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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XG011

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Bremerton and Edmonds Ferry Terminals Dolphin Relocation Project in Washington State

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

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that we have issued an incidental harassment authorization (IHA) to Washington State Department of Transportation (WSDOT) to take small numbers of marine mammals, by harassment, incidental to Bremerton and Edmonds ferry terminals dolphin relocation project in Washington State.

DATES: This authorization is effective from October 1, 2018, through September 30, 2019.

FOR FURTHER INFORMATION CONTACT: Shane Guan, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as the issued IHA, 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 (as delegated to NMFS) 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, 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).

Summary of Request

On October 4, 2017, WSDOT submitted a request to NMFS requesting an IHA for the possible harassment of small numbers of marine mammal species incidental to the dolphin relocation project at the Bremerton and Edmonds ferry terminals in Washington State, between October 1, 2018, to September 30, 2019. NMFS determined that the IHA application is adequate and complete on December 4, 2017, with a few minor comments and questions. WSDOT subsequently addressed all NMFS comments and submitted a revised IHA application on March 1, 2018. NMFS is proposing to authorize the take by Level B harassment of the following marine mammal species: harbor seal (*Phoca vitulina*); northern elephant seal (*Mirounga angustirostris*); California sea lion (*Zalophus californianus*); Steller sea lion (*Eumetopias jubatus*); killer whale (*Orcinus orca*); gray whale (*Eschrichtius robustus*); humpback whale (*Megaptera novaeangliae*); minke whale (*Balaenoptera acutorostrata*); harbor porpoise (*Phocoena phocoena*); Dall's porpoise (*Phocoenoides dalli*); and long-beaked common dolphin (*Delphinus delphis*).

Description of Proposed Activity

Overview

The WSDOT is proposing to relocate one dolphin to improve safety at each of the Bremerton and Edmonds ferry terminals. The Olympic Class ferries have an atypical shape, which at some terminals causes the vessel to make contact with the inner dolphin prior to the stern reaching the intermediate or outer dolphin. This tends to cause rotation of the vessel away from the wingwalls and presents a safety issue. The project will reduce the risk of landing issues for Olympic Class ferries at the Bremerton and Edmonds ferry terminals.

Dates and Duration

Due to NMFS and the U.S. Fish and Wildlife Service (USFWS) in-water work timing restrictions to protect ESA-listed salmonids, planned WSDOT in-water construction is limited each year to July 16 through February 15.

In-water construction at the Bremerton Ferry Terminal will commence after October 1, and is planned during the August 1, 2018, to February 15, 2019 in-water work window. In-water construction at the Edmonds Ferry Terminal will commence October 1, and is planned during the July 15, 2018, to February 15, 2019 in-water work window.

Specified Geographic Region

The Bremerton Ferry Terminal is located in the city of Bremerton, east of the Navy shipyard. Bremerton is on the shoreline of Sinclair Inlet, south of Bainbridge Island. Located in Kitsap County, Washington, the terminal is located in Section 24, Township 24 North, Range 1 East. The Edmonds Ferry Terminal is located in the city of Edmonds, along the downtown waterfront. Edmonds is in Snohomish County, approximately 15 miles north of Seattle. The terminal is located in Section 23, Township 27 North, Range 3 East (Figure 1-2 in the IHA application). Land use near both ferry terminals is a mix of residential, commercial, industrial, and open space and/or undeveloped lands.

Detailed Description of In-water Pile Driving and Removal Associated with the Dolphin Relocation Project at Bremerton and Edmonds Ferry Terminals

The proposed project includes vibratory hammer driving and removal creating elevated in-water and in-air noise that may impact marine mammals.

The following construction activities (in sequence) are anticipated for the Bremerton Ferry Terminal.

- Install one temporary 36-inch diameter steel indicator pile with a vibratory hammer. The temporary indicator pile will be used as a visual landing aid reference for vessel captains during construction. It will be relocated to become a fender pile for the new dolphin.
- Remove the existing left outer dolphin that consists of six 36-inch diameter steel pipe piles with a vibratory hammer and/or by direct pull and clamshell removal.
- Using a vibratory hammer, install three 30-inch steel pile reaction piles. This is a back group of piles that provide stability to the dolphin.
- Install a concrete diaphragm (the diaphragm joins the piles at their tops), then use a vibratory hammer to install the remaining four 30-inch reaction piles.
- Using a vibratory hammer, install three 36-inch diameter steel pipe fender piles; install fenders and attach rub panels to the fender piles. Fender piles absorb much of the energy as the ferry vessel makes contact with the dolphin.
- Using a vibratory hammer, remove the 36-inch temporary indicator pile and install it as the last remaining fender pile along with the fender and fender panel.

The following construction activities (in sequence) are anticipated for the Edmonds Ferry Terminal.

- Install one temporary 36-inch diameter steel indicator pile with a vibratory hammer. The temporary indicator pile will be used as a visual landing aid reference for vessel captains during construction.
- Using a vibratory hammer, install one 30-inch reaction pile.
- Using a vibratory hammer, install the two remaining reaction piles through the diaphragm.

- Using a vibratory hammer, remove three 36-inch steel pipe fender piles and reinstall them in their new locations.
- Using a vibratory hammer, remove the 36-inch temporary indicator pile (this portion of the project will not reuse the indicator pile).

A summary of the piles to be installed and removed, along with pile driving information, is provided in Table 1.

Table 1. Summary of in-water pile driving and removal durations

Location	Pile element	Method	Pile type	Size (inch)	Pile number	Duration/pile (min)	# pile/day	Duration (Days)
Bremerton	Indicator pile	Vibratory install	Steel	36	1	20	1	1
	Indicator pile	Vibratory removal	Steel	36	1	15	1	1
	Existing dolphin	Vibratory removal	Steel	36	6	15	3	2
	Relocate dolphin install	Vibratory install	Steel	36	4	20	3	2
	Relocated dolphin install	Vibratory install	Steel	30	7	20	3	3
	Subtotal				**19**	**345**		**9**
Edmond	Indicator pile	Vibratory install	Steel	36	1	20	1	1
	Indicator pile	Vibratory removal	Steel	36	1	15	1	1
	Existing dolphin removal	Vibratory removal	Steel	36	3	15	3	1
	Relocated dolphin	Vibratory install	Steel	36	3	20	3	1
	Relocated dolphin	Vibratory install	Steel	30	3	20	3	1
	Subtotal				**11**	**200**		**5**
Total					**30**	**545**		**14**

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

Comments and Responses

A notice of NMFS' proposal to issue an IHA was published in the **Federal Register** on April 16, 2018 (83 FR 16330). During the 30-day public comment period, NMFS received comment letters from the Marine Mammal Commission (Commission) and the Whale and Dolphin Conservation (WDC). Specific comments and responses are provided below.

Comment 1: The Commission recommends that NMFS require WSDOT to collect spectral data at the source to verify the spectrum of 36-in piles and adjust the Level A harassment zones as necessary, rather than continue to use the spectrum associated with 30-in piles.

Response: NMFS agrees with the Commission that if WSDOT plans to conduct pile driving source level measurements, spectral data should be required to calculate Level A harassment zones. However, WSDOT stated that it does not plan to conduct source level measurements for the Bremerton-Edmonds ferry terminal construction. Instead, WSDOT plans to use broadband source level measurement on the 36-in piles collected at Edmonds Ferry Terminal in 2017 and applies the 30-in pile spectrum to model for Level A harassment zones. NMFS has determined that this is acceptable for this activity, though we plan to continue evaluating this determination as new information is collected. Therefore, since WSDOT does not plan to conduct source measurements for the Bremerton-Edmonds ferry terminal project, NMFS will not request it to acquire spectral data.

Comment 2: The Commission commented that the method NMFS used to estimate the numbers of takes during the proposed activities, which summed fractions of takes for each

species across project days, does not account for and negates the intent of NMFS' 24-hour reset policy. The Commission also recommends that NMFS develop and share guidance on this issue.

Response: NMFS has provided the guidance to the Commission; and, as described therein and discussed subsequently, we have determined that the method used for rounding take estimates here is appropriate and does not conflict with the methodology that the Commission refers to as the "24-hour reset policy."

Comment 3: The Commission requested clarification of certain issues associated with NMFS's notice that one-year renewals could be issued in certain limited circumstances and expressed concern that the process would bypass the public notice and comment requirements. The Commission also suggested that NMFS should discuss the possibility of renewals through a more general route, such as a rulemaking, instead of notice in a specific authorization. The Commission further recommended that if NMFS did not pursue a more general route, that the agency provide the Commission and the public with a legal analysis supporting our conclusion that this process is consistent with the requirements of section 101(a)(5)(D) of the MMPA.

Response: The process of issuing a renewal IHA does not bypass the public notice and comment requirements of the MMPA. The notice of the proposed IHA expressly notifies the public that under certain, limited conditions an applicant could seek a renewal IHA for an additional year. The notice describes the conditions under which such a renewal request could be considered and expressly seeks public comment in the event such a renewal is sought. Additional reference to this solicitation of public comment has recently been added at the beginning of FR notices that consider renewals. NMFS appreciates the streamlining achieved by the use of abbreviated **Federal Register** notices and intends to continue using them for proposed IHAs that include minor changes from previously issued IHAs, but which do not satisfy the renewal

requirements. However, we believe our proposed method for issuing renewals meets statutory requirements and maximizes efficiency. Importantly, such renewals would be limited to where the activities are identical or nearly identical to those analyzed in the proposed IHA, monitoring does not indicate impacts that were not previously analyzed and authorized, and the mitigation and monitoring requirements remain the same, all of which allow the public to comment on the appropriateness and effects of a renewal at the same time the public provides comments on the initial IHA. NMFS has, however, modified the language for future proposed IHAs to clarify that all IHAs, including renewal IHAs, are valid for no more than one year and that the agency would consider only one renewal for a project at this time. In addition, notice of issuance or denial of a renewal IHA would be published in the **Federal Register**, as are all IHAs. Last, NMFS will publish on our website a description of the renewal process before any renewal is issued utilizing the new process.

Comment 4: The WDC states that as part of the recently initiated Washington State Southern Resident Recovery Task Force, WSDOT should utilize locally available resources, including a hydrophone network and well-informed local sightings network, to monitor the presence, abundance, and movement of killer whales in the area during the project. WDC further recommends that if a protected species observer (PSO) is unable to differentiate between transient and resident killer whales, any killer whale sighting near the shutdown zone should result in shutdown measures. In addition, WDC recommends WSDOT employ soft-start or ramp-up methods for pile driving activities to give any marine mammal within hearing range time to respond to increased noise levels and leave the area before work begins.

Response: NMFS agrees with WDC's recommendations. In fact, all the recommended mitigation and monitoring measures in the WDC's comment letter were already in the proposed

IHA. These measures include, but not limited to, (1) coordinating with the Orca Network on a daily basis during pile driving to understand marine mammal presence near the project areas and also sharing project sightings data with Orca Network; (2) implementing shutdown measures if a killer whale is sighted near the shutdown zone when the ecotype of the killer whale is unknown, and (3) implementing ramp-up methods for pile driving activities.

Description of Marine Mammals in the Area of Specified Activities

We have reviewed the applicant's species information, which summarizes available information regarding status and trends, distribution and habitat preferences, behavior and life history, and auditory capabilities of the potentially affected species—for accuracy and completeness and refer the reader to Sections 3 and 4 of the applications, as well as to NMFS' Stock Assessment Reports (SAR; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region#reports*).

Table 2 lists all species with expected potential for occurrence in Bremerton and Edmonds ferry terminal project area and summarizes information related to the population or stock, including potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2017). PBR, 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, is considered in concert with known sources of ongoing anthropogenic mortality to assess the population-level effects of the anticipated mortality from a specific project (as described in NMFS' SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality 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' 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' 2017 U.S. Pacific Marine Mammal SARs (Carretta *et al*., 2018). The 2017 SAR is available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region#reports.*

Table 2. Marine mammals with potential presence within the proposed project area.

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	*Eschrichtius robustus*	Eastern North Pacific	-; N	20,990 (0.05, 20,125)	624	132
Family Balaenopteridae						
Humpback whale	*Megaptera novaeangliae*	California/Oregon/ Washington	E/D;Y	1,918 (0.03, 1,976)	11.0	>6.5
Minke whale	*Balaenoptera acutorostrata*	California/Oregon/ Washington	-; N	636 (0.72, 369)	3.5	>1.3
Family Delphinidae						
Killer whale	*Orcinus orca*	Eastern N. Pacific Southern resident	E/D; Y	83 (NA, 83)	0.14	0
		West coast transient	-; N	243 (NA, 243)	2.4	0
Long-beaked common dolphin	*Delphinus delphis*	California	-; N	101,305 (0.49, 68,432)	657	>35.4
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Washington inland waters	-; N	11,233 (0.37, 8,308)	66	7.2
Dall's porpoise	*Phocoenoides dali*	California/Oregon/ Washington	-; N	25,750 (0.45, 17,954)	172	0.3
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California sea lion	*Zalophus californianus*	U.S.	-; N	296,750 (NA, 153,337)	9,200	389
Steller sea lion	*Eumetopias jubatus*	Eastern U.S.	-; N	41,638 (NA, 41,638)	2,498	108
Family Phocidae (earless seals)						
Harbor seal	*Phoca vitulina*	Washington northern inland waters	-; N	11,036[4] (unk, unk)	1,641	43

Northern elephant seal	*Mirounga angustirostris*	California breeding	-; N	179,000 (NA, 81,368)	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: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region#reports*. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance.

[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 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.

[4]Harbor seal estimate is based on data that are 8 years old, but this is the best available information for use here.

All species that could potentially occur in the proposed construction areas are included in Table 2. Although the SRKW could occur in the vicinity of the project area, WSDOT proposes to implement strict monitoring and mitigation measures with assistance from local marine mammal researchers and observers. Thus, the take of this marine mammal stock can be avoided (see details in Mitigation section).

In addition, sea otters may be found in Puget Sound area. However, this species is managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

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 (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (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);
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): generalized hearing is estimated to occur between approximately 150 Hz and 160 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;
- Pinnipeds in water; Otariidae (eared seals): generalized hearing is estimated to occur between 60 Hz and 39 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).

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For more detail concerning these groups and associated frequency ranges, please see NMFS (2016) 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 construction activities. Please refer to Table 2. Of the cetacean species that may be present, one species is classified as low-frequency cetaceans (*i.e*., gray, humpback, and minke whales), two are classified as mid-frequency cetaceans (killer whale and long-beaked common dolphin), and two are classified as high-frequency cetaceans (*i.e*., harbor and Dall's 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 "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.

Potential impacts to marine mammals from the Bremerton-Edmonds ferry terminal construction project are from noise generated during in-water pile driving and pile removal activities.

Acoustic Effects

Here, we first provide background information on marine mammal hearing before discussing the potential effects of the use of active acoustic sources on marine mammals.

The WSDOT's Bremerton-Edmond ferry terminal construction 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 TS just after exposure is the initial TS. If the TS eventually returns to zero (*i.e.*, the threshold returns to the pre-exposure value), it is a temporary threshold shift (TTS) (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 a noise-induced TS. An animal can experience 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, 2015). 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 sound pressure level (SPL) at 200.2 dB (peak-to-peak) re: 1 micropascal (μPa), which corresponds to a sound exposure level of 164.5 dB re: 1 μPa^2 s after integrating exposure. Because the airgun noise is a broadband impulse, one cannot directly determine the equivalent of root mean square (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. Therefore, based on these studies, NMFS recognizes that TTS of harbor porpoises is lower than other cetacean species empirically tested (Finneran & 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.

In addition, chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals, which 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 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 SPL) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand, 2009). For WSDOT's Bremerton-Edmonds ferry terminal 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.

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 μPa (rms) to predict the onset of behavioral harassment from impulse noises (such as impact pile driving), and 120 dB re 1 μPa (rms) for continuous noises (such as vibratory pile driving). For the WSDOT's Bremerton-Edmonds ferry terminal project, only 120-dB level is considered for effects analysis because WSDOT plans to use only vibratory pile driving and 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.

Potential Effects on Marine Mammal Habitat

The primary potential impacts to marine mammal habitat are associated with elevated sound levels produced by vibratory pile removal and pile driving in the area. However, other potential impacts to the surrounding habitat from physical disturbance are also possible.

With regard to fish as a prey source for cetaceans and pinnipeds, fish are known to hear and react to sounds and to use sound to communicate (Tavolga *et al*., 1981) and possibly avoid predators (Wilson and Dill, 2002). 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). In general, fish react more strongly to pulses of sound (such as noise from impact pile driving) rather than continuous signals (such as noise from vibratory pile driving) (Blaxter *et al*., 1981), and a quicker alarm response is elicited when the sound signal intensity rises rapidly compared to sound rising more slowly to the same level.

During the coastal construction, 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 marine mammals' prey availability 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.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS' 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 be by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to noise generated from vibratory pile driving and removal. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, shutdown measures – discussed in detail below in Mitigation section), Level A harassment is neither anticipated nor authorized.

As described previously, no mortality is anticipated or authorized for this activity. 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 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 μPa (rms) for continuous (*e.g.* vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

Applicant's proposed activity includes the generation of non-impulse (vibratory pile driving and removal) source; and, only the 120-dB re 1 μPa (rms) is used.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Technical Guidance, 2016) 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). Applicant's proposed activity would generate and non-impulsive (vibratory pile driving and pile removal) noises.
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 the table 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 3. Current Acoustic Exposure Criteria for Non-explosive Sound Underwater

Hearing Group	PTS Onset Thresholds		Behavioral Thresholds	
	Impulsive	Non-impulsive	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB	$L_{rms,flat}$: 160 dB	$L_{rms,flat}$: 120 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		

* 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.

Note: Peak sound pressure (Lpk) 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 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.

Source Levels

The project includes vibratory removal and/or driving of 30-inch and 36-inch diameter hollow steel piles. Based on in-water measurements at Edmonds Ferry Terminal in 2017

(WSDOT 2017), vibratory driving of 30-inch steel piles generated 174 dB rms re 1 µPa at 10 meters and vibratory pile driving of a 36-inch steel pile generated 177 dB rms re 1 µPa measured at 10 meters. As a conservative estimate, vibratory pile removal source level of 36-in steel pile is based on 36-in pile installation level of 177 dB re 1 µPa SEL.

A summary of source levels from different pile driving and pile removal activities is provided in Table 4.

Table 4. Summary of in-water pile driving source levels (at 10 m from source)

Method	Pile type / size	SEL (dB re 1 µPa^2-s)	SPL_{rms} (dB re 1 µPa)
Vibratory driving / removal	36-in steel pile	177	177
Vibratory driving	30-in steel pile	174	174

These source levels are used to compute the Level A harassment zones and to estimate the Level B harassment zones. For Level A harassment zones, since the peak source levels for both pile driving are below the injury thresholds, cumulative SEL were used to do the calculations using the NMFS acoustic guidance (NMFS 2016).

Estimating Harassment Zones

For Level B harassment, ensonified areas are based on WSDOT's source measurements (see above) computed using 15*log(R) for transmission loss to derive the distances up to 120-dB isopleths.

For Level A harassment, calculation is based on duration of installation/removal per pile and number of piles installed or removed per day, using spectral modeling based on vibratory pile driving recordings made at Edmonds Ferry Terminal for the same piles. One-second sound exposure level (SEL) power spectral densities (PSDs) were calculated and used as representative pile driving sources to assess Level A harassment for marine mammals in different hearing

groups. Initial results showed that Level A harassment zones from the 3-in piles were smaller than those from 30-in piles for high-frequency cetaceans, despite the broadband noise level from the 36-in pile being 3 dB higher than that of 30-in pile. Close examination of the pile driving spectra revealed some unusual high decay rate in the 36-in pile driving sound above 2 kHz. This unusual decay was probably due to the specific sediment in the pile driving location. Therefore, the spectrum for the 30-in pile was used to model the 36-in pile and scaled up to the 177 dB broadband level.

Transmission loss due to absorption was also incorporated based using the equation

$$TL(f) = 15\log(R) + a(f)*R/1000$$

where TL(f) is frequency dependent transmission loss, and a(f) is frequency dependent transmission loss coefficient.

Distances of ensonified area for different pile driving/removal activities for different marine mammal hearing groups is present in Table 5.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

In most cases, marine mammal density data are from the U.S. Navy Marine Species Density Database (U.S. Navy 2015) except California sea lion and harbor porpoise. California sea lion density at Bremerton area is based on survey data of California sea lions at the Navy Shipyard at Bremerton from 2012-2016 (Navy 2017). Survey results indicate as many as 144 animals hauled out each day during this time period, with the majority of animals observed August through May and the greatest numbers observed in November. The average of the monthly maximum counts during the in-water work window provides an estimate of 69 sea lions

per day. For harbor porpoise, because Washington Department of Fish and Wildlife has better local distribution data based on recent survey in the area, local animal abundance are used to calculate the take numbers (Evenson, 2016).

Table 5. Modeled distances and areas to harassment zones

Location	*Pile driving activity*	*SL (10m)*	*Level A harassment distance (m) Level A harassment area (m^2)*					*Level B harassment distance (m) Level B harassment area (m^2)*
		SEL_{ss}	*LF Cetacean*	*MF Cetacean*	*HF Cetacean*	*Phocid*	*Otariid*	*All marine mammals*
Bremerton	**36" indicate pile install (1 pile/day)**	177	10	10	25	10	10	**63,100**
			314	314	1,964	314	314	**13,200,000**
	36" indicate pile removal (1 pile/day)	177	10	10	10	10	10	**63,100**
			314	314	314	314	314	**13,200,000**
	36" steel pile (existing dolphin) removal (3 piles/day)	177	25	10	35	10	10	**63,100**
			1962.5	314	3,849	314	314	**13,200,000**
	36" steel pile (relocated dolphin) install (3 piles/day)	177	25	10	35	10	10	**63,100**
			1,964	314	3,849	314	314	**13,200,000**
	30" steel pile (relocated dolphin) install (3 piles/day)	174	25	10	25	10	10	**39,800**
			1,964	314	1,964	314	314	**13,200,000**
Edmond	**36" steel pile (indicate pile) install (1 pile/day)**	177	10	10	25	10	10	**63,100**
			314	314	1,964	314	314	**351,000,000**
	36" steel pile (indicate pile) removal (1 pile/day)	177	10	10	10	10	10	**63,100**
			314	314	314	314	314	**351,000,000**
	36" steel pile (existing dolphin) removal (3 piles/day)	177	25	10	35	10	10	**63,100**
			1,964	314	3,859	314	314	**351,000,000**
	36" steel pile (relocated dolphin) install (3 piles/day)	177	25	10	35	10	10	**63,100**
			1,964	314	3,849	314	314	**351,000,000**
	30" steel pile (relocated dolphin) install (3 piles/day)	174	25	10	25	10	10	**39,800**
			1,964	314	1,964	314	314	**351,000,000**

A summary of marine mammal density and local occurrence used for take estimates is provided in Table 6.

Table 6. Marine mammal density and local occurrence in the WSDOT project area

Species	Density (#/km^2)
Gray whale	0.0051
Humpback whale	0.0007
Minke whale	0.00003
Killer whale (West coast transient)	0.002
Long-beaked common dolphin	0.002

Harbor porpoise	0.58
Dall's porpoise	0.048
California sea lion	0.03*
Steller sea lion	0.04
Harbor seal	1.22
Northern elephant seal	0.00001

* This density is only used for Edmonds Ferry Terminal area. For animals at Bremerton Ferry Terminal, a daily sighting of 69 animals is used for take estimates.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate. For all marine mammals except California sea lion at Bremerton Ferry Terminal area, takes were calculated as: Take = ensonified area x average animal abundance in the area x pile driving days and rounded up to the nearest integer. For California sea lion at Bremerton, take estimate is based on the average daily sighting of 69 animals within the area multiplied by the nine project days, which yield a total of 621 estimated takes.

For calculated take number less than 10, such as northern elephant seals, transient killer whales, humpback whales, minke whales, and long-beaked common dolphins, takes numbers were adjusted to account for group encounter and the likelihood of encountering. Specifically, for northern elephant seal, take of 15 animals is estimated based on the likelihood of encountering this species during the project period. For transient killer whale, takes of 30 animals is estimated based on the group size and the likelihood of encountering in the area. For humpback and minke whales, takes of eight animals each are estimated based on the likelihood of encountering. For long-beaked common dolphin, take of 50 animals is estimated based on the group size and the likelihood of encountering in the area.

No Level A harassment take is calculated using the aforementioned estimation method because of the small injury zones and relatively low average animal density in the area. Since the largest Level A harassment distance is only 35 m from the source for high-frequency

cetaceans (harbor porpoise and Dall's porpoise), NMFS considers that WSDOT can effectively monitor such small zones to implement shutdown measures and avoid Level A harassment takes. Therefore, no Level A harassment take of marine mammal is anticipated for the dolphin replacement project at the Bremerton and Edmonds ferry terminals.

A summary of estimated takes based on the above analysis is listed in Table 7.

Table 7. Estimated numbers of marine mammals that may be exposed to received noise levels that cause Level B harassment

Species	Estimated Level B harassment take	Abundance	Percentage
Gray whale	10	20,990	0%
Humpback whale	8	1,918	0%
Minke whale	8	636	2%
Killer whale (West coast transient)	30	243	12%
Killer whale (Southern resident)	0	83	0%
Long-beaked common dolphin	50	101,305	0%
Harbor porpoise	1,087	11,233	10%
Dall's porpoise	90	25,750	0%
California sea lion	1,149	296,750	0%
Steller sea lion	75	41,638	0%
Harbor seal	2,286	11,036	21%
Northern elephant seal	15	179,000	0%

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.

Mitigation for Marine Mammals and their Habitat

1. Time Restriction

In-water work must occur only during daylight hours, when visual monitoring of marine mammals can be conducted.

2. Establishing and Monitoring Level A, Level B Harassment Zones, and Shutdown Zones.

Before the commencement of in-water construction activities, which include vibratory pile driving and pile removal, WSDOT must establish Level A harassment zones where received underwater SEL_{cum} could cause PTS (see above).

WSDOT must also establish Level B harassment zones where received underwater SPLs are higher than 120 dB_{rms} re 1 µPa for non-impulsive noise sources (vibratory pile driving and pile removal).

WSDOT must establish shutdown zones within which marine mammals could be taken by Level A harassment. For Level A harassment zones that is less than 10 m from the source, a minimum of 10 m distance should be established as a shutdown zone.

A summary of shutdown zones is provided in Table 8.

Table 8. Shutdown Distances for Various Pile Driving Activities and Marine Mammal Hearing Groups

Pile type, size & pile driving method	Shutdown distance (m)				
	LF cetacean	MF cetacean	HF cetacean	Phocid	Otariid
36" indicate pile install (1 pile/day)	10	10	25	10	10
36" indicate pile removal (1 pile/day)	10	10	10	10	10
36" steel pile (existing dolphin) removal (3 piles/day)	25	10	35	10	10
36" steel pile (relocated dolphin) install (3 piles/day)	25	10	35	10	10
30" steel pile (relocated dolphin) install (3 piles/day)	25	10	25	10	10

NMFS-approved protected species observers (PSO) shall conduct an initial 30-minute survey of the shutdown zones to ensure that no marine mammals are seen within the zones before pile driving and pile removal of a pile segment begins. If marine mammals are found within the shutdown zone, pile driving of the segment must be delayed until they move out of the area. If a marine mammal is seen above water and then dives below, the contractor must wait 15

minutes. If no marine mammals are seen by the observer in that time it can be assumed that the animal has moved beyond the shutdown zone.

If pile driving of a segment ceases for 30 minutes or more and a marine mammal is sighted within the designated shutdown zone prior to commencement of pile driving, the observer(s) must notify the pile driving operator (or other authorized individual) immediately and continue to monitor the shutdown zone. Operations may not resume until the marine mammal has exited the shutdown zone or 30 minutes have elapsed since the last sighting.

To verify the required monitoring distance, the shutdown zones and ZOIs will be determined by using a range finder or hand-held global positioning system device.

3. Shutdown Measures

WSDOT must implement shutdown measures if a marine mammal is detected within or to be approaching the shutdown zones provided in Table 8 of this notice.

WSDOT must implement shutdown measures if Southern Resident killer whales (SRKWs) are sighted within the vicinity of the project area and are approaching the Level B harassment zone (zone of influence, or ZOI) during in-water construction activities.

If a killer whale approaches the ZOI during pile driving or removal, and it is unknown whether it is a SRKW or a transient killer whale, it must be assumed to be a SRKW and WSDOT shall implement the shutdown measure described above.

If a SRKW enters the ZOI undetected, in-water pile driving or pile removal must be suspended until the SRKW exits the ZOI to avoid further level B harassment.

WSDOT must implement shutdown measures if the number of any allotted marine mammal takes reaches the limit under the IHA or if a marine mammal observed is not authorized

for take under this IHA, if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B harassment zone during pile removal activities.

Based on our evaluation of the required measures, NMFS has determined that the prescribed mitigation measures provide the means 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.

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.

Monitoring Measures

WSDOT must employ NMFS-approved PSOs to conduct marine mammal monitoring for its dolphin relocation project at Bremerton and Edmonds ferry terminals. The purposes of marine mammal monitoring are to implement mitigation measures and learn more about impacts to marine mammals from WSDOT's construction activities. The PSOs must 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 must 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 must be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer; and

5. NMFS will require submission and approval of observer CVs.

Monitoring of marine mammals around the construction site shall be conducted using high-quality binoculars (*e.g.*, Zeiss, 10 x 42 power). Due to the different sizes of zones of influence (ZOI) from different pile types, two different ZOIs and different monitoring protocols corresponding to a specific pile type must be established.

- For all vibratory driving/removal at the Bremerton Ferry Terminal, two land-based PSOs and one monitoring boat with one PSO and boat operator must monitor the Level A and Level B harassment zones.
- For all vibratory driving/removal at the Edmonds Ferry Terminal, five land-based PSOs and two ferry-based PSOs must monitor the Level A and Level B harassment zones.
- If the in-situ measurement showed that the Level B harassment zone at the Edmonds Ferry Terminal is under 15 km from the source, three land-based PSOs and one ferry-based PSO must be monitoring the Level A and Level B harassment zones.

Locations of the land-based PSOs and routes of monitoring vessels are shown in WSDOT's Marine Mammal Monitoring Plan, which is available online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*.

6. PSOs must collect the following information during marine mammal monitoring:

- Date and time that monitored activity begins and ends for each day conducted (monitoring period);
- Construction activities occurring during each daily observation period, including how many and what type of piles driven;
- Deviation from initial proposal in pile numbers, pile types, average driving times;
- Weather parameters in each monitoring period (*e.g.*, wind speed, percent cloud cover, visibility);
- Water conditions in each monitoring period (*e.g.*, sea state, tide state);
- For each marine mammal sighting, the following information shall be collected:
    - Species, numbers, and, if possible, sex and age class of marine mammals;
    - Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
    - Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point; and
    - Estimated amount of time that the animals remained in the Level B harassment zone;
    - Description of implementation of mitigation measures within each monitoring period (*e.g.*, shutdown or delay); and
    - Other human activity in the area within each monitoring period.

WSDOT may conduct noise field measurement at the Edmonds Ferry Terminal to determine the actual Level B harassment distance from the source during vibratory pile driving of 36" piles.

Reporting Measures

WSDOT is required to submit a draft monitoring report within 90 days after completion of the construction work or the expiration of the IHA, whichever comes earlier. In the case if WSDOT intends to renew the IHA in a subsequent year, a monitoring report should be submitted 60 days before the expiration of the current IHA (if issued). This report would detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed. NMFS would have an opportunity to provide comments on the report, and if NMFS has comments, WSDOT would address the comments and submit a final report to NMFS within 30 days.

In addition, NMFS would require WSDOT to notify NMFS' Office of Protected Resources and NMFS' West Coast Stranding Coordinator within 48 hours of sighting an injured or dead marine mammal in the construction site. WSDOT shall provide NMFS and the Stranding Network with the species or description of the animal(s), the condition of the animal(s) (including carcass condition, if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available).

In the event that WSDOT finds an injured or dead marine mammal that is not in the construction area, WSDOT must report the same information as listed above to NMFS as soon as operationally feasible.

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' 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).

To avoid repetition, this introductory discussion of our analyses applies to all the species listed in Table 7, given that the anticipated effects of WSDOT's Bremerton and Edmonds ferry terminals dolphin relocation project involving pile driving and pile removal on marine mammals are expected to be relatively similar in nature. There is no information about the nature or severity of the impacts, or the size, status, or structure of any species or stock that would lead to a different analysis by species for this activity, or else species-specific factors would be identified and analyzed.

For all marine mammal species, takes that are anticipated and authorized are expected to be limited to short-term Level B harassment, because of the small scale (only a total of 30 piles to be installed and removed) and short durations (maximum nine days pile driving/removal at Bremerton Ferry Terminal and five days pile driving/removal at Edmonds Ferry Terminal).

Marine mammals present in the vicinity of the action area and taken by 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. For these reasons, these behavioral impacts are not expected to affect marine mammals' growth, survival, and reproduction, especially considering the limited geographic area that would be affected in comparison to the much larger habitat for marine mammals in the Pacific Northwest.

Take calculation based on marine mammal densities within the ensonified areas did not predict a Level A harassment take. In addition, the estimated Level A harassment zones are small (less than 35 m from the source) and can be effectively monitored to implement a shutdown measure if a marine mammal is detected to be moving towards that zone. The impacts are not expected to affect survival, and reproduction of the marine mammal population in the project vicinity.

The project also is not expected to have significant adverse effects on affected marine mammals' habitat, as analyzed in detail in the "Anticipated Effects on Marine Mammal Habitat" section. There is no ESA designated critical area in the vicinity of the Bremerton and Edmonds ferry terminal areas. The 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, WSDOT's proposed

construction activity at Bremerton and Edmonds ferry terminals would not adversely affect marine mammal habitat.

In summary and as described above, the following factors primarily support our 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 injury, serious injury, or mortality is anticipated or authorized;
- All harassment is Level B harassment in the form of short-term behavioral modification; and
- No areas of specific importance to affected species are impacted.

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 prescribed monitoring and mitigation measures, NMFS finds that the total 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, 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.

The estimated takes are below 21 percent of the population for all marine mammals.

Based on the analysis contained herein of the proposed activity (including the prescribed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds

that small numbers of marine mammals will be taken relative to the population size 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.

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 (*i.e*., the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment.

NMFS has determined the issuance of the IHA is consistent with categories of activities identified in Categorical Exclusion B4 (issuance of incidental harassment authorizations under section 101(a)(5)(A) and (D) of the MMPA for which no serious injury or mortality is anticipated) of NOAA's Companion Manual for NAO 216-6A, and we have not identified any extraordinary circumstances listed in Chapter 4 of the Companion Manual for NAO 216-6A that would preclude this categorical exclusion under NEPA.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 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 NMFS West Coast Region Protected Resources Division, whenever we propose to authorize take for endangered or threatened species.

The humpback whale and the killer whale (southern resident distinct population segment (DPS)) are the only marine mammal species listed under the ESA that could occur in the vicinity of WSDOT's proposed construction project. Two DPSs of the humpback whale stock, the Mexico DPS and the Central America DPS, are listed as threatened and endangered under the ESA, respectively. NMFS Office of Protected Resources has initiated consultation with NMFS West Coast Regional Office under section 7 of the ESA on the issuance of an IHA to WSDOT under section 101(a)(5)(D) of the MMPA for this activity. NMFS is authorizing take of California/Oregon/Washington stock of humpback whale, which are listed under the ESA.

In March 2018, NMFS finished conducting its section 7 consultation and issued a Biological Opinion concluding that the issuance of the IHA associated with WSDOT's Bremerton-Edmonds ferry terminals construction project is not likely to jeopardize the continued existence of the endangered humpback and the Southern Resident killer whales.

Authorization

As a result of these determinations, NMFS has issued an IHA to the Washington State Department of Transportation for the Bremerton and Edmonds ferry terminals dolphin relocation

project in Washington State, provided the previously described mitigation, monitoring, and reporting requirements are incorporated.

Dated: September 5, 2018.

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Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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