> (genus/species when possible), group composition, and, if possible, sex and age class of detections,
- Construction activities occurring during each sighting (pile material and pile driving method),

- Marine mammal behavior patterns observed,
- Bearing and direction of travel relative to the active pile,
- Animal's closest point of approach and estimated time spent within the safety and exclusion zones<sup>2</sup>,
- Behavioral reactions right before or during ramp up and/or shutdown procedures including a behavioral assessment to the response as a result of pile driving activity (e.g., no response or a change in behavior such as altered direction of travel, breached, stopped foraging, looked),
- Distance and location of marine mammal from in-water construction activity when active,
- Detailed description of implemented mitigation measures,
- Reason for mitigation action, and
- Any other pertinent information (e.g., non-USCG Project boat activity, other human activity in the area).

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<sup>1</sup>In the case of unidentified species, a physical description will be recorded.

<sup>2</sup>To the best of their ability, PSOs shall document same/different individuals per mitigation/exposure event to identify total exposure times to animals.

### **3.4.3 Operational Activity**

Pile driving activities defined as Active/Inactive are to be recorded with each environmental and sighting entry. Additionally, the following must be recorded:

- time and duration of pile driving activity at observation/mitigation event,
- any issue or delay with mitigation implementation, and
- communication between the construction crew and PSO.

### **3.5 PROJECT IMPACT AVOIDANCE AND MINIMIZATION MEASURES**

In order to adhere to the objectives of the IHA and this 4MP and to reduce overall impact on the waters surrounding Port Angeles and beyond, best management practices (BMPs) will be followed. USCG Project design has developed the following measures in accordance with BMPs:

- The Contractor will hand-remove any crabs, sea stars, anemones, sea cucumbers, or similar invertebrates that are at least 3 inches (7.62 cm) in diameter prior to sea floor excavation, water jetting, or other in-water maintenance and repair work, and prior to placing pulled piles in the barge. All collected animals will be relocated to a suitable kelp bed or area with fringe kelp at least 300 feet (91.44 m) up current of the USCG Project area.
- All treated wood will be handled consistent with the Western Wood Preservers Institute's (WWPI) *Specifiers Guide to Best Management Practices For the Use of Preserved Wood in Aquatic and Sensitive Environments* (Western Wood Preserver's Institute et al. 2018).
- Care will be taken to minimize non-organic debris from entering water during all pier maintenance activities, and debris will be removed promptly if it does enter the water.



Materials and construction methods shall be used that avoid or minimize introduction of toxic materials, petrochemicals, and other pollutants from entering surface water during and after construction. Appropriate equipment and material for hazardous material cleanup must be kept at the site.

- Absorbent materials must be employed if petrochemical sheen is observed. Materials shall remain in place until all pollutants have been collected to the extent feasible and sheens dissipate. Used absorbent materials shall be stored in an appropriate upland facility until transported to a permitted treatment, storage, and disposal facility. Contractor to notify all required regulatory agencies and comply with reporting requirements.
- USCG or its contractor shall dispose of all hazardous materials in a landfill that meets liner and leachate standards of Washington State Contractor shall provide a pile extraction and installation plan that maximizes removal of piles in the dry, at lowest practical tide condition, and at slack water in that order to the extent practicable. The barge and tug may not ground.
- Vibratory extraction is preferred if direct pull is not feasible. Pile driving will be performed primarily using a vibratory pile driver; impact pile driving will only be used when needed to “proof” load-bearing piles or when a pile cannot be advanced with a vibratory driver due to hard substrate conditions.
  - Operator to “wake up” pile to be removed to break bond with sediment.
  - Vibrate to break the skin friction bond between pile and sediment.
  - Bond breaking avoids pulling out a large block of sediment – possibly breaking off the pile in the process.
  - Usually there is little sediment attached to the skin of the pile during withdrawal. In some cases, material may be attached to the pile tip, in line with the pile.
  - Crane operator shall be trained to remove pile slowly. This will minimize turbidity in the water column as well as sediment disturbance.
  - Piling must not be broken off intentionally by twisting, bending, or other deformation.
  - Work surface on the barge deck shall include a containment basin for extracted piles and any sediment removed during pulling.
    - Basin may be constructed of durable plastic sheeting with sidewalls supported by hay bales or other structure to contain all sediment.
    - Upon removal from substrate, the pile shall be moved expeditiously from the water into the containment basin. The pile shall not be shaken, hosed off, left hanging to drip dry, or any other action intended to clean or remove adhering material from the pile.
    - Work surface shall be cleaned by disposing of sediment or other residues along with cut-off piling.

- Containment basin shall be removed and disposed in accordance BMPs below or in another manner complying with applicable federal and state regulations.

## 4. REPORTING

### 4.1 DAILY/WEEKLY REPORTS

A daily report will be sent to USCG and then compiled into a weekly report that will be submitted to NMFS by close of business each Monday for the previous week's activity during pile driving activity. These reports will show data collected including:

- Species and count of all sightings,
- Operational activity at time of sighting,
- Reactional behavior of animal(s) to pile driving activity or lack thereof, and
- Number of potential exposures to harassment level noise.

### 4.2 MONTHLY REPORTS

A monthly report will also be submitted to USCG by the 15th day of the following month. The report will include:

- PSO locations during marine mammal monitoring;
- Dates and times (before, during and after pile driving activity) of all marine mammal monitoring;
- Construction activities during each daily observation period (inactive/active pile driving);
- Environmental data during each monitoring period (e.g., percent glare, percent cloud cover, visibility, Beaufort sea state);
- Number of individuals of each species sighted within the monitoring zone, and estimates of number of marine mammals taken, by species (a correction factor may be applied to total take numbers, as appropriate);
- Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting);
- Description of any marine mammal behaviors observed (e.g., direction of travel, feeding, hauled-out) including perceived reactions due to pile driving activities (if occurring at time of sighting); and
- Detailed information about any implementation of any mitigation measure (e.g., shutdowns and delays) and specific actions that were carried out including all communication with the construction team and PSOs.

### 4.3 FINAL 90-DAY REPORT

Within 90 days of completion of the USCG Project or 60 days prior to the issuance of any subsequent IHA for this USCG Project, USCG will submit a comprehensive draft report to NMFS. A final report will be submitted within 30 days of the resolution of comments on the draft report. The draft report will summarize all monitoring and mitigation observations conducted during the USCG Project duration to include:

- Summary of monitoring efforts and environmental observations including dates, times and all observations collected by PSOs (datasheets and raw sighting data);
- Analyses of environmental conditions that influence detectability of marine mammals (e.g., sea state, fog, glare, visibility, precipitation);
- Construction activities occurring during each daily observation period, including the number, type of piles, and pile driving method (i.e., impact, vibratory);
- Total duration of driving time for each pile (vibratory driving) and number of strikes for each pile (impact driving);
- Species composition, occurrence, and distribution of marine mammal sightings, including age/size/sex classification, when possible;
- Analyses of the effects of pile driving;
- Sighting rates, numbers, and distributions of marine mammals during periods with and without pile driving;
- Sighting distances, behaviors observed, and reactions compared with pile driving activities, including initial sighting distance versus construction activity; observed behaviors and travel directions versus construction activity; and counts of sightings/individuals versus construction activity; and

All draft and final monitoring reports will be submitted to [PR.ITP.MonitoringReports@noaa.gov](mailto:PR.ITP.MonitoringReports@noaa.gov).

#### **4.4 NOTIFICATION OF INJURED OR DEAD MARINE MAMMAL**

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as serious injury, or mortality, USCG must immediately cease specified activities and report the incident to the NMFS Office of Protected Resources (OPR) West Coast Region, West Coast Stranding Network, 1-866-767-6114. In this situation, the report will include the following information:

- Time, date, and location (latitude/longitude) of the initial discovery and subsequent updated data if applicable,
- Species identification (if known) or a description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if animal is dead);
- Observed behavior of animal(s), if alive;
- Photographs or video footage, if available;
- Environmental conditions at time of discovery; and
- Operational status of USCG Project activities.

Permitted activities may not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with USCG to determine what measures are necessary to

minimize the likelihood of further prohibited take and ensure ESA and MMPA compliance. Activities may not resume their activities until USCG is notified by NMFS.

In the event USCG Project personnel encounter an injured or dead marine mammal, and the lead PSO determines death is unknown and is relatively recent (i.e., in less than a moderate state of decomposition), USCG will immediately report the incident to the Chief of the Permits and Conservation Division, OPR, NMFS and the West Coast Stranding Network, 1-866-767-6114. The lead PSO shall provide USCG photographs or video footage (if available) or other documentation of the stranded animal sighting, USCG will provide the same information to NMFS. Activities may continue while NMFS reviews the circumstances of the discovery.

In the event USCG Project personnel discovers an injured or dead marine mammal and the lead PSO determines the injury or death is not associated with or related to activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), USCG must report the incident to the NMFS OPR and NMFS Stranding Coordinator at the West Coast Stranding Network, 1-866-767-6114 within 24 hours of the discovery. USCG will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS.

## 5. REFERENCES

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