



BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XF444

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Pile Driving Activities for the Restoration of Pier 62, Seattle Waterfront, Elliot Bay

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from the Seattle Department of Transportation (Seattle DOT) for authorization to take marine mammals incidental to pile driving activities for the restoration of Pier 62, Seattle Waterfront, Elliot Bay in Seattle, Washington. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities.

DATES: Comments and information must be received no later than [*INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to ITP.egger@noaa.gov.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted online at www.nmfs.noaa.gov/pr/permits/incidental/construction.htm without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Stephanie Egger, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained online at www.nmfs.noaa.gov/pr/permits/incidental/construction.htm. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined “negligible impact” in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term “take” means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, 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 (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action with respect to environmental consequences on the human environment. This action is consistent with categories of activities identified in CE B4 of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not

identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

Summary of Request

On January 27, 2017, NMFS received a request from the Seattle DOT for an IHA to take marine mammals incidental to pile driving activities for the restoration of Pier 62, Seattle Waterfront, Elliot Bay in Seattle, Washington. Seattle DOT's request is for take of 11 species of marine mammals, by Level A and Level B harassment. Neither Seattle DOT nor NMFS expect mortality to result from this activity and, therefore, an IHA is appropriate.

This proposed IHA would cover one year of a larger project for which Seattle DOT intends to request take authorization for subsequent facets of the project. The 2-year project involves pile driving the remainder of piles for Pier 62 and Pier 63.

Description of Specified Activities

Overview

The proposed project will replace Pier 62 and make limited modifications to Pier 63 on the Seattle waterfront of Elliot Bay, Seattle, Washington. The existing piers are constructed of creosote-treated timber piles and treated timber decking, which are failing. The proposed project would demolish and remove the existing timber piles and decking of Pier 62, and replace them with concrete deck planks, concrete pile caps, and steel piling.

The footprint of Pier 62 will remain as it currently is, with a small amount of additional over-water coverage (approximately 3,200 square feet) created by a new float system added to the south side of Pier 62. This float system is intended for moorage of transient, small-boat traffic, and will not be designed to accommodate mooring or berthing for larger vessels. This

includes removing 815 timber piles, and will require installation of 180 steel piles for Pier 62. To offset the additional over-water coverage associated with the new float system, approximately 3,700 square feet of Pier 63 will be removed. This includes removing 65 timber piles, and will require installation of nine steel piles to provide structural support for the remaining portion of Pier 63. In addition, approximately 5,900 square feet of grated decking will be installed to replace solid timber decking in the nearshore environment of both piers.

In-water noise from pile driving activities will result in the take, by Level A and Level B harassment only, of 11 species of marine mammals. Pile driving activities for this project will occur from September 2017 through February 2018.

Dates and Duration

In-water construction for this application is proposed from September 1, 2017 to February 28, 2018. It is assumed that a second season of in-water pile driving will be required to finish the pile installation. The specific scope of the second season of work will depend on work accomplished during the first season. A separate IHA application will be prepared for the second season of work. In-water work will occur within a modified or shortened work window (September through February) to reduce or minimize effect on juvenile salmonids.

Seattle DOT estimates 49 days will be needed to remove the old timber piles and 64 days for installation of steel piles for a total of 113 in-water construction days for both Pier 62 and Pier 63. It is likely some of these installation days for Pier 62 will be carried over into a second season of work (which will have a separate IHA application). Pile driving (removal and installation activities) will occur approximately eight hours a day during daylight hours only.

Specified Geographic Region

Pier 62 and Pier 63 are located on the downtown Seattle waterfront on Elliot Bay in King County, Washington just north of the Seattle Aquarium (see Figure 1 from the Seattle DOT application). The project will occur between Pike Street and Lenora Street, an urban embayment in central Puget Sound. This is an important industrial region and home to the Port of Seattle, which ranked 8th in the top 10 metropolitan port complexes in the U.S. in 2015. The region of the specified activity is the area in which elevated sound levels from pile-related activities could result in the take of marine mammals. This area includes the proposed construction zone, Elliott Bay, and a portion of Puget Sound.

Detailed Description of Specific Activities

The 14-inch (in) timber piles will be removed with a vibratory hammer or pulled with a clamshell bucket. The 30-in steel piles will be installed with a vibratory hammer to the extent possible. An impact hammer will be used for proofing steel piles or when encountering obstructions or difficult ground conditions. Vibratory hammers are commonly used for pile removal and installation where sediments allow. The pile is placed into position using a choker and crane, and then vibrated between 1,200 and 2,400 vibrations per minute (Washington State Ferries (WSF) 2016). The vibrations liquefy the sediment surrounding the pile, allowing it to penetrate to the required seating depth, or to be removed (WSF 2016).

Impact hammers are typically used to install plastic/steel core, wood, concrete, or steel piles. An impact hammer is a steel device that works like a piston (WSF 2016). To drive the pile, the pile is first moved into position and set in the proper location using a choker cable or vibratory hammer. Once the pile is set in place, installation can take less than 15 minutes under good conditions, to over an hour under poor conditions, such as glacial till and bedrock, or exceptionally loose material in which the pile repeatedly moves out of position (WSF 2016).

The project includes vibratory removal of 14-in timber piles and vibratory and impact pile driving of 30-in steel piles. The maximum extent of pile removal and installation activities are described in Table 1.

Table 1. In-water Pile Removal and Installation Totals.

Structure	Pile Type and Number
Pier 62	815 Timber Piles (14-in) Removed
	Up to 180 Steel Piles (30-in) Installed
Pier 63	65 Timber Piles (14-in) Removed
	Up to 9 Steel Piles (30-in) Installed

The contractor may elect to operate multiple pile crews for the Pier 62 Project. As a result, more than one vibratory or impact hammer may be active at the same time. Operating multiple noise sources at the same time results in a louder noise than one source alone, so the noises are added together to provide a more realistic source level of the sound for calculating the potential effects on marine mammals. Decibels cannot be added by standard addition because they are measured on a logarithmic scale. Washington State Department of Transportation (WSDOT) provides guidance for adding decibel values from multiple noise sources (WSDOT 2015a). For example, based on guidance used by WSDOT (2015a), when more than one impact or vibratory hammer is being used close enough to another hammer to create overlapping noise fields, the physical area of potential effects on marine mammals is larger, and must be accounted for through a multiple-source “decibel addition” rule. The increased noise generated by multiple impact hammers would potentially create a larger zone of influence (ZOI). For the Pier 62 Project, there is a low likelihood that multiple impact hammers would operate in a manner that piles would be struck simultaneously; however, as a conservative approach we used multiple-

source decibel rule when determining the Level A and B harassment zones for this project.

Table 2 provides guidance on adding decibels to account for multiple sources (WSDOT 2015a):

Table 2. Multiple Source Decibel Addition.

When two decibel values differ by:	Add the following to the higher decibel value:
0 or 1 dBA	3 dBA
2 or 3 dBA	2 dBA
4 to 9 dBA	1 dBA
10 dBA or more	0 dBA

It is not possible to know in advance the location of the crews and hammers on a given day, nor how many crews will be working each day. The multiple-source decibel addition method does not result in significant increases in the noise source when an impact hammer and vibratory hammer are working at the same time, because the difference in noise sources is greater than 10 dBA. For periods when two vibratory hammers are operating simultaneously, an increase in noise level could be generated, and this will be accounted for when determining PTS isopleths and Level B Harassment Zones for all marine mammal hearing groups (Table 3).

Table 3. Summary of the proposed in-water pile installation and removal plan and the associated sound source levels.

Construction Phase	Type	Number of Piles	Anticipated Duration	Maximum Hours per Day	Installation/ Removal Method	Single Source Sound Levels	Additive Source Sound Levels
Removal	Creosote-treated Timber 14-in ¹	880	49 days	8	Vibratory	152 dB _{rms} ² (at 16 m)	155 dB _{rms} ³
Installation	Steel Pile 30-in	189	53 days	8	Vibratory	177 dB _{rms} ² (at 10 m)	180 dB _{rms} ⁴
		--	11 days ⁵	4	Impact	189 dB _{rms} ² (at 14 m)	189 dB _{rms} ⁶
Totals	–	189 Installed 880 Removed	113 days	–	–	–	

1. Assumed to be 14-in diameter.
2. Source sound level obtained from Washington State Ferries Request for an Incidental Harassment Authorization under the Marine Mammal Protection Act—Seattle Multimodal Project at Colman Dock (WSDOT 2016b).
3. Up to two vibratory hammers removing timber piles, operating simultaneously. Value based on identical single source level dB_{rms}, adding 3 dB, based on WSDOT Additive noise model.
4. For simultaneous operation of two vibratory hammers installing steel pipe piles, the 180 dB_{rms} value is based on identical single source levels, adding 3 dB, based on WSDOT rules for decibel addition (2016a).
5. Approximately 20 percent of the pile driving effort is anticipated to require an impact hammer.
6. For simultaneous operation of one impact hammer and one vibratory hammer installing 30-in piles, the original dB_{rms} estimates differ by more than 10 dB, so the higher value, 189 dB_{rms}, is used, based on WSDOT rules for decibel addition.

dB – decibels

rms – root mean square: the square root of the energy divided by the impulse duration. This level is the mean square pressure level of the pulse.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see “Proposed Mitigation” and “Proposed Monitoring and Reporting”).

Description of Marine Mammals in the Area of Specified Activities

The marine mammal species under NMFS’s jurisdiction that have the potential to occur in the proposed construction area include Pacific harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall’s porpoise (*Phocoenoides dalli*), long-beaked common dolphin (*Delphinus capensis*), both southern resident and transient killer whales (*Orcinus orca*), humpback whale (*Megaptera novaengliae*), gray whale (*Eschrichtius robustus*), and minke whale (*Balaenoptera acutorostrata*) (Table 4). Of these, the

southern resident killer whale (SRKW) and humpback whale are protected under the Endangered Species Act (ESA). Pertinent information for each of these species is presented in this document to provide the necessary background to understand their demographics and distribution in the area.

Table 4. Marine Mammal Species Potentially Present in Region of Activity

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	<i>Eschrichtius robustus</i>	Eastern North Pacific	-; N	20,990 (0.05; 20,125; 2011)	624	132
Family Balaenidae						
Humpback whale	<i>Megaptera novaeangliae novaeangliae</i>	California/Oregon/Washington	E; D	1,918 (0.03; 1,855; 2011)	11.0	≥ 5.5
Minke whale	<i>Balaenoptera acutorostrata scammoni</i>	California/Oregon/Washington	-; N	636 (0.72, 369, 2014)	3.5	≥ 1.3
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer whale	<i>Orcinus orca</i>	Eastern North Pacific Offshore	-; N	240 (0.49, 162, 2008)	1.6	0
Killer whale	<i>Orcinus orca</i>	Eastern North Pacific Southern Resident	E; D	78 (na, 78, 2014)	0.14	0
Long-beaked common dolphin	<i>Dephinus capensis</i>	California	-; N	101,305 (0.49; 68,432, 2014)	657	≥35.4
Family Phocoenidae (porpoises)						
Harbor Porpoise	<i>Phocoena phocoena</i>	Washington Inland Waters	-; N	11,233 (0.37; 8,308; 2015)	66	≥7.2
Dall's Porpoise	<i>Phocoenoides dalli</i>	California/Oregon/Washington	-; N	25,750 (0.45, 17,954, 2014)	172	≥0.4
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California sea lion	<i>Zalophus californianus</i>	U.S.	-; N	296,750 (na, 153,337,	9,200	389

				2011)		
Steller sea lion	<i>Eumetopias jubatus</i>	Eastern DPS	-; N	60,131-74,448 (-; 36,551; 2013)	1,645	Insig.
Family Phocidae (earless seals)						
Harbor seal	<i>Phoca vitulina</i>	Washington Northern Inland Waters stock	-; N	11,036 (0.15, -, 1999)	Undet.	9.8
Northern elephant seal	<i>Mirounga angustirostris</i>	California breeding	-; N	179,000 (na; 81,368, 2010)	4,882	8.8

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2- NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike). Annual mortality/serious injury (M/SI) often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; www.nmfs.noaa.gov/pr/sars/) and more general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS's website (www.nmfs.noaa.gov/pr/species/mammals/).

Table 4 lists all species with expected potential for occurrence in Elliot Bay and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and

annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. 2015 SARs (Carretta *et al.* 2016). All values presented in Table 4 are the most recent available at the time of publication and are available in the 2015 SARs (Carretta *et al.* 2016). Additional information may be found in the 2015 Pacific Navy Marine Species Density Database (U.S. Department of the Navy (U.S. Navy) 2015) and can also be accessed online at:

http://nwttteis.com/Portals/NWTT/files/supporting_technical/REVISED_NWTT_FINAL_NMSDD_Technical_Report_04_MAY_2015.pdf.

All species that could potentially occur in the proposed survey areas are included in Table 4. As described below, all 11 species temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it.

Harbor Seal

Individual harbor seals occur along the Elliott Bay shoreline. There is one documented harbor seal haulout area near Bainbridge Island, approximately 6 miles (9.66 km) from Pier 62. The haulout, which is estimated at less than 100 animals, consists of intertidal rocks and reef areas around Blakely Rocks and is within the area of potential effects but at the outer extent near Bainbridge Island (Jefferies *et al.* 2000), though harbor seals also make use of docks, buoys and

beaches in the area. The level of use of this haulout during the fall and winter is unknown, but is expected to be much less than during the spring and summer, as air temperatures become colder than water temperatures, resulting in seals in general hauling out less. Harbor seals are perhaps the most commonly observed marine mammal in the area of potential effects.

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 of the Elliot Bay Seawall Project (EBSP), during which 267 harbor seals were documented as takes in the Pier 62 Project area (Anchor QEA 2014, 2015, and 2016). Additional marine mammal monitoring results in the vicinity of the projects, are as follows:

- 2012 Seattle Slip 2 Batter Pile Project: Six harbor seals were observed during this one-day project in the area that corresponds to the upcoming project ZOIs (WSF 2012).
- 2016 Seattle Test Pile Project: 56 harbor seals were observed over 10 days in the area that corresponds to the upcoming project ZOIs. The maximum number sighted during one day was 13 (WSF 2016).
- 2012 Seattle Aquarium Pier 60 Project: 281 harbor seals were observed over 29 days in the area that corresponds to the upcoming project ZOIs (HiKARI 2012).

Northern Elephant Seal

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 of the EBSP, during which no elephant seals were observed in the project area (Anchor QEA 2014, 2015, and 2016). Similarly, no elephant seals were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (WSF 2016).

California Sea Lion

California sea lions are often observed in the area of potential effects. The nearest documented California sea lion haulout sites are 3 km (2 miles) southwest of Pier 62, although sea lions also make use of docks and buoys in the area. Marine mammal monitoring occurred on 158 days during Seasons 1, 2, 3, and 4 of the EBSP, during which 937 California sea lions were documented as takes in the project area (Anchor QEA 2014, 2015, 2016, and unpublished data). California sea lions were frequently (average seven per day and a maximum of 15 over a day) observed hauled out on two navigational buoys within the project area (near Alki Point) and swimming along the shoreline. Additional marine mammal monitoring results in the vicinity of the projects, are as follows:

- During the 2012 Seattle Slip 2 Batter Pile project, 15 California sea lions were observed during this one-day project in the area that corresponds to the upcoming project ZOIs (WSF 2012).
- During the 2016 Seattle Test Pile project, 12 California sea lions were observed over 10 days in the area that corresponds to the upcoming project ZOIs. The maximum number sighted during one day was four (WSF 2016).
- During the 2012 Seattle Aquarium Pier 60 project, 382 California sea lions were observed over 29 days in the area that corresponds to the upcoming project ZOIs. The maximum number sighted during one day was 37; however seals, may have been double counted during these observations (HiKARI 2012).

Steller Sea Lion

Steller sea lions are a rare visitor to the Pier 62 area of potential effects. Steller sea lions use haulout locations in Puget Sound. The nearest haulout to the project area is located

approximately six miles away (9.66 km). This haulout is composed of net pens offshore of the south end of Bainbridge Island. The population of Steller sea lions at this haulout has been estimated at less than 100 individuals (Jeffries *et al.* 2000).

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 of the EBSP, during which three Steller sea lions were observed and documented as takes in the project area (Anchor QEA 2014, 2015, and 2016).

No Steller sea lions were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project or the 2016 Seattle Test Pile Project (WSF 2016).

Killer Whale

The Eastern North Pacific Southern Resident (SRKW) and West Coast Transient (transient) stocks of killer whale may be found near the project site. The SRKW live in three family groups known as the J, K and L pods. Transient killer whales generally occur in smaller (less than 10 individuals), less structured pods (NMFS 2013). According to the Center for Whale Research (CWR) (2015), they tend to travel in small groups of one to five individuals, staying close to shorelines, often near seal rookeries when pups are being weaned. The transient killer whale sightings have become more common since mid-2000. Unlike the SRKW pods, transients may be present in an area for hours or days as they hunt pinnipeds.

A long-term database maintained by the Whale Museum contains sightings and geospatial locations of SRKWs, among other marine mammals, in inland waters of Washington State (Osborne 2008). Data are largely based on opportunistic sightings from a variety of sources (*i.e.*, public reports, commercial whale watching, Soundwatch, Lime Kiln State Park land-based observations, and independent research reports), but the database is regarded as a robust but

difficult to quantify inventory of occurrences. The data provide the most comprehensive assemblage of broad-scale habitat use by the SRKW in inland waters.

Based on reports from 1990 to 2008, the greatest number of unique killer whale sighting-days near or in the area of potential effects occurred from November through January, although observations were made during all months except May (Osborne 2008). Most observations were of SRKWs passing west of Alki Point (82 percent of all observations), which lies on the edge or outside the area of potential effects; this pattern is potentially due to the high level of human disturbance or highly degraded habitat features currently found within Elliott Bay. J Pod, with an estimated 24 members, is the pod most likely to appear year-round near the San Juan Islands, in the lower Puget Sound near Seattle, and in Georgia Strait at the mouth of the Fraser River. J Pod tends to frequent the west side of San Juan Island in mid to late spring (CWR 2011).

An analysis of sightings in 2011 described an estimated 93 sightings of SRKWs near the area of potential effects (Whale Museum 2011). During this same analysis period, 12 transient killer whales were also observed near the area of potential effects. The majority of all sightings in this area are of groups of killer whales moving through the main channel between Bainbridge Island and Elliott Bay and outside the area of potential effects (Whale Museum 2011). The purely descriptive format of these observations makes it impossible to discern what proportion of the killer whales observed entered the area of potential effects; however, it is assumed that individuals do enter this area on occasion.

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 (2014, 2015, and 2016) of the EBSP, during which two killer whales were documented as takes in the project area (unknown if SRKW or transient), and one pod of six whales was also observed in

Elliott Bay more than 30 minutes before or after pile driving activity (no take documented; Anchor QEA 2014, 2015, and 2016).

During the 2016 Seattle Test Pile project, 0 SRKW were observed over 10 days in the area that corresponds to the upcoming project ZOIs (WSF 2016). During the 2012 Seattle Slip 2 Batter Pile project, 0 SRKW were observed during this one day project in the area that corresponds to the upcoming project ZOIs (WSF 2012). On February 5, 2016, a pod of up to 7 transients were reported in the area (Orca Network Archive Report 2016a).

Long-Beaked Common Dolphin

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 (2014, 2015, and 2016) of the EBSP, during which no long-beaked common dolphins were observed in the project area (Anchor QEA 2014, 2015, and 2016).

No long-beaked common dolphins were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 project. However, there were reported sightings in the Puget Sound in the summer of 2016. Beginning on June 16, long-beaked common dolphins were observed near Victoria, British Columbia. Over the following weeks, a pod of 15 to 20 (including a calf) was observed in central and southern Puget Sound. They were positively identified as long-beaked common dolphins (Orca Network 2016a). This is the first confirmed observation of a pod of long-beaked common dolphins in Washington waters—NMFS states that as of 2012, long-beaked common dolphins had not been observed during surveys in Washington waters (Carretta *et al.* 2016). Two individual long-beaked common dolphins were observed in 2011, one in August and one in September (Whale Museum 2015).

Gray Whale

Gray whale sightings are typically reported in February through May and include an observation of a gray whale off the ferry terminal at Pier 52 heading toward the East Waterway in March 2010 (CWR 2011). Three gray whales were observed near the project area during 2011 (Whale Museum 2011), but the narrative format of the observations make it difficult to discern whether these individuals entered the area of potential effects. It is assumed that gray whales might rarely occur in the area of potential effects.

No gray whales were observed during monitoring for the EBSP, the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (Anchor QEA 2014, 2015, 2016; WSF 2016a).

Humpback Whale

Humpbacks are only rare visitors to Puget Sound. There is evidence of increasing numbers in recent years (Falcone *et al.* 2005). A rare encounter with one and possibly two humpbacks occurred in Hood Canal (well away from the area of potential effects) as recently as February 2012 (Whale Museum 2012). Humpbacks do not visit Puget Sound every year and are considered rare in the area of potential effects (Whale Museum 2011); however, they have the potential to occur at least during the Pier 62 Project construction period.

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 (2014, 2015, and 2016) of the EBSP, during which two humpback whales were observed in the project area (Anchor QEA 2014, 2015, and 2016).

No humpback whales were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (WSF 2016a).

Minke Whale

Minke whales are relatively common in the San Juan Islands and Strait of Juan de Fuca (especially around several of the banks in both the central and eastern Strait), but are relatively rare in Puget Sound (WSF 2016a). No minke whales were observed during monitoring for the EBSP, the 2012 Seattle Slip 2 Batter Pile Project, the 2016 Seattle Test Pile Project, or the 2012 Seattle Aquarium Pier 60 Project (Anchor QEA 2014, 2015, 2016; WSF 2016).

Harbor Porpoise and Dall's Porpoise

Marine mammal monitoring occurred on 158 days during Seasons 1, 2, and 3 (2014, 2015, and 2016) of the EBSP, during which one harbor porpoise was observed and documented as a take in the project area; no Dall's porpoises were observed (Anchor QEA 2014, 2015, and 2016).

During the 2012 Seattle Aquarium Pier 60 Project, five harbor porpoises and one Dall's porpoise were observed over 29 days in the area that corresponds to the upcoming project ZOIs, with a maximum of three observed in one day (HiKARI 2012). Neither harbor porpoise nor Dall's porpoise were observed during monitoring for the 2012 Seattle Slip 2 Batter Pile Project or the 2016 Seattle Test Pile Project (WSF 2016).

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.* 1995; Wartzok and Ketten 1999; Au and Hastings 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into

functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2016a) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

- Low-frequency cetaceans (mysticetes): generalized hearing is estimated to occur between approximately 7 hertz (Hz) and 35 kilohertz (kHz), with best hearing estimated to be from 100 Hz to 8 kHz;
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz, with best hearing from 10 to less than 100 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera *Kogia* and *Cephalorhynchus*; including two members of the genus *Lagenorhynchus*, on the basis of recent echolocation data and genetic data): generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz.

- Pinnipeds in water; Phocidae (true seals): generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz, with best hearing between 1-50 kHz;
- Pinnipeds in water; Otariidae (eared seals and sea lions): generalized hearing is estimated to occur between 60 Hz and 39 kHz, with best hearing between 2-48 kHz.

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016a) for a review of available information. Eleven marine mammal species (7 cetacean and 4 pinniped (2 otariid and 2 phocid) species) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 4. Of the cetacean species that may be present, three are classified as low-frequency cetaceans (*i.e.*, all mysticete species), two are classified as mid-frequency cetaceans (*i.e.*, all delphinid and ziphiid species), and two are classified as high-frequency cetaceans (*i.e.*, harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The “Estimated Take by Incidental Harassment” section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The “Negligible Impact Analysis and Determination” section will consider the content of this section, the “Estimated

Take by Incidental Harassment” section, and the “Proposed Mitigation” section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

The Seattle DOT’s Pier 62 Project using in-water pile driving and pile removal could adversely affect marine mammal species and stocks by exposing them to elevated noise levels in the vicinity of the activity area.

Exposure to high intensity sound for a sufficient duration may result in auditory effects such as a noise-induced threshold shift (TS)—an increase in the auditory threshold after exposure to noise (Finneran *et al.* 2005). Factors that influence the amount of threshold shift include the amplitude, duration, frequency content, temporal pattern, and energy distribution of noise exposure. The magnitude of hearing threshold shift normally decreases over time following cessation of the noise exposure. The amount of threshold shift just after exposure is the initial threshold shift. If the threshold shift eventually returns to zero (*i.e.*, the threshold returns to the pre-exposure value), it is a temporary threshold shift (Southall *et al.* 2007).

Threshold Shift (noise-induced loss of hearing) – When animals exhibit reduced hearing sensitivity (*i.e.*, sounds must be louder for an animal to detect them) following exposure to an intense sound or sound for long duration, it is referred to as TS. An animal can experience temporary threshold shift (TTS) or permanent threshold shift (PTS). TTS can last from minutes or hours to days (*i.e.*, there is complete recovery), can occur in specific frequency ranges (*i.e.*, an animal might only have a temporary loss of hearing sensitivity between the frequencies of 1 and 10 kHz), and can be of varying amounts (for example, an animal’s hearing sensitivity might be reduced initially by only 6 dB or reduced by 30 dB). PTS is permanent, but some recovery is

possible. PTS can also occur in a specific frequency range and amount as mentioned above for TTS.

For marine mammals, published data are limited to the captive bottlenose dolphin, beluga, harbor porpoise, and Yangtze finless porpoise (Finneran *et al.*, 2000, 2002, 2003, 2005, 2007, 2010a, 2010b; Finneran and Schlundt, 2010; Lucke *et al.*, 2009; Mooney *et al.*, 2009a, 2009b; Popov *et al.*, 2011a, 2011b; Kastelein *et al.*, 2012a; Schlundt *et al.*, 2000; Nachtigall *et al.*, 2003, 2004). For pinnipeds in water, data are limited to measurements of TTS in harbor seals, an elephant seal, and California sea lions (Kastak *et al.*, 1999, 2005; Kastelein *et al.*, 2012b).

Lucke *et al.* (2009) found a TS of a harbor porpoise after exposing it to airgun noise with a received SPL at 200.2 dB (peak-to-peak) re: 1 μPa , which corresponds to a sound exposure level (SEL) of 164.5 dB re: 1 $\mu\text{Pa}^2 \text{ s}$ after integrating exposure. NMFS currently uses the rms of received SPL at 180 dB and 190 dB re: 1 μPa as the threshold above which PTS could occur for cetaceans and pinnipeds, respectively. Because the airgun noise is a broadband impulse, one cannot directly determine the equivalent of rms SPL from the reported peak-to-peak SPLs. However, applying a conservative conversion factor of 16 dB for broadband signals from seismic surveys (McCauley *et al.* 2000) to correct for the difference between peak-to-peak levels reported in Lucke *et al.* (2009) and rms SPLs, the rms SPL for TTS would be approximately 184 dB re: 1 μPa , and the received levels associated with PTS (Level A harassment) would be higher. However, NMFS recognizes that TTS of harbor porpoises is lower than other cetacean species empirically tested (Finneran and Schlundt 2010; Finneran *et al.* 2002; Kastelein and Jennings 2012).

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e.*, recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts. Also, depending on the degree and frequency range, the effects of PTS on an animal could range in severity, although it is considered generally more serious because it is a permanent condition. Of note, reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.* 2007), so one can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Masking - In addition, chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.* 2009). Acoustic masking is when other noises such as from human sources interfere with animal detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction.

Masking occurs at the frequency band that the animals utilize. Therefore, since noise generated from vibratory pile driving activity is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds by odontocetes (toothed whales). However, lower frequency man-made noises are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. It may also affect communication signals when they occur near the noise band and thus reduce the communication space of animals (*e.g.*, Clark *et al.* 2009) and cause increased stress levels (*e.g.*, Foote *et al.* 2004; Holt *et al.* 2009).

Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, as well as individual levels. Masking affects both senders and receivers of the signals and could have long-term chronic effects on marine mammal species and populations. Recent science suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of sound pressure level) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand 2009). For Seattle DOT's Pier 62 Project, noises from vibratory pile driving and pile removal contribute to the elevated ambient noise levels in the project area, thus increasing potential for or severity of masking. Baseline ambient noise levels in the vicinity of project area are high due to ongoing shipping, construction and other activities in the Puget Sound.

Behavioral disturbance - Finally, marine mammals' exposure to certain sounds could lead to behavioral disturbance (Richardson *et al.*, 1995), such as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or

feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (*e.g.*, pinnipeds flushing into water from haulouts or rookeries).

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Southall *et al.*, 2007). Currently NMFS uses a received level of 160 dB re 1 μ Pa (rms) to predict the onset of behavioral harassment from impulse noises (such as impact pile driving), and 120 dB re 1 μ Pa (rms) for continuous noises (such as vibratory pile driving). For the Seattle DOT's Pier 62 Project, both of these noise levels are considered for effects analysis because Seattle DOT plans to use both impact and vibratory pile driving, as well as vibratory pile removal.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, and/or reproduction, which depends on the severity, duration, and context of the effects.

Habitat - The primary potential impacts to marine mammal habitat are associated with elevated sound levels produced by pile driving and removal associated with marine mammal prey species. However, other potential impacts to the surrounding habitat from physical disturbance are also possible. Prey species for the various marine mammals include marine invertebrates and fish species. Short-term effects would occur to marine invertebrates during removal of existing piles. This effect is expected to be minor and short-term on the overall population of marine invertebrates in Elliott Bay. Construction will also have temporary effects on salmonids and other fish species in the project area due to disturbance, turbidity, noise, and

the potential resuspension of contaminants. All in-water work will occur during the designated in-water work window, to minimize effects on juvenile salmonids with the exception of some Chinook salmon that may be found along the seawall into October. Additionally, marine resident fish species are only present in limited numbers along the seawall during the in-water work season and primarily occur during the summer months, when work would not be occurring (Anchor QEA 2012).

SPLs from impact pile driving has the potential to injure or kill fish in the immediate area. These few isolated fish mortality events are not anticipated to have a substantial effect on prey species population or their availability as a food resource for marine mammals.

Studies also suggest that larger fish are generally less susceptible to death or injury than small fish. Moreover, elongated forms that are round in cross section are less at risk than deep-bodied forms. Orientation of fish relative to the shock wave may also affect the extent of injury. Open water pelagic fish (*e.g.*, mackerel) seem to be less affected than reef fishes. The results of most studies are dependent upon specific biological, environmental, explosive, and data recording factors.

The huge variation in fish populations, including numbers, species, sizes, and orientation and range from the detonation point, makes it very difficult to accurately predict mortalities at any specific site of detonation. Most fish species experience a large number of natural mortalities, especially during early life-stages, and any small level of mortality caused by the Seattle DOT's impact pile driving will likely be insignificant to the population as a whole.

For non-impulsive sound such as that of vibratory pile driving, experiments have shown that fish can sense both the strength and direction of sound (Hawkins 1981). Primary factors

determining whether a fish can sense a sound signal, and potentially react to it, are the frequency of the signal and the strength of the signal in relation to the natural background noise level.

The level of sound at which a fish will react or alter its behavior is usually well above the detection level. Fish have been found to react to sounds when the sound level increased to about 20 dB above the detection level of 120 dB (Ona 1988); however, the response threshold can depend on the time of year and the fish's physiological condition (Engas *et al.* 1993).

During construction activity of the Pier 62 Project, only a small fraction of the available habitat would be ensonified at any given time. Disturbance to fish species would be short-term and fish would return to their pre-disturbance behavior once the pile driving activity ceases. Thus, the proposed construction would have little, if any, impact on the abilities of marine mammals to feed in the area where construction work is planned.

Finally, the time of the proposed construction activity would avoid the spawning season of the ESA-listed salmonid species between March and July.

Short-term turbidity is a water quality effect of most in-water work, including pile driving. Cetaceans are not expected to be close enough to the Pier 62 Project to experience turbidity, and any pinnipeds will be transiting the terminal area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals.

For these reasons, any adverse effects to marine mammal habitat in the area from the Seattle DOT's proposed Pier 62 would not be significant.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS's consideration of whether the number of takes is "small" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of 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 (Level B harassment).

Authorized takes would primarily be by Level B harassment, as exposure to pile driving activities has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for high frequency species due to larger predicted auditory injury zones. Auditory injury is unlikely to occur for mid-frequency species and most pinnipeds. The proposed mitigation and monitoring measures (*i.e.*, exclusion zones, use of a bubble curtain, etc. as discussed in detail below in "Proposed Mitigation" section), are expected to minimize the severity of such taking to the extent practicable. Below we describe how the take is estimated.

Described in the most basic way, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area or volume of water that will be ensonified above these levels in a day; 3) the density or occurrence

of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the proposed take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.* 2007, Ellison *et al.* 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μ Pa (rms) for continuous (*e.g.*, vibratory pile-driving, drilling) sources and above 160 dB re 1 μ Pa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Seattle DOT's proposed activity includes the use of continuous (vibratory pile driving and removal) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μ Pa (rms) are applicable.

Level A harassment for non-explosive sources - NMFS’s Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS, 2016a) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). Seattle DOT’s proposed activity includes the use of continuous (vibratory pile driving and removal) and impulsive (impact pile driving) sources.

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in Table 5 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>.

Table 5. Thresholds Identifying the Onset of Permanent Threshold Shift.

Hearing Group	PTS Onset Thresholds	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB
<p>* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.</p> <p>Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (LE) has a reference value of 1μPa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level</p>		

thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds.

Background noise is the sound level that would exist without the proposed activity (pile driving and removal, in this case), while ambient sound levels are those without human activity (NOAA 2009). The marine waterway of Elliott Bay is very active, and human factors that may contribute to background noise levels include ship traffic and fishing-boat depth sounders.

Natural actions that contribute to ambient noise include waves, wind, rainfall, current fluctuations, chemical composition, and biological sound sources (*e.g.*, marine mammals, fish, and shrimp; Carr *et al.* 2006). Background noise levels will be compared to the NOAA/NMFS threshold levels designed to protect marine mammals to determine the Level B Harassment Zones for noise sources. Based on work completed by WSDOT for Washington State Ferries (WSF) to determine background noise in the vicinity of Elliott Bay, specifically at the Seattle Ferry terminal, the background level of 124 dB rms was used to calculate the attenuation for vibratory pile driving and removal (WSDOT 2015b). Although NMFS's harassment threshold is typically 120 dB for continuous noise, based on multiple measurements, the data collected by WSDOT (2015b) indicate that ambient sound levels are typically higher than this sound level and ranged from 124 dB to 141 dB; therefore, we accepted the 124 dB rms as a proxy for the relevant threshold for the Seattle DOT Pier 62 project.

The sound source levels for installation of the 30-in steel piles are based on surrogate data compiled by WSDOT. The source level of vibratory removal of 14-in timber piles were based on measurements conducted at the Port Townsend Ferry Terminal during vibratory removal of 12-in timber piles by WSDOT (Laughlin 2011). The recorded source level is 152 decibels (dB) re 1 micropascal (μPa) at 16 meters (m) from the pile. This value was also used for other pile driving projects (WSDOT Seattle Multimodal Construction Project - Colman Dock IHA RIN 0648-XF250) in the same area as the proposed Seattle Pier 62 project. In February of 2016, WSDOT conducted a test pile project at Colman Dock and the measured results from that project were used for that project and here to provide source levels for the prediction of isopleths ensonified over thresholds for the Seattle Pier 62 project. The results showed that the sound pressure level (SPL) root-mean-square (rms) for impact pile driving of 36-in steel pile is 189 dB re 1 μPa at 14 m from the pile (WSDOT 2016b). This value is also used for impact driving of the 30-in steel piles, which is a precautionary approach. Source level of vibratory pile driving of 36-in steel piles is based on test pile driving at Port Townsend in 2010 (Laughlin 2011). Recordings of vibratory pile driving were made at a distance of 10 m from the pile. The results show that the SPLrms for vibratory pile driving of 36-in steel pile was 177 dB re 1 μPa (WSDOT 2016a).

The method of incidental take requested is Level B acoustical harassment of any marine mammal occurring within the 160 dB rms disturbance threshold during impact pile driving of 30-in pipe piles; the 120 dB rms disturbance threshold for vibratory pile driving of 30-in pipe piles; and the 120 dB rms disturbance threshold for vibratory removal of 14-in timber piles have been established as the three different Level B ZOIs that will be in place during active pile removal or installation of the different types of piles (Table 6). However, measured ambient noise levels in the area are 124 dB; therefore, NMFS only considers take likely to occur in the area ensonified

above 124 dB, as pile driving noise below 124 dB would likely be masked or their impacts diminished such that any reactions would not be considered take as a result of the high ambient noise levels.

For the Level B ZOI's, sound waves propagate in all directions when they travel through water until they dissipate to background levels or encounter barriers that absorb or reflect their energy, such as a landmass. Therefore, the area of the Level B ZOIs was determined using land as the boundary on the north, east and south sides of the project. On the west, land was also used to establish the zone for vibratory driving. From Alki on the south and Magnolia on the north, a straight line of transmission was established out to Bainbridge Island. For impact driving (and vibratory removal), sound dissipates much quicker and the impact zone stays within Elliott Bay. Pile-related construction noise would extend throughout the nearshore and open water environments to just west of Alki Point and a limited distance into the East Waterway of the Lower Duwamish River, a highly industrialized waterway. Because landmasses block in-water construction noise, a “noise shadow” created by Alki Point is expected to be present immediately west of this feature (refer to Seattle DOT’s application for maps depicting the Level B ZOIs).

Table 6. Level B Zone Descriptions and Duration of Activity

Sound Source	Activity	Construction Method	Level B Threshold (m)	Level B ZOI (km²)	Days of Activity
1	Removal of 14-in Timber Piles	Vibratory	1,865	4.9	49
2	Installation of 30-in Steel Piles	Vibratory	54,117	91	53
3	Installation of 30-in Steel Piles	Impact	1,201	2.3	11

When NMFS Technical Guidance (NMFS 2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the

duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which will result in some degree of overestimate of Level A take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources such as vibratory and impact pile driving, NMFS’s User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. Inputs used in the User Spreadsheet, and the resulting isopleths are reported below.

The PTS isopleths were identified for each hearing group for impact and vibratory installation and removal methods that will be used in the Pier 62 Project. The PTS isopleth distances were calculated using the NMFS acoustic threshold calculator (NMFS 2016), with inputs based on measured and surrogate noise measurements taken during the EBSP construction and from WSDOT, and estimating conservative working durations (Table 7 and Table 8).

Table 7. NMFS Technical Acoustic Guidance User Spreadsheet Input to Predict PTS Isopleths.

USER SPREADSHEET INPUT			
	Sound Source 1	Sound Source 2	Sound Source 3
Spreadsheet Tab Used	A)Vibratory pile driving (removal)	A)Vibratory pile driving (installation)	E.1) Impact pile driving (installation)
Source Level (rms SPL)	155 dB	180 dB	
Source Level (Single			176 dB

Strike/shot SEL)			
Weighting Factor Adjustment (kHz)	2.5	2.5	2
a) Number of strikes in 1 h			20
a) Activity Duration (h) within 24-h period	8	8	4
Propagation (xLogR)	15	15	15
Distance of source level measurement (meters) ⁺	16	10	14

Table 8. NMFS Technical Acoustic Guidance User Spreadsheet Output for Predicted PTS Isopleths and Level A Daily Ensonified Areas.

USER SPREADSHEET OUTPUT					
Sound Source Type	PTS Isopleth (meters)				
	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
1 - Vibratory (pile removal)	17.4	1.5	25.7	10.6	0.7
2 - Vibratory (installation)	504.8	44.7	746.4	306.8	21.5
3 - Impact (installation)	88.6	3.2	105.6	47.4	3.5
Daily ensonified area (km ²)*					
Vibratory (pile removal)	0.000476	0.000004	0.001037	0.000176	7.70E-13
Vibratory (installation)	0.400275	0.003139	0.875111	0.147853	0.000726
Impact (installation)	0.012331	0.000016	0.017517	0.003529	1.92423E-05

*Daily ensonified areas were divided by two to only account for the ensonified area within the water and not over land.

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculation and we describe how the marine mammal occurrence information is brought together to produce a quantitative take estimate. In all cases we demonstrated take estimates using the species density data from the 2015 Pacific Navy Marine Species Density Database (U.S. Navy 2015), to estimate take for marine mammals.

Take estimates are based on average marine mammal density in the project area multiplied by the area size of ensonified zones within which received noise levels exceed certain

thresholds (*i.e.*, Level A and B harassment) from specific activities, then multiplied by the total number of days such activities would occur.

Unless otherwise described, incidental take is estimated by the following equation:

Incidental take estimate = species density * zone of influence * days of pile-related activity

However, adjustments were made for nearly every marine mammal species, whenever their local abundance is known through other monitoring efforts. In those cases, the local abundance data are used for take calculations for the proposed authorized take instead of general animal density (see below).

Harbor Seal

Based on U.S. Navy species density estimates (U.S. Navy 2015) for the inland waters of Puget Sound, potential take of harbor seal is requested as shown in Table 9. Based on these calculations, Level A take is estimated at 10 harbor seals from vibratory pile driving and Level B take is estimated at 6,193 harbor seals from all sound sources. However, observational data from previous projects on the Seattle waterfront have documented only a fraction of what is calculated using the Navy density estimates for Puget Sound. For example, between zero and seven seals were observed daily for the EBSP and 56 harbor seals were observed over 10 days in the area with the maximum number of 13 harbor seals sighted during the 2016 Seattle Test Pile project (WSF 2016).

Therefore, NMFS proposes to authorize Level B harassment of 1,469 harbor seals that could be exposed to noise levels associated with “take.” The harbor seal take estimate is based on local seal abundance information using the maximum number of seals (13) sighted in one day during the 2016 Seattle Test Pile project multiplied by a total of 113 pile driving days for the Seattle DOT Pier 62 Project. Fifty-three days would involve installation by vibratory pile

driving, which has a much larger Level A zone (306.8 m) than the Level A zones for vibratory removal (10.6 m) and impact pile driving (47.4 m). Harbor seals may be difficult to observe at greater distances, therefore, during vibratory pile driving, it may not be known how long a seal is present in the Level A zone. We estimate that 4 harbor seals may experience Level A harassment during these 53 days. Four seals were considered to have the potential to be taken by Level A harassment based the local observational data for harbor seals, the larger ensonified area during vibratory pile driving for installation, and our best professional judgment that an animal would remain within the injury zone for prolonged exposure of intense noise. The number of Level B takes was adjusted to exclude those already counted for Level A takes, so the proposed authorized Level B take is 1,465 harbor seals.

Table 9. Harbor Seal Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Take Level A	Estimated Take Level B
1	1.219	0.000176	4.9	49	0	293
2	1.219	0.147853	91	53	10	5,879 (*Adjusted 5,869)
3	1.219	0.003529	2.3	11	0	31

Note:

km² – square kilometers

*Number of Level B takes was adjusted to exclude those already counted for Level A takes.

Northern Elephant Seal

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of northern elephant seal is expected to be zero. However, The Whale Museum (as cited in WSDOT 2016a) reported one sighting in the relevant area between 2008 and 2014. Therefore, the Seattle DOT is requesting authorization for Level B harassment of one northern elephant seal.

California Sea Lion

Based on U.S. Navy species density estimates (U.S. Navy 2015) for the inland waters of Washington, including Eastern Bays and Puget Sound, potential take of California sea lion is requested as shown in Table 10. Since the calculated Level A zones of otariids are all very small (Table 8), we do not consider it likely that any sea lions would be taken by Level A harassment. All California sea lion takes estimated here are expected to be taken by Level B harassment. The estimated Level B take is 644 California sea lions. However, the Seattle DOT believes that this estimate is unrealistically low, based on local marine mammal monitoring. Therefore, NMFS proposes to authorize Level B harassment of 1,695 California sea lions. The California sea lion take estimate is based on four seasons of local sea lion abundance information from the EBSP. Marine mammal visual monitoring during the EBSP indicates that a maximum of 15 sea lions were observed in a day during four year project monitoring (Anchor QEA 2014, 2015, 2016). Based on a total of 113 pile driving days for the Seattle Pier 62 project, it is estimated that up to 1,695 California sea lions could be exposed to noise levels associated with “take.”

Table 10. California Sea Lion Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.1266	7.70E-13	4.9	49	0	30
2	0.1266	0.000726	91	53	0	611
3	0.1266	1.92423E-05	2.3	11	0	3

Note:
km² – square kilometers

Steller Sea Lion

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of Steller sea lion is requested as shown in Table 11. Since the calculated Level A zones of otariids are all very small (Table 8), we do not consider it likely that any Steller sea lions would be taken by Level A harassment. The Seattle DOT is requesting authorization for Level B harassment of 188 Steller sea lions.

Table 11. Steller Sea Lion Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.0368	7.70E-13	4.9	49	0	9
2	0.0368	0.000726	91	53	0	178
3	0.0368	1.92423E-05	2.3	11	0	1

Note:
km² – square kilometers

Southern Resident Killer Whale

Based on the U.S. Navy species density estimates (U.S. Navy 2015) the density for the SRKW is variable across seasons and across the range. The inland water density estimates vary from 0.001461 to 0.004760/km² in fall and 0.004761-0.020240/km² in winter. Therefore, the take request as shown in Table 12 is based on the highest density estimated during the winter season (0.020240/km²) for the SRKW population.

With the variable winter density, the Level B take estimate can range from 24 to 104 SRKW, with the upper take estimate greater than the estimated population size and the lower estimated take still greater than 20 percent of the population. NMFS proposes to authorize Level B harassment of 24 SRKW based on a single occurrence of one pod (*i.e.*, J Pod – 24 individuals) that would be most likely to be seen near Seattle. The Seattle DOT will coordinate with The Orca Network in an attempt to avoid all take of SRKW, but it may be possible that a group may enter the Level B ZOI before Seattle DOT could shut down due to the larger size of the Level B

ZOI, particularly during vibratory pile driving (installation). Since the Level A zones of mid-frequency cetaceans are small (Table 8), we do not consider it likely that any SRKW would be taken by Level A harassment.

Table 12. Southern Resident Killer Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.020240	0.000004	4.9	49	0	5
2	0.020240	0.003139	91	53	0	98
3	0.020240	0.000016	2.3	11	0	1

Note:
km² – square kilometers

Transient Killer Whale

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of transient killer whale is requested as shown in Table 13. As with the SRKW, the density estimate of transient killer whales is variable between seasons and regions. In fall, density estimates range from 0.001583 to 0.002373/km² and in winter they range from 0.000575 to 0.001582/km². The winter density estimate, when most of the work is being conducted, will be used for estimating density and take. For Level B harassment, this results in a take estimate of eight individuals. However, the Seattle DOT believes that this estimate is low based on local data of 7 transients that were reported in the area (Orca Network Archive Report 2016a). Therefore, NMFS proposes to authorize Level B harassment of 42 transient killer whales, which would cover up to two groups of up to seven transient whales entering into the project area and remaining there for three days. Since the Level A zones of mid-frequency cetaceans are small (Table 8), we do not consider it likely that any transient killer whales would be taken by Level A harassment.

Table 13. Transient Killer Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.001582	0.000004	4.9	49	0	0
2	0.001582	0.003139	91	53	0	8
3	0.001582	0.000016	2.3	11	0	0

Note:
km² – square kilometers

Long-beaked Common Dolphin

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of long-beaked common dolphin is expected to be zero. However, in 2016, the Orca Network (2016c) reported a pod of up to 20 long-beaked common dolphins. Therefore, the Seattle DOT is requesting authorization for Level B harassment of 20 long-beaked common dolphins. Since the Level A zones of mid-frequency cetaceans are all very small (Table 8), we do not consider it likely that the long-beaked common dolphin would be taken by Level A harassment.

Harbor Porpoise

Based on species density estimates from Jefferson *et al.* (2016), potential take of harbor porpoise is requested as shown in Table 14. Take by Level A harassment is estimated at 32 harbor porpoises and take by Level B harassment is estimated at 3,512 exposures to harbor porpoises. NMFS proposes to authorize take by Level A harassment of 32 harbor porpoises and take by Level B harassment of 3,480 harbor porpoises.

Table 14. Harbor Porpoise Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.69	0.001037	4.9	49	0	166
2	0.69	0.875111	91	53	32	3,328 (*Adjusted 3,296)

3	0.69	0.017517	2.3	11	0	18
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Note:

km² – square kilometers

*Number of Level B takes was adjusted to exclude those already counted for Level A takes. Take is instances not individuals.

Dall’s Porpoise

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take is requested as shown in Table 15. Based on these calculations, the Seattle DOT is requesting take for Level A harassment of 2 Dall’s porpoise and take for Level B harassment of 199 Dall’s porpoise.

Table 15. Dall’s Porpoise Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km ²)	Level B ZOI (km ²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.039	0.001037	4.9	49	0	10
2	0.039	0.875111	91	53	2	190 (*Adjusted 188)
3	0.039	0.017517	2.3	11	0	1

Note:

km² – square kilometers

*Number of Level B takes was adjusted to exclude those already counted for Level A takes.

Humpback Whales

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of humpback whale is requested as shown in Table 16. Although the standard take calculations would result in an estimated take of less than one humpback whale, to be conservative, the Seattle DOT is requesting authorization for Level B harassment of five humpback whales based on take during previous work in Elliott Bay where two humpback whales were observed, including one take, during the 175 days of work during the previous four years (Anchor QEA 2014, 2015, 2016, and 2017). Since the Level A zones of low-frequency cetaceans are smaller during vibratory removal (17.4 m) or impact installation (88.6 m) compared to the Level A zone for vibratory installation (504.8 m) (Table 8), we do not consider it likely that any humpbacks

would be taken by Level A harassment during removal or impact installation. We also do not believe any humpbacks would be taken during vibratory installation due to the ability to see humpbacks easily during monitoring and additional coordination with The Orca Network and The Center for Whale Research, which would enable the work to be shut down before a humpback would be taken by Level A harassment.

Table 16. Humpback Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.00001	0.000476	4.9	49	0	0
2	0.00001	0.400275	91	53	0	0
3	0.00001	0.012331	2.3	11	0	0

Note:
km² – square kilometers

Gray whale

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of gray whale is requested as shown in Table 17. The Seattle DOT is requesting authorization for Level B harassment of three gray whales. Since the Level A zones of low-frequency cetaceans are smaller during vibratory removal (17.4 m) or impact installation (88.6 m) compared to the Level A zone for vibratory installation (504.8 m) (Table 8), we do not consider it likely that any gray whales would be taken by Level A harassment during removal or impact installation. We also do not believe any gray whales would be taken during vibratory installation due to the ability to see gray whales easily during monitoring and additional coordination with The Orca Network and The Center for Whale Research, which would enable the work to be shut down before a gray whale would be taken by Level A harassment.

Table 17. Gray Whale Estimated Take Based on NMSDD Presented for Comparison.

Sound Source	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.00051	0.000476	4.9	49	0	0
2	0.00051	0.400275	91	53	0	3
3	0.00051	0.012331	2.3	11	0	0

Note:
km² – square kilometers

Minke Whale

Based on U.S. Navy species density estimates (U.S. Navy 2015), potential take of minke whales is expected to be zero (Table 18). However, between 2008 and 2014, the Whale Museum (as cited in WSDOT 2016a) reported one sighting in the relevant area. Although the take calculations would result in an estimated take of less than one minke whale, the Seattle DOT is requesting authorization for Level B harassment of two minke whales, based on previous sightings in the construction area by the Whale Museum. Based on the low probability that a minke whale would be observed during the project and then also enter into a Level A zone, we do not consider it likely that any minke whales would be taken by Level A harassment.

Table 18. Minke Whale Estimated Take Based on NMSDD Presented for Comparison.

Level B Zone	Species Density	Level A ZOI (km²)	Level B ZOI (km²)	Days of Activity	Estimated Level A Take	Estimated Level B Take
1	0.00003	0.000476	4.9	49	0	0
2	0.00003	0.400275	91	53	0	<1
3	0.00003	0.012331	2.3	11	0	0

Note:
km² – square kilometers

The summary of proposed authorized take by Level A and Level B Harassment is described below in Table 19.

Table 19. Summary of Requested Incidental Take by Level A and Level B Harassment

Species	Stock Size	Proposed Authorized Level A Take	Proposed Authorized Level B Take	Proposed Authorized Total Take	% of Population
Pacific harbor seal (<i>Phoca vitulina</i>)	11,036	4	1,465 ^a	1,469	13.31
Northern elephant seal (<i>Mirounga angustirostris</i>)	179,000	0	1 ^b	1	Less than 1
California sea lion (<i>Zalophus californianus</i>)	296,750	0	1,695 ^c	1,695	Less than 1
Steller sea lion (<i>Eumetopias jubatus</i>)	60,131- 74,448	0	188	188	Less than 1
Southern resident killer whale DPS (<i>Orcinus orca</i>)	78	0	24 (single occurrence of one pod) ^d	24 (single occurrence of one pod)	30.77
Transient killer whale (<i>Orcinus orca</i>)	240	0	42 ^e	42	20
Long-beaked common dolphin (<i>Dephinus capensis</i>)	101,305	0	20 ^f	20	Less than 1
Harbor porpoise (<i>Phocoena phocoena</i>)	11,233	32	3,480	3,512	31.26
Dall's porpoise (<i>Phocoenoides dalli</i>)	25,750	2	199	201	Less than 1
Humpback whale (<i>Megaptera novaengliae</i>)	1,918	0	5 ^g	5	Less than 1
Gray whale (<i>Eschrichtius robustus</i>)	20,990	0	3	3	Less than 1
Minke whale (<i>Balaenoptera acutorostrata</i>)	636	0	2 ^h	2	Less than 1

Note:

^a The take estimate proposed is based on a maximum of 13 seals observed on a given day during the 2016 Seattle Test Pile project. The number of Level B takes was adjusted to exclude those already counted for Level A takes.

^b The take estimate proposed is based on The Whale Museum (as cited in WSDOT 2016a) reporting one sighting of a Northern Elephant seal in the area between 2008 and 2014.

^c The take estimate proposed is based on a maximum of 15 California sea lions observed on a given day during 4 monitoring seasons of the EBSP project.

^d The take estimate proposed is based on a single occurrence of one pod of SRKW (*i.e.*, J-pod of 24 SRKW) that would be most likely to be seen near Seattle.

^e The take estimate proposed is based on local data which is greater than the estimates produced using the Navy density estimates. Therefore, the take proposed is 20 percent of the transient killer whale stock.

^f The take estimate proposed is based on The Orca Network (2016c) reporting a pod of up to 20 long-beaked common dolphins.

^g The take estimate proposed is based on take during previous work in Elliott Bay, where two humpback whales were observed and is greater than what was calculated using 2015 Navy density estimates.

^h The take estimate proposed is based on The Whale Museum (as cited in WSDOT 2016a) reporting one sighting in the relevant area. Although the take calculations would result in an estimated take of less than one minke whale, to be conservative the Seattle DOT is requesting take of two minke whales.

Proposed Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, “and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking” for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

1) the manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned), and;

2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Several measures are proposed for mitigating effects on marine mammals from the pile installation and removal activities at Pier 62 and are described below.

Timing Restrictions

All work would be conducted during daylight hours.

Bubble Curtain

A bubble curtain will be used during pile driving activities with an impact hammer to reduce sound levels.

Exclusion Zones

Exclusion Zones calculated from the PTS isopleths will be implemented to protect marine mammals from Level A harassment (refer to Table 8). Outside of any Level A take authorized, if a marine mammal is observed at or within the Exclusion Zone, work will shut down (stop work) until the individual has been observed outside of the zone, or has not been observed for at least 15 minutes for pinnipeds and small cetaceans and 30 minutes for large whales.

Additional Shutdown Measures

Seattle DOT will implement shutdown measures if the number of authorized takes for any particular species reaches the limit under the IHA and if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B harassment zone during in-water construction activities.

Level B Harassment Zones

Seattle DOT will implement the Level B harassment ZOIs as described in Table 6.

Soft-Start for Impact Pile Driving

For impact pile installation, contractors will provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent three-strike sets. Each day, Seattle DOT will use the soft-start technique at the beginning of impact pile driving, or if impact pile driving has ceased for more than 30 minutes.

Additional Coordination

The project team will monitor and coordinate with local marine mammal sighting networks (*i.e.*, Orca Network and/or the CWR) to gather information on the location of whales prior to initiating pile removal. Marine mammal monitoring will be conducted to collect information on the presence of marine mammals within the Level B Harassment Zones for this project. The project team will also coordinate with Washington State Ferries (WSF) to discuss marine mammal sightings on days when vibratory or impact removal is occurring on their nearby projects. In addition, reports will be made available to interested parties upon request.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, "requirements pertaining to the monitoring and reporting of such taking."

The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).

- Mitigation and monitoring effectiveness.

Marine mammal monitoring will be conducted at all times during in-water pile driving and removal in strategic locations around the area of potential effects as described below:

- During pile removal or installation with a vibratory hammer, a three-monitor protocol would be used, positioned such that each monitor has a distinct view-shed and the monitors collectively have overlapping view-sheds.
- During pile driving activities with an impact hammer, one monitor, based at or near the construction site, will conduct the monitoring.
- In the case(s) where visibility becomes limited, additional land-based monitors and/or boat-based monitors may be deployed.
- Monitors will record take when marine mammals enter the relevant Level B Harassment Zones based on type of construction activity.
- If a marine mammal approaches an Exclusion Zone, the observation will be reported to the Construction Manager and the individual will be watched closely. If the marine mammal crosses into an Exclusion Zone, a stop-work order will be issued. In the event that a stop-work order is triggered, the observed marine mammal(s) will be closely monitored while it remains in or near the Exclusion Zone, and only when it moves well outside of the Exclusion Zone or has not been observed for at least 15 minutes for pinnipeds and 30 minutes for whales will the lead monitor allow work to recommence.

Protected species observers

Seattle DOT shall employ NMFS-approved protected species observers (PSOs) to conduct marine mammal monitoring for its Pier 62 Project. The PSOs will observe and collect

data on marine mammals in and around the project area for 30 minutes before, during, and for 30 minutes after all pile removal and pile installation work. NMFS-approved PSOs shall meet the following requirements:

1. Independent observers (*i.e.*, not construction personnel) are required.
2. At least one observer must have prior experience working as an observer.
3. Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.
4. Where a team of three or more observers are required, one observer should be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer.
5. NMFS will require submission and approval of observer CVs.
6. PSOs will monitor marine mammals around the construction site using high-quality binoculars (*e.g.*, Zeiss, 10 x 42 power) and/or spotting scopes. Due to the different sizes of the Level B Zones from different pile sizes, several different Level B Zones and different monitoring protocols corresponding to a specific pile size will be established.
7. If marine mammals are observed, the following information will be documented:
 - (A) Date and time that monitored activity begins or ends;
 - (B) Construction activities occurring during each observation period;
 - (C) Weather parameters (*e.g.*, percent cover, visibility);
 - (D) Water conditions (*e.g.*, sea state, tide state);
 - (E) Species, numbers, and, if possible, sex and age class of marine mammals;
 - (F) Description of any observable marine mammal behavior patterns,

including bearing and direction of travel and distance from pile driving activity;

(G) Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;

(H) Locations of all marine mammal observations; and

(I) Other human activity in the area.

Acoustic Monitoring

In addition, acoustic monitoring will occur on up to six days per in-water work season to evaluate, in real time, sound production from construction activities (minimum of two days for each type of pile-related activity: vibratory removal of timber pile, vibratory installation of 30-in steel, and impact installation of 30-in steel). Acoustic monitoring will follow NMFS's 2012 Guidance Documents: Sound Propagation Modeling to Characterize Pile Driving Sounds Relevant to Marine Mammals and Data Collection Methods to Characterize Underwater Background Sound Relevant to Marine Mammals in Coastal Nearshore Waters and Rivers of Washington and Oregon.

Background noise recordings (in the absence of pile-related work) will also be made during the study to provide a baseline background noise profile. The results and conclusions of the acoustic monitoring will be summarized and presented to NOAA/NMFS with recommendations on any modifications to this proposed plan or Exclusion Zones.

Proposed Reporting Measures

Marine Mammal Monitoring Report

Seattle DOT would be required to submit a draft marine mammal monitoring report within 90 days after completion of the in-water construction work or the expiration of the IHA (if

issued), whichever comes earlier. The report would include data from marine mammal sightings as described: date, time, location, species, group size, and behavior, any observed reactions to construction, distance to operating pile hammer, and construction activities occurring at time of sighting and environmental data for the period (*i.e.*, wind speed and direction, sea state, tidal state, cloud cover, and visibility). The marine mammal monitoring report will also include total takes, takes by day, and stop-work orders for each species. NMFS would have an opportunity to provide comments on the report, and if NMFS has comments, Seattle DOT would address the comments and submit a final report to NMFS within 30 days.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury, or mortality, Seattle DOT would immediately cease the specified activities and immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hrs preceding the incident;
- Water depth;
- Environmental conditions (*e.g.*, wind speed and direction, sea state, cloud cover, and visibility);

- Description of all marine mammal observations in the 24 hrs preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with Seattle DOT to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Seattle DOT may not resume their activities until notified by NMFS via letter, email, or telephone.

Reporting of Injured or Dead Marine Mammals

In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition as described in the next paragraph), Seattle DOT would immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with Seattle DOT to determine whether modifications in the activities are appropriate.

In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Seattle DOT would report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS Stranding Hotline

and/or by email to the NMFS' West Coast Stranding Coordinator within 24 hrs of the discovery. Seattle DOT would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. Activities may continue while NMFS reviews the circumstances of the incident.

Acoustic Monitoring Report

Seattle DOT will submit an Acoustic Monitoring Report that will provide details on the monitored piles, method of installation, monitoring equipment, and sound levels documented during monitoring. NMFS will review the acoustic monitoring report and suggest any changes in monitoring as needed.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival” (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS’s implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are

incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

No serious injury or mortality is anticipated or proposed to be authorized for the Pier 62 Project. Takes that are anticipated and proposed to be authorized are expected to be limited to short-term Level A and Level B harassment (behavioral). Marine mammals present in the vicinity of the action area and taken by Level A and Level B harassment would most likely show overt brief disturbance (startle reaction) and avoidance of the area from elevated noise levels during pile driving and pile removal and the implosion noise. However, many marine mammals showed no observable changes during similar project activities for the EBSP.

There are two endangered species that may occur in the project area, humpback whales and SRKW. However, few humpbacks are expected to occur in the project area and few have been observed during previous projects in Elliot Bay. SRKW have occurred in small numbers in the project area. Seattle DOT will shut down in the Level B ZOI should they meet or exceed the proposed take of one occurrence of one pod (J-pod, 24 whales).

There is ESA-designated critical habitat in the vicinity of Seattle DOT's proposed Pier 62 Project for SRKW. However, this proposed IHA is authorizing the harassment of marine mammals, not the production of sound, which is what would result in adverse effects to critical habitat for SRKW. There is one documented harbor seal haulout area near Bainbridge Island, approximately 6 miles (9.66 km) from Pier 62. The haulout, which is estimated at less than 100 animals, consists of intertidal rocks and reef areas around Blakely Rocks and is at the outer edge of potential effects at the outer extent near Bainbridge Island (Jefferies *et al.* 2000). The level of use of this haulout during the fall and winter is unknown, but is expected to be much less than in

the spring and summer, as air temperatures become colder than water temperatures resulting in seals in general hauling out less. Similarly, the nearest Steller sea lion haulout to the project area is located approximately six miles away (9.66 km) and is also on the outer edge of potential effects. This haulout is composed of net pens offshore of the south end of Bainbridge Island.

The project also is not expected to have significant adverse effects on affected marine mammals' habitat, as analyzed in detail in the "Potential Effects of Specified Activities on Marine Mammals and their Habitat" section. Project activities would not permanently modify existing marine mammal habitat. The activities may kill some fish and cause other fish to leave the area temporarily, thus impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences. Therefore, given the consideration of potential impacts to marine mammal prey species and their physical environment, Seattle DOT's proposed Pier 62 Project would not adversely affect marine mammal habitat.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized.
- Takes that are anticipated and proposed to be authorized are expected to be limited to short-term Level B harassment (behavioral).
- The project also is not expected to have significant adverse effects on affected marine mammals' habitat.

- There are no known important feeding or pupping areas. There are two haulouts (harbor seals and Steller sea lions). However, they are at the most outer edge of the potential effects and approximately 6.6 miles from Pier 62. There are no other known important areas for marine mammals.
- For eight of the eleven species, take is less than one percent of the stock abundance. Instances of take for the other three species (harbor seals, killer whales, and harbor porpoise) range from about 13-31 percent of the stock abundance. However, when the fact that a fair number of these instances are expected to be repeat takes of the same animals is considered, the number of individual marine mammals taken is significantly lower.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Take of eight of the eleven species is less than one percent of the stock abundance. Instances of take for the SRKW and transient killer whales, harbor seals, and harbor porpoise ranges from about 13-31 percent of the stock abundance. However, when the fact that a fair number of these instances are expected to be repeat takes of the same animals is considered, the number of individual marine mammals taken is significantly lower. Specifically, for example, Jefferson *et al.* 2016 conducted harbor porpoise surveys in eight regions of Puget Sound, and estimated an abundance of 147 harbor porpoise in the Seattle area (1,798 porpoise in North Puget Sound and 599 porpoise in South Puget Sound). While individuals do move between regions, we would not realistically expect that 3000+ individuals would be exposed around the pile driving for the Seattle DOT's Pier 62 Project. Considering these factors, as well as the general small size of the project area as compared to the range of the species affected, the numbers of marine mammals estimated to be taken are small proportions of the total populations of the affected species or stocks. Further, for SRKW we acknowledge that 30.77% of the stock is proposed to be taken by Level B harassment, but we believe that a single, brief incident of take of one group of any species represents take of small numbers for that species. Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population sizes of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

Section 7(a)(2) of the ESA of 1973 (16 U.S.C. § 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the West Coast Regional Office, whenever we propose to authorize take for endangered or threatened species.

NMFS is proposing to authorize take of SRKW and humpback whales, which are listed under the ESA.

The Permit and Conservation Division has requested initiation of Section 7 consultation with the West Coast Regional Office for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Seattle DOT for conducting piledriving activities at Pier 62, Elliot Bay, Seattle, Washington from September 2017 to February 2018, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

The proposed IHA language is provided next.

1. This Authorization is valid from September 1, 2017, through February 28, 2018.

2. This Authorization is valid only for activities associated with in-water construction work at the Seattle Department of Transportation's (Seattle DOT) Pier 62 Project, Seattle, Washington.

3. General Condition

(a) The species authorized for taking, by Level A harassment and Level B harassment, and in the numbers shown in Table 19 are: Pacific harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), long-beaked common dolphin (*Delphinus capensis*), both southern resident killer whale (SRKW) and transient killer whale (*Orcinus orca*), humpback whale (*Megaptera novaengliae*), gray whale (*Eschrichtius robustus*), and minke whale (*Balaenoptera acutorostrata*).

(b) The authorization for taking by harassment is limited to the following acoustic sources and from the following activities:

- Impact pile driving;
- Vibratory pile driving; and
- Vibratory pile removal

4. Prohibitions

(a) The taking, by incidental harassment only, is limited to the species listed under condition 3(a) above and by the numbers listed in Table 19 of this notice. The taking by serious injury or death of these species or the taking by harassment, injury or death of any other species of marine mammal is prohibited unless separately authorized or exempted under the MMPA and may result in the modification, suspension, or revocation of this Authorization.

(b) The taking of any marine mammal is prohibited whenever the required protected species observers (PSOs), required by condition 6(b), are not present in conformance with condition 6(b) of this Authorization.

5. Mitigation

(a) Time Restriction

In-water construction work will occur only during daylight hours.

(b) Bubble Curtain

A bubble curtain will be used during pile driving activities with an impact hammer.

(c) Level B Harassment Zones

Seattle DOT will implement the Level B harassment ZOIs as described in Table 6 of this notice.

(d) Exclusion Zones

Outside of any Level A take authorized, Seattle DOT will shut down (stop work) in the Exclusion Zones using the PTS isopleths as described in Table 8 of this notice to protect marine mammals from Level A harassment.

(i) Seattle DOT will implement a minimum shutdown zone of 10 m radius around each pile for all construction methods other than pile driving for all marine mammals.

(ii) If a marine mammal is observed at or within the Exclusion Zone, work will stop until the individual has been observed outside of the zone, or has not been observed for at least 15 minutes for pinnipeds and small cetaceans and 30 minutes for large whales.

(e) Additional Shutdown Measures

Seattle DOT will implement shutdown measures if the number of authorized takes for any particular species reaches the limit under the IHA and if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B harassment zone during in-water construction activities.

(f) Soft-Start for Impact Pile Driving

For impact pile installation, contractors will provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent three-strike sets.

(g) Additional Coordination

The project team will monitor and coordinate with local marine mammal sighting networks (*i.e.*, The Orca Network and/or The Center for Whale Research) to gather information on the location of whales prior to initiating pile removal. Marine mammal monitoring will be conducted to collect information on the presence of marine mammals within the Level B Harassment Zones for this project. The project team will also coordinate with Washington State Ferries (WSF) to discuss marine mammal sightings on days when vibratory or impact removal is occurring on their nearby projects. In addition, reports will be made available to interested parties upon request.

6. Monitoring:

(a) Protected Species Observers

Seattle DOT shall employ NMFS-approved PSOs to conduct marine mammal monitoring for its construction project. NMFS-approved PSOs will meet the following qualifications.

- (i) Independent observers (*i.e.*, not construction personnel) are required.

- (ii) At least one observer must have prior experience working as an observer.
 - (iii) Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.
 - (iv) Where a team of three or more observers are required, one observer should be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer.
 - (v) NMFS will require submission and approval of observer CVs.
- (b) Monitoring Protocols: PSOs shall be present on site at all times during pile removal and driving. Marine mammal visual monitoring will be conducted for different Level B Harassment Zones based on different sizes of piles being driven or removed.
- (i) A 30-minute pre-construction marine mammal monitoring will be required before the first pile driving or pile removal of the day. A 30-minute post-construction marine mammal monitoring will be required after the last pile driving or pile removal of the day. If the constructors take a break between subsequent pile driving or pile removal for more than 30 minutes, then additional 30-minute pre-construction marine mammal monitoring will be required before the next start-up of pile driving or pile removal.
 - (ii) During pile removal or installation with a vibratory hammer, a three-monitor protocol will be used, positioned such that each monitor has a distinct view-shed and the monitors collectively have overlapping view-sheds.
 - (iii) During pile driving activities with an impact hammer, one monitor, based at or near the construction site, will conduct the monitoring.

- (iv) Where visibility becomes limited, additional land-based monitors and/or boat-based monitors shall be deployed.
- (v) Monitors will record take when marine mammals enter their relevant Level B Harassment Zones based on type of construction activity.
- (vi) If a marine mammal approaches an Exclusion Zone, the observation will be reported to the Construction Manager and the individual will be watched closely. If the marine mammal crosses into an Exclusion Zone, a stop-work order will be issued. In the event that a stop-work order is triggered, the observed marine mammal(s) will be closely monitored while it remains in or near the Exclusion Zone, and only when it moves well outside of the Exclusion Zone or has not been observed for at least 15 minutes for pinnipeds and small cetaceans and 30 minutes for large whales will the lead monitor allow work to recommence.
- (vii) PSOs will monitor marine mammals around the construction site using high-quality binoculars (*e.g.*, Zeiss, 10 x 42 power) and/or spotting scopes.
- (viii) If marine mammals are observed, the following information will be documented:
 - (A) Date and time that monitored activity begins or ends;
 - (B) Construction activities occurring during each observation period;
 - (C) Weather parameters (*e.g.*, percent cover, visibility);
 - (D) Water conditions (*e.g.*, sea state, tide state);
 - (E) Species, numbers, and, if possible, sex and age class of marine mammals;
 - (F) Description of any observable marine mammal behavior patterns,

including bearing and direction of travel and distance from pile driving activity;

(G) Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;

(H) Locations of all marine mammal observations; and

(I) Other human activity in the area.

(ix) Acoustic Monitoring - Seattle DOT will conduct acoustic monitoring up to six days per in-water work season to evaluate, in real time, sound production from construction activities (minimum of two days for each type of pile-related activity: vibratory removal of timber pile, vibratory installation of 30-in steel, and impact installation of 30-in steel). Acoustic monitoring will follow NMFS's 2012 Guidance Documents: *Sound Propagation Modeling to Characterize Pile Driving Sounds Relevant to Marine Mammals and Data Collection Methods to Characterize Underwater Background Sound Relevant to Marine Mammals in Coastal Nearshore Waters and Rivers of Washington and Oregon*. Background noise recordings (in the absence of pile-related work) will also be made during the study to provide a baseline background noise profile.

7. Reporting:

(a) Marine Mammal Monitoring

(i) Seattle DOT will submit a draft marine mammal monitoring report within 90 days after completion of the in-water construction work or the expiration of the IHA (if issued), whichever comes earlier. The report will include data from marine mammal sightings as described: date, time, location, species, group size,

and behavior, any observed reactions to construction, distance to operating pile hammer, and construction activities occurring at time of sighting and environmental data for the period (*i.e.*, wind speed and direction, sea state, tidal state, cloud cover, and visibility). The marine mammal monitoring report will also include total takes, takes by day, and stop-work orders for each species.

(ii) If comments are received from NMFS Office of Protected Resources on the draft report, a final report will be submitted to NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

(iii) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury, or mortality, Seattle DOT will immediately cease the specified activities and immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hrs preceding the incident;
- Water depth;

- Environmental conditions (*e.g.*, wind speed and direction, sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hrs preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Seattle DOT to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Seattle DOT will not resume their activities until notified by NMFS via letter, email, or telephone.

(b) Reporting of Injured or Dead Marine Mammals

- (i) In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition as described in the next paragraph), Seattle DOT will immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS' West Coast Stranding Coordinator. The report must include the same information identified in 7(a)(iii). Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Seattle DOT to determine whether modifications in the activities are appropriate.

(ii) In the event that Seattle DOT discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Seattle DOT will report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS and the NMFS Stranding Hotline and/or by email to the NMFS' West Coast Stranding Coordinator within 24 hrs of the discovery. Seattle DOT will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. Activities may continue while NMFS reviews the circumstances of the incident.

(c) Acoustic Monitoring Report - Seattle DOT will submit an Acoustic Monitoring Report that will provide details on the monitored piles, method of installation, monitoring equipment, and sound levels documented during monitoring. NMFS will review the acoustic monitoring report and suggest any changes in monitoring as needed.

8. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

9. A copy of this Authorization must be in the possession of each contractor who performs the construction work at the Pier 62 Project.

Request for Public Comments

We request comment on our analyses, the draft authorization, and any other aspect of this Notice of Proposed IHA for the proposed pile driving activities for the Seattle Pier 62 Project.

Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

Dated: July 19, 2017.

Catherine Marzin,
Acting Deputy Director,
Office of Protected Resources,
National Marine Fisheries Service.

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