E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XE835]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Washington Department of Transportation Mukilteo Wingwalls Repair Project in Puget Sound, Washington

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

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from the Washington Department of Transportation (WSDOT) for authorization to take marine mammals incidental to the Mukilteo Wingwalls Repair Project in Puget Sound, 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. NMFS is also requesting comments on a possible one-time, 1-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

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 Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be

submitted via email to *ITP.Fleming@noaa.gov*. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities.* In case of problems accessing these documents, please call the contact listed below.

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, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* 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: Kate Fleming, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. 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 proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable

adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the monitoring and reporting of the takings. The definitions of all applicable MMPA statutory terms used above are included in the relevant sections below and can be found in section 3 of the MMPA (16 U.S.C. 1362) and NMFS regulations at 50 CFR 216.103.

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 IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NAO 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 February 27, 2025, NMFS received a request from the Washington Department of Transportation (WSDOT) for an IHA to take marine mammals incidental to the Mukilteo Wingwalls Repair Project in Puget Sound, Washington. Following

NMFS' review of the application, and discussions between NMFS and WSDOT, the application was deemed adequate and complete on April 24, 2025. WSDOT submitted a final revised version on May 30, 2025. WSDOT's request is for take of nine species of marine mammals by Level B harassment and, for a subset of six of these species, Level A harassment. Neither WSDOT nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS previously issued IHAs to WSDOT for similar work. On July 25, 2014, NMFS issued a requested IHA for the Mukilteo Ferry Terminal Replacement Project, to place the new terminal at Tank Farm. Work was delayed and a new IHA was issued on August 2, 2015. On August 3, 2017, NMFS issued a requested IHA for Phase 2 of the Mukilteo Multimodal Project in Mukilteo, Washington, between August 1, 2017 and July 31, 2018 (82 FR 44164, September 21, 2017). This project was designed to relocate the Mukilteo Ferry Terminal approximately one-third of a mile east of the existing terminal. On August 20, 2018, NMFS issued a subsequent IHA to cover work that was not completed under the prior IHA (83 FR 43849, August 28, 2018), which was subsequently reissued because work was delayed (84 FR 39263, August 9, 2019). An IHA to cover the anticipated final year of the project was issued on July 27, 2020 (85 FR 47737, August 6, 2020). WSDOT's monitoring reports are available online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities* and information regarding WSDOT's monitoring results may be found in the **Potential Effects of Specified Activities on Marine Mammals and Their Habitat**.

Description of Proposed Activity

Overview

At the Mukilteo Ferry Terminal, wingwalls are used to guide the Mukilteo ferry into the slip during landings. The Mukilteo-Clinton ferry route is part of State Route (SR)

525, the major transportation corridor crossing Possession Sound (the portion of Puget Sound that separates Island County/Whidbey Island from the mainland). The wingwalls are designed to withstand glancing impacts from the ferries. However, the left wingwall was moved out of position by approximately two feet during a normal ferry landing. The purpose of this project is to strengthen the left wingwall to withstand normal landing impacts.

The activities that have the potential to cause take of marine mammals include installation of six 30-inch (76 centimeter) (cm)) steel piles by vibratory or impact pile driving, and installation and removal of two 30-in (76 cm) steel piles by vibratory pile driving. A total of 6 construction days are planned between October 2025 and February 2026.

Dates and Duration

The proposed IHA would be valid for the statutory maximum of one year from the date of effectiveness, and will become effective upon written notification from the applicant to NMFS, but not beginning later than one year from the date of issuance or extending beyond two years from the date of issuance. All in-water work would be conducted during the Washington Department of Fish and Wildlife (WDFW) authorized work times in saltwater areas. WSDOT indicates that the in-water work window in this area is July 15 through February 15 to avoid working when ESA-listed salmonids are most likely to be present. While in-water work associated with this project could occur between August 1, 2025 and February 15, 2026, WSDOT indicates that October 2025 is the target project start date.

The project would require 6 days of in-water construction. In-water construction activities would occur during daylight hours only.

Specific Geographic Region

The Mukilteo Ferry Terminal is in the City of Mukilteo, Snohomish County, Washington. The terminal is in Township 28N, Range 4E, Section 33 (figure 1). Land use in the Mukilteo area is a mix of residential, commercial, industrial, and open space and/or undeveloped lands.

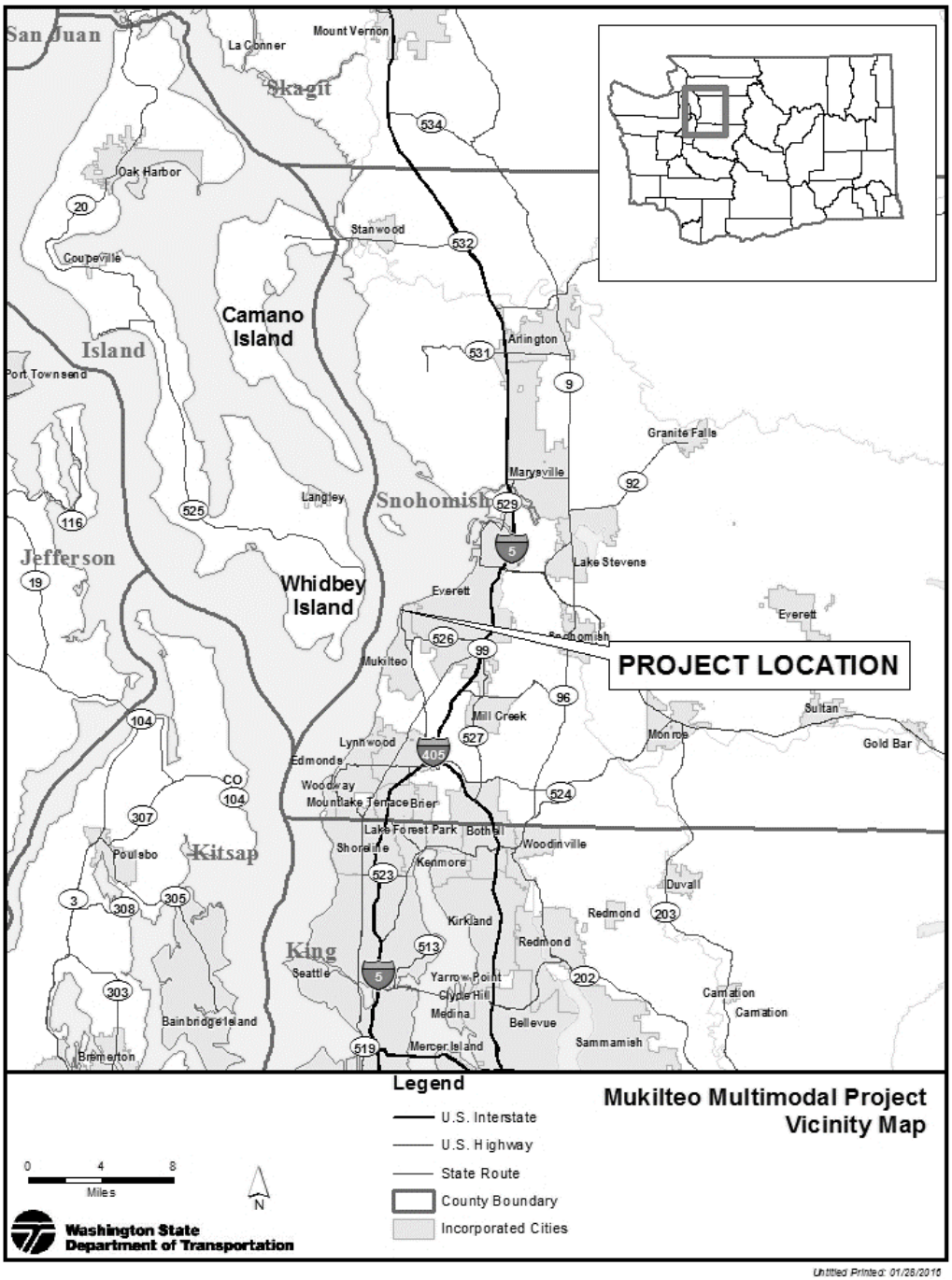

Figure 1 – Location of Mukilteo Ferry Terminal

Detailed Description of the Specified Activity

WSDOT is repairing the left wingwalls at the Mulkiteo Terminal by adding two new wingwall bents. To do so, six 30-in (76 cm) permanent steel piles would be installed with a vibratory hammer, then proofed (impacted). A bubble curtain would be used during all impacting. Four piles would be driven plumb (vertical) and two would be driven battered (driven at an angle) to provide additional support to the wingwall. Two temporary 30-in (76 cm) steel piles would be installed and removed with a vibratory hammer (no impacting). The temporary piles would support a guide to drive the two battered permanent piles.

Table 1 -- Pile types, Installation Methods, and Durations

Method	Steel Pile Size (inch)	Total Number	Minutes (strikes) per pile	Piles per day	Minutes (strikes) per day	Construction Days
Permanent						
Vibratory Install (vertical)	30	4	60	4	240	1
Impact Install (vertical)			60 (200)		240 (4800)	1
Vibratory Install (battered)	30	2	60	2	120	1
Impact Install (battered)			60 (1200)		120 (2400)	1
Temporary						
Vibratory Install	30	2	60	2	120	1
Vibratory Removal			60	2	120	1

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

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. NMFS fully considered all of this information, and we refer the reader to these descriptions, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock

Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species*).

Table 2 lists all species or stocks for which take is expected and proposed to be authorized for this activity and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. 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' SARs). While no serious injury or mortality is anticipated or proposed to be authorized here, PBR and annual serious injury and mortality (M/SI) from anthropogenic sources are included here as gross indicators of the status of the species or stocks 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' U.S. Pacific SARs. All values presented in table 2 are the most recent available at the time of publication (including from the draft 2024 SARs) and are available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*.

Table 2 -- Species[1] with Estimated Take from Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[2]	Stock abundance (CV, N_{min}, most recent abundance survey)[3]	PBR	Annual M/SI[4]
Order Artiodactyla – Cetacea – Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	*Eschrichtius robustus*	Eastern N Pacific	-, -, N	26,960 (0.05, 25,849, 2016)	801	131
Family Balaenopteridae (rorquals)						
Minke whale	*Balaenoptera acutorostrata*	CA/OR/WA	-, -, N	915 (0.792, 509, 2018)	4.1	≥0.19
Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer whale	*Orcinus orca*	West Coast Transient	-, -, N	349 (N/A[5], 349, 2018)	3.5	0.4
Family Phocoenidae (porpoises)						
Dall's porpoise	*Phocoenoides dalli*	CA/OR/ WA	-, -, N	16,498 (0.61, 10,286, 2018)	99	≥0.66
Harbor porpoise	*Phocoena phocoena*	Washington Inland Waters	-, -, N	11,233 (0.37, 8,308, 2015)	66	≥7.2
Order Carnivora – Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California sea lion	*Zalophus californianus*	U.S.	-, -, N	257,606 (N/A, 233,515, 2014)	14,011	>321
Steller sea lion	*Eumetopias jubatus*	Eastern	-, -, N	36,308 (N/A[6], 36,308, 2022)	2,178	93.2
Family Phocidae (earless seals)						
Harbor seal	*Phoca vitulina*	Washington Northern Inland Waters	-, -, N	UNK[7] (UNK, UNK, UNK)	UND	9.8
Northern elephant seal	*Mirounga angustirostris*	CA Breeding	-, -, N	187,386 (N/A, 85,369, 2013)	5,122	13.7

[1]Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (*https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies/*).

[2]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.

[3]NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region*. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance.

[4]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.

[5]N_{es}t is based upon count of individuals identified from photo-ID catalogs in analysis of a subset of data from 1958 – 2018.

[6]N_{est} is best estimate of counts, which have not been corrected for animals at sea during abundance surveys. Estimates provided are for the U.S. only.

[7] While the draft 2024 SAR suggests the abundance estimates for the Washington Northern Inland Waters stock of harbor seal is unknown (UNK), Pearson *et al*., 2024. Indicates that the most recent N_{est} is 15,898 and the N_{min} is 14,005.

As indicated above, all nine species (with nine managed stocks) in table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. All species that could potentially occur in the proposed project area are included in table 3-1 of the IHA application. While humpback whales (Central America/Southern Mexico - CA/OR/WA; Mainland Mexico - CA/OR/WA; and Hawai'i stocks), and southern resident killer whales have been documented in the area, take is not proposed for authorization. WSDOT proposes, with NMFS' concurrence, to avoid take of these species by implementing monitoring and mitigation measures (see **Proposed Mitigation** and **Proposed Monitoring and Reporting** sections below).

Generally, southern resident killer whales and humpback whales are considered common in the Puget Sound (Olson *et al*., 2018; Olson *et al*., 2024), though the greatest density of humpback whale sightings are off the south end of Vancouver Island in the Strait of Juan de Fuca (Olsen *et al*., 2024) and the occurrence of southern resident killer whale depends on prey abundance. During the multi-year WSDOT Multimodal Construction Project, PSOs located at the project site, on the Mukilteo – Clinton ferry, and additional locations on Whidbey Island, Camano Island, and north of Everett, Washington, monitored for 169 days 2015 and 2021, between the months of August and February. Across 169 monitoring days, a total of 29 southern resident killer whales in 6 groups were observed, all within the same project year. During the same 169 day monitoring period, a single humpback whale was observed on two occasions. For this project, WSDOT would establish shutdown zones for southern resident killer whale and humpback whale at the extent of the estimated Level B harassment zone. WSDOT would shut down if a southern resident killer whale, a killer whale in which the stock has been unidentified, a humpback whale, or an unidentified mysticete is observed near or approaching the Level B harassment zone. WSDOT would also monitor marine mammal occurrence and movement with the Orca Network and the Whale Report Alert System

(WRAS) networks daily for this project to ensure PSOs are aware of these species locations in Puget Sound. Due to these mitigation and monitoring measures, which WSDOT has experience designing and implementing, and the fact that these species are highly conspicuous, incidental take of southern resident killer whales and humpback whales are not expected to occur during this project.

Gray Whale

During migration from Mexico to the Arctic, a subpopulation of the Eastern North Pacific stock of Gray whales, commonly referred to as the Pacific Coast Feeding Group (PCFG), stops and feeds along the coasts of Oregon and Washington including the Northern Puget Sound (Calambokidis *et al.,* 2024). A subgroup of the PCFG that feed in the Puget Sound, recently termed as "Sounders" gray whales occurs in highest concentrations on the Southern ends of Whidbey and Camano Islands in the North Puget Sound (Calambokidis *et al.,* 2024). However, they typically arrive in March and generally leave the area before June 1, when project activities are not planned to occur.

Across 169 Mukilteo Multimodal Project monitoring days between 2015 and 2021, a single gray whale was observed on two occasions by PSOs.

Minke Whale

Minke whales are reported in Washington inland waters year-round, although a few are reported in the winter (Calambokidis and Baird 1994). 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 Straits) but are relatively rare in Puget Sound. Across 169 monitoring days between 2015 and 2021, no minke whales were observed by PSOs during the Mukilteo Multimodal Project. However, an occurrence of minke whale was reported near the project area by the Pacific Whale Watching Foundation in 2022 (Gless and Krieger, 2023).

Transient Killer Whale

West coast transient killer whales are documented intermittently year-round in Washington inland waters. Within Puget Sound, transient killer whales primarily hunt pinnipeds and porpoises. Across 169 monitoring days between 2015 and 2021, 43 transient killer whales (11 groups) were reported by PSOs. The maximum pod size reported by PSOs was eight.

Dall's Porpoise

Within the inland waters of Washington and British Columbia, this species is most abundant in the Strait of Juan de Fuca east to the San Juan Islands (Nyswander *et al*., 2005). Dall's porpoises may be most abundant in Puget Sound during the winter (Nysewander *et al*., 2005; WDFW 2007). While sightings appear to be decreasing (Evenson *et al.*, 2016), Dall's porpoises may occur in all areas of inland Washington at all times of year, but with different distributions throughout Puget Sound from winter to summer.

Across 169 monitoring days between 2015 and 2021, a total of 2 Dall's porpoises were observed by PSOs during the Mukilteo Multimodal Project from the Mukilteo – Clinton Ferry monitoring location.

Harbor Porpoise

Harbor porpoise are known to occur year-round in the inland trans-boundary waters of Washington and British Columbia, Canada and along the Oregon/Washington coast (Barlow *et al.,* 1988). There was a significant decline in harbor porpoise sightings within southern Puget Sound between the 1940s and 1990s but sightings have increased seasonally more recently (Carretta *et al.,* 2019). Annual winter aerial surveys conducted by the WDFW from 1995 to 2015 revealed an increasing trend in harbor porpoise in Washington inland waters, including the return of harbor porpoise to Puget Sound. The data suggest that harbor porpoise were already present in Juan de Fuca, Georgia Straits, and the San Juan Islands from the mid-1990s to mid-2000s, and then expanded into Puget

Sound and Hood Canal from the mid-2000s to 2015, areas they had used historically but abandoned (Evenson *et al.,* 2016).

Across 169 monitoring days between 2015 and 2021, between 194 and 214 harbor porpoises were observed by PSOs during the Mukilteo Multimodal Project, for an average daily occurrence of 1.3 harbor porpoises and average group size of two.

California Sea Lion

Only male California sea lions migrate into Pacific Northwest waters, with females remaining in waters near their breeding rookeries off the coast of California and Mexico. They use haul-out sites along the outer coast, Strait of Juan de Fuca, and in Puget Sound. Haul-out sites are located on jetties, offshore rocks and islands, log booms, marina docks, and navigation buoys. This species also may be frequently seen resting in the water, rafted together in groups in Puget Sound. The closest documented California sea lion haul out sites to the Mukilteo Ferry Terminal are 3.2 miles northeast on the Everett Harbor buoys (Figure 3-1 in application). The number of California sea lions using the buoys is less than 20 (Jeffries, *et al*., 2000).

Across 169 monitoring days between 2015 and 2021, between 2,029 and 2,125 California sea lions were observed by PSOs during the Mukilteo Multimodal Project, for an average daily occurrence of 12 California sea lions and average group size of 1.

Steller Sea Lion

Steller sea lions use haul-out locations in Puget Sound, and may occur at the same haul-outs as California sea lions. Across 169 monitoring days between 2015 and 2021, 43 Steller sea lions were observed by PSOs during the Mukilteo Multimodal Project, for an average daily occurrence of 0.25 Steller sea lions and average group size of 1.

Harbor Seal

Harbor seals are the most common and the only pinniped that breeds and remains in the inland marine waters of Washington year-round (Calambokidis and Baird 1994a).

Harbor seals haul out on rocks, reefs and beaches, and feed in marine, estuarine and occasionally fresh waters. Harbor seals display strong fidelity for haul out sites (Pitcher and McAllister 1981).

There is a documented California sea lion/harbor seal haulout approximately 8 km NE of the project site. (Figure 3-1). Seals and sea lions also make use of undocumented docks, buoys, and beaches in the area.

Across 169 monitoring days between 2015 and 2021, between 3,506 and 3,513 harbor seals were observed by PSOs during the Mukilteo Multimodal Project, for an average daily occurrence of 20.8 harbor seals and average group size of 1.

Northern Elephant Seal

Elephant seals are generally considered rare in Puget Sound. However, a female elephant seal has been reported hauled out in Mutiny Bay on Whidbey Island periodically since 2010. She was observed alone for her first three visits to the area, but in March 2015, she was seen with a pup. Since then, she has produced three more pups between 2018 and 2021 (Orca Network 2025). Northern elephant seals generally give birth in January but this individual has repeatedly given birth in March. She typically returns to Mutiny Bay (not included in the ensonified area) in April and May to molt (when project activities are not planned). Her pups have also repeatedly returned to haul out on nearby beaches and one has also had a pup (Orca Network 2025).

Across 169 monitoring days between 2015 and 2021, one to two northern elephant seals were observed by PSOs during the Mukilteo Multimodal Project from the New Mukilteo Ferry Terminal monitoring location.

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. 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, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, *etc.*). Generalized hearing ranges were chosen based on the ~65 decibel (dB) threshold from composite audiograms, previous analyses in NMFS (2018), and/or data from Southall *et al*. (2007) and Southall *et al.* (2019). We note that the names of two hearing groups and the generalized hearing ranges of all marine mammal hearing groups have been recently updated (NMFS 2024) as reflected below in table 3.

Table 3 -- Marine Mammal Hearing Groups (NMFS, 2024)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 36 kHz
High-frequency (HF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
Very High-frequency (VHF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	200 Hz to 165 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	40 Hz to 90 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 68 kHz

***** Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on ~65 dB threshold from composite audiogram, previous analysis in NMFS 2018, and/or data from Southall *et al*., 2007; Southall *et al*., 2019. Additionally, animals are able to detect very loud sounds above and below that "generalized" hearing range. Hz = Hertz. kHz = Kilohertz.

For more detail concerning these groups and associated frequency ranges, please see NMFS (2024) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The **Estimated Take of Marine Mammals** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated Take of Marine Mammals** 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 whether those impacts are reasonably expected to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Description of Sound Sources

The marine soundscape is comprised of both ambient and anthropogenic sounds. Ambient sound is defined as the all-encompassing sound in a given place and is usually a composite of sound from many sources both near and far (American National Standards Institute (ANSI), 1995). The sound level of an area is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* waves, wind, precipitation, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.,* vessels, dredging, aircraft, construction).

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise "ambient" or "background" sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity), but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can

be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

In-water construction activities associated with the project would include impact pile driving, and vibratory pile driving and removal. The sounds produced by these activities fall into one of two general sound types: impulsive and non-impulsive. Impulsive sounds (*e.g.,* explosions, gunshots, sonic booms, impact pile driving) are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI, 1986; National Institute of Occupational Safety and Health (NIOSH), 1998; NMFS, 2018). Non-impulsive sounds (*e.g.,* aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems) can be broadband, narrowband or tonal, brief or prolonged (continuous or intermittent), and typically do not have the high peak sound pressure with rapid rise/decay time that impulsive sounds do (ANSI, 1995; NIOSH, 1998; NMFS, 2018). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward, 1997, in Southall *et al.,* 2007).

Two types of hammers would be used on this project: impact and vibratory. Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak sound pressure levels (SPLs) may be 180 dB or

greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.,* 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2005).

The likely or possible impacts of WSDOT's proposed activity on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of equipment and personnel; however, any impacts to marine mammals are expected to be primarily acoustic in nature. Acoustic stressors include effects of heavy equipment operation during pile installation and removal.

Acoustic Effects

The introduction of anthropogenic noise into the aquatic environment from pile driving is the means by which marine mammals may be harassed from WSDOT's specified activity. In general, animals exposed to natural or anthropogenic sound may experience behavioral, physiological, and/or physical effects, ranging in magnitude from none to severe (Southall *et al.,* 2007, 2019). In general, exposure to pile driving noise has the potential to result in behavioral reactions (*e.g.*, avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior) and, in limited cases, an auditory threshold shift (TS). Exposure to anthropogenic noise can also lead to non-observable physiological responses such an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection. The effects of pile driving on marine mammals are dependent on several factors, including, but not limited to, sound type (*e.g.*, impulsive vs. non-impulsive), the species, age and sex class (*e.g.*, adult male vs. mom with calf), duration of exposure, the distance between the sampling site and the animal, received levels, behavior at time of exposure, and previous history

with exposure (Wartzok *et al.*, 2004; Southall *et al.*, 2007). Here we discuss physical auditory effects (TSs) followed by behavioral effects and potential impacts on habitat.

NMFS defines a noise-induced TS as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018, 2024). The amount of TS is customarily expressed in dB. A TS can be permanent or temporary. As described in NMFS (2018, 2024), there are numerous factors to consider when examining the consequence of TS, including, but not limited to, the signal temporal pattern (*e.g.*, impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.*, spectral content), the hearing and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.*, how animal uses sound within the frequency band of the signal; *e.g.*, Kastelein *et al.*, 2014), and the overlap between the animal and the source (*e.g.*, spatial, temporal, and spectral).

Auditory injury and permanent threshold shift (PTS)—NMFS defines auditory injury (AUD INJ) as "damage to the inner ear that can result in destruction of tissue…which may or may not result in PTS" (NMFS, 2024). NMFS defines PTS as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2024). Available data from humans and other terrestrial mammals indicate that a 40-dB TS approximates PTS onset (Ward *et al.*, 1958, 1959; Ward 1960; Kryter *et al.*, 1966; Miller, 1974; Ahroon *et al.*, 1996; Henderson *et al.*, 2008). PTS levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (Reichmuth 2019), there are no empirical data measuring PTS in marine mammals largely due to the fact that, for various ethical reasons, experiments

involving anthropogenic noise exposure at levels inducing PTS are not typically pursued or authorized (NMFS, 2018).

Temporary threshold shift (TTS)—A temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). Based on data from cetacean TTS measurements (Southall *et al.*, 2007, 2019), a TTS of 6 dB is considered the minimum TS clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Schlundt *et al.*, 2000; Finneran *et al.*, 2000, 2002). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with cumulative sound exposure level (SEL_{cum}) in an accelerating fashion: At low exposures with lower SEL_{cum}, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{cum}, the growth curves become steeper and approach linear relationships with the noise SEL.

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 *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 takes place during a time when the animal is traveling through the open ocean, 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. We note that 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 we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Many studies have examined noise-induced hearing loss in marine mammals (see Finneran (2015) and Southall *et al.,* (2019) for summaries). TTS is the mildest form of hearing impairment that can occur during exposure to sound. While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. For cetaceans, published data on the onset of TTS are limited to captive bottlenose dolphin (*Tursiops truncatus*), beluga whale, harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*) (Southall *et al.*, 2019). For pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), bearded seals (*Erignathus barbatus*) and California sea lions (*Zalophus californianus*) (Kastak *et al.*, 1999, 2007; Kastelein *et al.*, 2019b, 2019c, 2021, 2022a, 2022b; Reichmuth *et al.*, 2019; Sills *et al.*, 2020). TTS was not observed in spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to single airgun impulse sounds at levels matching previous predictions of TTS onset (Reichmuth *et al.*, 2016). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense or long-duration sound exposures. The difference between the pre-exposure and post-exposure thresholds can be used to determine the amount of threshold shift at various post-exposure times.

The amount and onset of TTS depends on the exposure frequency. Sounds at low frequencies, well below the region of best sensitivity for a species or hearing group, are less hazardous than those at higher frequencies, near the region of best sensitivity (Finneran and Schlundt, 2013). At low frequencies, onset-TTS exposure levels are higher compared to those in the region of best sensitivity (*i.e.*, a low frequency noise would need to be louder to cause TTS onset when TTS exposure level is higher), as shown for harbor porpoises and harbor seals (Kastelein *et al.*, 2019a, 2019c). Note that in general, harbor

seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). In addition, TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same SEL (Mooney *et al.*, 2009; Finneran *et al.*, 2010; Kastelein *et al.*, 2014, 2015). This means that TTS predictions based on the total, cumulative SEL will overestimate the amount of TTS from intermittent exposures, such as sonars and impulsive sources. Nachtigall *et al.,* (2018) describe measurements of hearing sensitivity of multiple odontocete species (bottlenose dolphin, harbor porpoise, beluga, and false killer whale (*Pseudorca crassidens*)) when a relatively loud sound was preceded by a warning sound. These captive animals were shown to reduce hearing sensitivity when warned of an impending intense sound. Based on these experimental observations of captive animals, the authors suggest that wild animals may dampen their hearing during prolonged exposures or if conditioned to anticipate intense sounds. Another study showed that echolocating animals (including odontocetes) might have anatomical specializations that might allow for conditioned hearing reduction and filtering of low-frequency ambient noise, including increased stiffness and control of middle ear structures and placement of inner ear structures (Ketten *et al.*, 2021). Data available on noise-induced hearing loss for mysticetes are currently lacking (NMFS, 2018). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species.

Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several decibels above that inducing mild TTS (*e.g.*, a 40-dB threshold shift approximates PTS onset (Kryter *et al.*, 1966; Miller, 1974), while a 6-dB threshold shift approximates TTS onset (Southall *et al.*, 2007, 2019). Based on data from

terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulsive sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.*, 2007, 2019). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Activities for this project include impact and vibratory pile driving and removal. For the proposed project, these activities would not occur at that same time and there would likely be pauses in activities producing the sound during each day. Given these pauses and the fact that many marine mammals are likely moving through the project areas and not remaining for extended periods of time, the potential for TS declines.

Behavioral Harassment—Exposure to noise from pile driving and DTH also has the potential to behaviorally disturb marine mammals. Generally speaking, NMFS considers a behavioral disturbance that rises to the level of harassment under the MMPA a non-minor response – in other words, not every response qualifies as behavioral disturbance, and for responses that do, those of a higher level, or accrued across a longer duration, have the potential to affect foraging, reproduction, or survival. Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.*, minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses may include changing durations of surfacing and dives, changing direction and/or speed; reducing/increasing vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); eliciting a visible startle response or aggressive behavior (such as tail/fin slapping or jaw clapping); and avoidance of areas

where sound sources are located. Pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006). Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al.*, 1995; Wartzok *et al.*, 2004; Southall *et al.*, 2007, 2019; Weilgart, 2007; Archer *et al.*, 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.*, 2012), and can vary depending on characteristics associated with the sound source (*e.g.*, whether it is moving or stationary, number of sources, distance from the source). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see Appendices B and C of Southall *et al.* (2007) and Gomez *et al.,* (2016) for reviews of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.*, 2004). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a "progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial," rather than as, more generally, moderation in response to human disturbance (Bejder *et al.*, 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure.

As noted above, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding

(Richardson *et al.*, 1995; Wartzok *et al.*, 2004; National Research Council (NRC), 2005). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.*, 1997; Finneran *et al.*, 2003). Observed responses of wild marine mammals to loud pulsed sound sources (*e.g.*, seismic airguns) have been varied but often consist of avoidance behavior or other behavioral changes (Richardson *et al.*, 1995; Morton and Symonds, 2002; Nowacek *et al.*, 2007).

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.*, Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.*, Frankel and Clark, 2000; Costa *et al.*, 2003; Ng and Leung, 2003; Nowacek *et al.*, 2004; Goldbogen *et al.*, 2013a, 2013b). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.*, foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.*, bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.*, Croll *et al.*, 2001; Nowacek *et al.*, 2004; Madsen *et al.*, 2006; Yazvenko *et al.*, 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Variations in respiration naturally vary with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.*, Kastelein *et al.*, 2001, 2005, 2006; Gailey *et al.*, 2007). For example, harbor porpoise respiration rate increased in response to pile driving sounds at and above a received broadband SPL of 136 dB (zero-peak SPL: 151 dB re 1 micropascal (µPa); SEL of a single strike: 127 dB re 1 μPa^2-s) (Kastelein *et al.*, 2013).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may

result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.*, 2000; Fristrup *et al.*, 2003) or vocalizations (Foote *et al.*, 2004), respectively, while North Atlantic right whales (*Eubalaena glacialis*) have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.*, 2007). In some cases, animals may cease sound production during production of aversive signals (Bowles *et al.*, 1994).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.*, 1995). For example, gray whales are known to change direction – deflecting from customary migratory paths – in order to avoid noise from seismic surveys (Malme *et al.*, 1984). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.*, Bowles *et al.*, 1994; Goold, 1996; Stone *et al.*, 2000; Morton and Symonds, 2002; Gailey *et al.*, 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.*, Blackwell *et al.*, 2004; Bejder *et al.*, 2006; Teilmann *et al.*, 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.*, directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996; Bowers *et al.*, 2018).

The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (England *et al.*, 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.*, when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fishes and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.*, Beauchamp and Livoreil, 1997; Fritz *et al.*, 2002; Purser and Radford, 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.*, decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.*, Harrington and Veitch, 1992; Daan *et al.*, 1996; Bradshaw *et al.*, 1998). However, Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a 5-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.*, 2007). Consequently, a behavioral response lasting less than 1 day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.*, 2007). Note that there is a difference between multi-day substantive (*i.e.*, meaningful) behavioral reactions and multi-day anthropogenic

activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Between 2015 and 2021, during the months of August through February, the WSDOT documented observations of marine mammals during construction activities at the same project site (New Mukilteo Terminal) (see 85 FR 47737, August 6, 2020; 84 FR 39263, August 9, 2019; 83 FR 43849, August 28, 2018; 82 FR 21793, May 10, 2017; 80 FR 54535, September 10, 20215) for a total of 169 monitoring days. During the 2020-2021 season, 86 California sea lions were observed within the estimated Level B harassment zone during pile driving activities, mostly traveling. Other behaviors reported while pile driving was occurring were loafing, diving, resting, surfacing, and spy hopping. Eleven harbor porpoises were observed mostly traveling during this time but two were observed spy hopping. A total of 119 harbor seals and 7 Steller sea lions were observed, primarily traveling and looking, but some of both species were also observed diving, resting, surfacing and spy hopping. Similar behaviors were observed during prior years in addition to foraging. No other species were documented within any harassment zones while pile driving was being conducted.

Given the similarities in activities and habitat and the fact the same species are involved, we expect similar behavioral responses of marine mammals to the WSDOT's specified activity. That is, disturbance, if any, is likely to be temporary and localized (*e.g.,* small area movements).

Stress Response—An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.*, Seyle, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical

(in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.*, Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.*, 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.*, Holberton *et al.*, 1996; Hood *et al.*, 1998; Jessop *et al.*, 2003; Krausman *et al.*, 2004; Lankford *et al.*, 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al.*, 2002b) and, more rarely, studied in wild populations (*e.g.*, Romano *et al.*, 2002a). For example, Rolland *et al.*

(2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003), however distress is an unlikely result of this project based on observations of marine mammals during previous, similar projects in the area.

Auditory Masking—Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack, 2008), noise from anthropogenic sound sources can interfere with these functions, but only if the noise spectrum overlaps with the hearing sensitivity of the receiving marine mammal (Southall *et al.*, 2007; Clark *et al.*, 2009; Hatch *et al.*, 2012). 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 an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.*, those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.*, 1995; Erbe *et al.*, 2016). 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. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.*, signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.*, sensitivity, frequency range, critical ratios,

frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions (Hotchkin and Parks, 2013).

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is human-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect (though not necessarily one that would be associated with harassment).

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.*, Clark *et al.*, 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.*, Miller *et al.*, 2000; Foote *et al.*, 2004; Parks *et al.*, 2007; Di Iorio and Clark, 2010; Holt *et al.*, 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.*, 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Hotchkin and Parks, 2013). Masking can be tested directly in captive species (*e.g.*, Erbe, 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few

studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.*, Branstetter *et al.*, 2013).

Marine mammals at or near the proposed WSDOT project site may be exposed to anthropogenic noise which may be a source of masking. Vocalization changes may result from a need to compete with an increase in background noise and include increasing the source level, modifying the frequency, increasing the call repetition rate of vocalizations, or ceasing to vocalize in the presence of increased noise (Hotchkin and Parks, 2013). For example, in response to loud noise, beluga whales may shift the frequency of their echolocation clicks to prevent masking by anthropogenic noise (Eickmeier and Vallarta, 2022).

Masking is more likely to occur in the presence of broadband, relatively continuous noise sources such as vibratory pile driving and removal. Energy distribution of pile driving covers a broad frequency spectrum, and sound from pile driving would be within the audible range of pinnipeds and cetaceans present in the proposed action area. While some construction during the WSDOT's activities may mask some acoustic signals that are relevant to the daily behavior of marine mammals, the short-term duration and limited areas affected make it very unlikely that the fitness of individual marine mammals would be impacted.

Airborne Acoustic Effects—Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above the acoustic criteria. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon the

area and move further from the source. However, these animals would previously have been "taken" because of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

Marine Mammal Habitat Effects

The WSDOT's proposed construction activities could have localized, temporary impacts on marine mammal habitat and their prey by increasing in-water SPLs and slightly decreasing water quality. Increased noise levels may affect acoustic habitat (see *Masking*) and adversely affect marine mammal prey in the vicinity of the project area (see discussion below). During impact and vibratory pile driving and removal, elevated levels of underwater noise would ensonify a portion of Puget Sound, where both fish and mammals occur, and could affect foraging success. Additionally, marine mammals may avoid the area during construction; however, displacement due to noise is expected to be temporary and is not expected to result in long-term effects to the individuals or populations. In-water pile driving activities would also cause short-term effects on water quality due to increased turbidity. Temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are installed or removed. In general, turbidity associated with pile installation is localized to about a 25 ft (7.6 m) radius around the pile (Everitt *et al.,* 1980). The sediments of the project site would settle out rapidly when disturbed. Cetaceans are not expected to be close enough to the pile driving areas to experience effects of turbidity, and any pinnipeds could avoid localized areas of turbidity.

In-water Construction Effects on Potential Foraging Habitat—The proposed activities would not result in permanent impacts to habitats used directly by marine mammals. The areas likely impacted by the proposed action are relatively small compared to the total available habitat in Puget Sound. The total seafloor area affected by piling activities is small compared to the vast foraging areas available to marine mammals at either location. At best, the areas impacted provide marginal foraging habitat for marine mammals and fishes. Furthermore, pile driving at the project locations would not obstruct movements or migration of marine mammals.

Avoidance by potential prey (*i.e.,* fish or, in the case of transient killer whales, other marine mammals) of the immediate area due to the temporary loss of this foraging habitat is also possible. The duration of fish and marine mammal avoidance of this area after pile driving activities is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. Any behavioral avoidance by fish or marine mammals of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

In-water Construction Effects on Potential Prey—Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fish, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Here, we describe studies regarding the effects of noise on known marine mammal prey.

Fish utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.*, Zelick *et al.*, 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al.*, 2008). The potential effects of noise on fishes depends on the overlapping frequency

range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds which are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.*, feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies in support of large, multiyear bridge construction projects (*e.g.*, Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.*, Fewtrell and McCauley, 2012; Pearson *et al.*, 1992; Skalski *et al.*, 1992; Santulli *et al.*, 1999; Paxton *et al.*, 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.*, Pena *et al.*, 2013; Wardle *et al.*, 2001; Jorgenson and Gyselman, 2009; Cott *et al.*, 2012). More commonly, though, the impacts of noise on fish are temporary.

SPLs of sufficient strength have been known to cause auditory injury, non-auditory injury, and mortality in fish. However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012a) showed that a TTS of 4–6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury

caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.*, 2012b; Casper *et al.*, 2013).

The greatest potential impact to fishes during construction would occur during impact pile installation of 30-in steel piles, which is estimated to occur on up to 6 days for a maximum of 4800 strikes per day for up to 4 hours over the course of the day. In-water construction activities would only occur during daylight hours, allowing fish to forage and transit the project area in the evening. Vibratory pile driving and removal would possibly elicit behavioral reactions from fishes such as temporary avoidance of the area but is unlikely to cause injuries to fishes or have persistent effects on local fish populations.

The most likely impact to fishes from pile driving and removal activities in the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of the area after pile driving stops is unknown but a rapid return to normal recruitment, distribution, and behavior is anticipated. There are times of known seasonal marine mammal foraging when fish are aggregating but the impacted areas are small portions of the total foraging habitats available in the regions. In general, impacts to marine mammal prey species are expected to be minor and temporary. Further, it is anticipated that preparation activities for pile driving and removal (*i.e.,* positioning of the hammer) and upon initial startup of devices would cause fish to move away from the affected area where injuries may occur. Therefore, relatively small portions of the proposed project area would be affected for short periods of time, and the potential for effects to fish would be temporary and limited to the duration of sound-generating activities.

Additionally, the time of the proposed construction activity would avoid the spawning season of ESA-listed salmonid species.

In summary, given the short daily duration of sound associated with individual pile driving and removal, and the relatively small areas being affected, pile driving and removal activities associated with the proposed action are not likely to have a permanent adverse effect on any fish habitat, or populations of fish species. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. Thus, we conclude that impacts of the specified activity are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Estimated Take of Marine Mammals

This section provides an estimate of the number of incidental takes proposed for authorization through the IHA, which will inform NMFS' consideration of "small numbers," the negligible impact determinations, and impacts on subsistence uses.

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 use of the acoustic sources (*i.e.*, vibratory and impact pile driving) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (AUD INJ) (Level A harassment) to result, primarily for very high-frequency species, phocids, and otariids because predicted AUD INJ zones are

larger in comparison to the observability of such species. Auditory injury is unlikely to occur for high and low-frequency cetaceans. The proposed mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic criteria above which NMFS believes the best available science indicates marine mammals will likely be behaviorally harassed or incur some degree of AUD INJ; (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) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Criteria

NMFS recommends the use of acoustic criteria 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 AUD INJ of some degree (equated to Level A harassment). We note that the criteria for AUD INJ, as well as the names of two hearing groups, have been updated (NMFS 2024) as reflected below in the Level A harassment section.

Level B Harassment—hough 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 or exposure context (*e.g.*, frequency,

predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB (referenced to 1 micropascal (re 1 μPa)) for continuous (*e.g.,* vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μPa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

The WSDOT Mukilteo Wingwalls Repair Project includes the use of continuous (vibratory pile driving and removal) and impulsive (impact pile driving) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μPa are applicable.

Level A harassment—NMFS' Updated Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) (Updated Technical Guidance, 2024) identifies dual criteria to assess AUD INJ (Level A

harassment) to five different underwater marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The WSDOT's Mukilteo Wingwalls Repair Project includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving and removal) sources.

The 2024 Updated Technical Guidance criteria include both updated thresholds and updated weighting functions for each hearing group. The thresholds are provided in the table below. The references, analysis, and methodology used in the development of the criteria are described in NMFS' 2024 Updated Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools*.

Table 4 --Thresholds Identifying the Onset of Auditory Injury

	AUD INJ Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 222 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 197 dB
High-Frequency (HF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,HF,24h}$: 193 dB	*Cell 4* $L_{E,HF,24h}$: 201 dB
Very High-Frequency (VHF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,VHF,24h}$: 159 dB	*Cell 6* $L_{E,VHF,24h}$: 181 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 223 dB $L_{E,PW,24h}$: 183 dB	*Cell 8* $L_{E,PW,24h}$: 195 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 230 dB $L_{E,OW,24h}$: 185 dB	*Cell 10* $L_{E,OW,24h}$: 199 dB

*Dual metric criteria for impulsive sounds: Use whichever criteria results in the larger isopleth for calculating AUD INJ onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level criteria associated with impulsive sounds, the PK SPL criteria are recommended for consideration for non-impulsive sources.

Note: Peak sound pressure level ($L_{p,0\text{-}pk}$) has a reference value of 1 µPa, and weighted cumulative sound exposure level ($L_{E,p}$) has a reference value of 1 µPa^{2}s. In this table, criteria are abbreviated to be more reflective of International Organization for Standardization standards (ISO 2017). The subscript "flat" is being included to indicate peak sound pressure are flat weighted or unweighted within the generalized hearing range of marine mammals underwater (*i.e.,* 7 Hz to 165 kHz). The subscript associated with cumulative sound exposure level criteria indicates the designated marine mammal auditory weighting function (LF, HF, and VHF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The weighted cumulative sound exposure level criteria 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 criteria will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e*., vibratory pile driving and removal, and impact pile driving).

In order to calculate distances to the Level A harassment and Level B harassment thresholds for the methods and piles used in the proposed project, WSDOT and NMFS used acoustic monitoring data from previous pile driving such as WSDOTs Bainbridge Island Ferry Terminal Project (impact pile driving of 30-inch (76 cm) steel, with a bubble curtain in place) and WSDOT's Keystone Ferry terminal Project (vibratory pile driving of 30-inch (76 cm) steel), and also used WSDOT's Biological Assessment Reference (vibratory and impact pile driving of 30-inch (76 cm) steel). A bubble curtain was in place for all impact pile driving measurements and a bubble curtain would be in place during impact pile driving associated with this project.

Source levels for vibratory installation and removal of piles of the same diameter are assumed to be the same.

Table 5 – Estimates of Mean Underwater Sound Levels Generated During Vibratory and Impact Pile Driving and Vibratory Removal of 30-inch (76 cm) steel Piles.

Method	dB RMS	dB SEL	dB Peak	References
Vibratory installation and removal	172.6	N/A	N/A	WSDOT. 2025. Biological Assessment Reference. Ch. 7, tables 7-15/16. Washington State Ferries, Washington State Department of Transportation. Seattle, Washington. January 2025. - Coupeville (Keystone) terminal, Laughlin 2010 - Colman dock terminal, Laughlin, 2012b - Vashon Ferry Terminal, Laughlin 2010b - Port Townsend Terminal (test pile), WSDOT 2010 - Edmonds Terminal, Laughlin 2017b WSDOT 2010. Keystone Ferry Terminal – Vibratory Pile Monitoring Technical Memorandum. May 4, 2010.
Impact installation*	187.3	179.3	203.7	WSDOT. 2025. Biological Assessment Reference. Ch. 7, tables 7-15/16. Washington State Ferries, Washington State Department of Transportation. Seattle, Washington. January 2025. - Friday Harbor Terminal, Laughlin, 2005b - Port Townsend Terminal, Magnoni et al., 2014 - SR 520 Bridge, 2013 - Vashon Ferry Terminal, Laughlin 2010a - 1-90, Yakima River, Laughlin, 2019c - Eagle Harbor Maintenance, Jasco 2005 - Mukilteo terminal, Laughlin, 2007, Laughlin 2018b WSDOT 2023. Bainbridge Island Ferry Terminal Overhead Loading Replacement Project.

				Underwater Noise Monitoring Report. February 2023.

Note: dB peak = peak sound level; rms = root mean square; SEL = sound exposure level
* a bubble curtain was in place for all impact pile driving measurements

TL is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. *TL* parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater *TL* is:

$$TL = B \times \text{Log10}\,(R_1/R_2), \text{ where}$$

TL = transmission loss in dB

B = transmission loss coefficient

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement

Absent site-specific acoustical monitoring with differing measured *TL*, a practical spreading value of 15 is used as the *TL* coefficient in the above formula. Site-specific *TL* data for the Womens Bay are not available; therefore, the default coefficient of 15 is used to determine the distances to the Level A harassment and Level B harassment thresholds.

The ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the 2024 Updated Technical Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources such as pile driving and DTH, the optional

User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur AUD INJ. Inputs used in the optional User Spreadsheet tool (*e.g.*, number of piles per day, duration, and/or strikes per pile), are presented in table 1, the sound levels are presented in table 5, and the resulting estimated isopleths, are reported below.

Table 6 -- Projected Distances to Level A and Level B Harassment Isopleths (m) and Associated Areas[1] (*km*^{2}) by Marine Mammal Hearing Group for Vibratory Installation and Removal and Impact Installation of Four 30-inch (76 cm) Steel Piles per Day[2]

Activity	Level A harassment zones (m)					[1]Level B harassment zones	
	LF	HF	VHF	PW	OW	Distance (km)	Area (km^2)
Vibratory	138	53	113	178	60	32	107
Impact	1,604	205	2,483	1,425	531	0.7	3.7

[1]Land is reached at a maximum of 20.6 km.
[2]Although the production rate for battered piles is two per day, all isopleths are estimated based on a production rate of four piles per day.

Level A harassment zones are typically smaller than Level B harassment zones. However, during impact pile driving, the calculated Level A harassment isopleth is greater than the calculated Level B harassment isopleth for very high-frequency cetaceans and phocids (however, because all activities are assumed as potentially occurring on the same day, we functionally reference the largest Level A and Level B harassment zones for purposes of estimating take). Calculation of Level A harassment isopleths includes a duration component, which in the case of impact pile driving, is estimated through the total number of daily strikes and the associated pulse duration. For a stationary sound source such as impact pile driving, we assume here that an animal is exposed to all of the strikes expected within a 24-hour period. Calculation of a Level B harassment zone does not include a duration component.

Marine Mammal Occurrence and Take Estimation

In this section we provide information about the occurrence of marine mammals, including density or other relevant information which will inform the take calculations. Additionally, we describe how the occurrence information is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization. Available information regarding marine mammal occurrence in the vicinity of the project area includes site-specific and nearby survey information from WSDOT. Specifically, data sources consulted included PSO monitoring completed on 169 days between 2015 and 2021, between the months of August and February, during the multi-year WSDOT Multimodal Construction Project. PSOs were located at the project site as well as on the Mukilteo – Clinton ferry and additional positions on Whidbey Island, Camano Island, and north of Everett, Washington.

To estimate take by Level B and Level A harassment, NMFS and WSDOT referred to the data reported at all PSO monitoring locations from each of the above referenced data sets. For take by Level B harassment, WSDOT and NMFS predicted a daily occurrence probability in which the average daily occurrence for each species is multiplied by the number of days of each type of pile driving activity, generally using the following equation;

Take by Level B harassment = marine mammal occurrence x days of pile driving activities.

However, WSDOT generated different daily average marine mammal occurrence rates based on the size of the Level B harassment zone for impact pile driving and vibratory pile driving. Since impact and vibratory pile driving could occur on any construction day, NMFS instead used the marine mammal occurrence estimated within

the largest Level B harassment zone across all activities to estimate take by Level B harassment.

In cases where marine mammals are expected to occasionally occur within the project area (*e.g.*, harbor porpoise or transient killer whale), NMFS and WSDOT define marine mammal occurrence by one group of the average (harbor porpoise) or maximum (transient killer whale) group size for that species. In cases where marine mammals are expected to occur frequently in the project area, marine mammal occurrence is defined by the daily average occurrence of marine mammals documented by PSOs during the Mukilteo Multimodal Project within the largest Level B harassment zones.

Finally, WSDOT rounded daily average occurrence of less than one up to one. However, in such cases where species are unlikely to occur in the project area, but for which there is some potential, NMFS proposes to predict that one group of each species may occur in the project area during the six days of planned construction rather than each construction day (*i.e.*, low-frequency cetaceans and Dall's porpoise).

For take by Level A harassment, WSDOT attempted to estimate the occurrence of marine mammals occurring within the largest Level A harassment zone across all hearing groups. However, WSDOT referred to data reported at all PSO monitoring locations during the Mukilteo Multimodal Project. In general, WSDOT reporting includes the distance of the marine mammal to the PSO rather than the source. Therefore, NMFS instead refers to marine mammal data reported from the Mukilteo Ferry Terminal location only, as it is reasonable to assume the distance of the marine mammal to the PSO reported at that location would be near the source. NMFS also reviewed the data to estimate marine mammal occurrence according to the largest Level A harassment zone of each species' respective hearing group, rather than the largest Level A harassment zone across all hearing groups.

For hearing groups where proposed shutdown zones are greater or equal to the calculated Level A harassment zones, take by Level A harassment is not proposed for authorization (low-frequency and high-frequency cetaceans).

In cases where the Level A harassment zones are larger than the proposed shutdown zones, NMFS proposes to authorize take by Level A harassment. The same general equation is used for take by Level A harassment that is used for take by Level B harassment: marine mammal occurrence x days of pile driving activities. For species that are common in the project area (*i.e.*, California sea lion, Steller sea lion, and harbor seal), marine mammal occurrence is defined by daily average occurrence within the largest Level A harassment zone for that hearing group. For species that are occasionally or rarely expected to occur in the project area, because the Level A harassment zones are large, it is assumed that takes by Level B harassment could also be by Level A harassment.

Gray Whale

As discussed the **Description of Marine Mammals in the Area of Specified Activities**, gray whales occurring near the project area are the most abundant from March through May, when project activities are not planned to occur. As such, although some exposure to individual gray whales could occur, the project timing will contribute to limiting potential exposures. Therefore, NMFS predicts that one gray whale could occur within the Level B harassment zone across the six day project period, to account for the low, but not discountable, likelihood that this species could occur within the project area. NMFS proposes to authorize one take by Level B harassment of gray whale.

WSDOT initially requested authorization of take by Level A harassment for gray whales. However, NMFS suggested and WSDOT agreed to shut down at a distance larger than the Level A harassment zone for this hearing group. Additionally, no gray whales have been observed anywhere near previous estimated Level A harassment zones. As

such, no take by Level A harassment of gray whales is anticipated or proposed for authorization.

Humpback Whale

WSDOT plans to shut down in-water pile driving upon observation of a humpback whale or any unknown large whale approaching the estimated Level B harassment zone. Given the plan to shut down and because humpback whales are conspicuous, no takes by Level B or Level A harassment are anticipated and none are proposed for authorization.

Minke Whale

While rare, it is possible that minke whales could occur within the project area. Therefore, NMFS predicts that one group of two minke whales could occur within the Level B harassment zone across the six day project period, to account for the low, but not discountable, likelihood that this species could occur within the project area. Therefore, NMFS proposes to authorize two takes by Level B harassment of minke whales.

WSDOT initially requested authorization of take by Level A harassment for minke whale. However, NMFS suggested and WSDOT agreed to shut down at a distance larger than the Level A harassment zone for the low-frequency cetacean hearing group. As such, no take by Level A harassment of minke whale is anticipated or proposed for authorization.

Killer Whale

Southern Resident

WSDOT plans to shut down operations upon observation of a southern resident killer whales or any unknown killer whale approaching the estimated Level B harassment zone. Given the plan to shut down and because killer whales are conspicuous, no takes by Level B or Level A harassment are expected to occur and none are proposed for authorization.

West Coast Transient

Because transient killer whales occasionally occur within the project area and can linger, NMFS conservatively predicts one group of eight transient killer whales could occur within the project area each construction day. Therefore, NMFS proposes to authorize 48 takes by Level B harassment of transient killer whale (1 group x 8 killer whales x 6 construction days = 48 takes by Level B harassment).

WSDOT initially requested authorization of take by Level A harassment for transient killer whales. However, WSDOT plans to shut down at a distance larger than the Level A harassment zone for the high frequency cetacean hearing group. As such, take by Level A harassment is not expected to occur and no take by Level A harassment of transient killer whales is proposed for authorization.

Dall's Porpoise

NMFS predicts that two Dall's porpoise could occur within the Level B harassment zone across the six-day project period. Because exposure estimates are low and the Level A harassment zones are larger than are likely observable during impact pile driving, NMFS proposes to authorize these two takes as Level A harassment, acknowledging that instead the takes could be by the less severe Level B harassment.

Harbor Porpoise

NMFS predicts that two harbor porpoises could occur within the Level B harassment zone across the six day project period. This results in 12 takes by Level B harassment (1 group x 2 harbor porpoises x 6 construction days = 12 takes by Level B harassment). Because exposure estimates are low and the Level A harassment zones are larger than are likely observable during impact pile driving, NMFS proposes to authorize these 12 takes as Level A harassment, acknowledging that instead the takes could be by the less severe Level B harassment.

California Sea Lion

NMFS predicts that 12 California sea lions could occur within the Level B harassment zone each construction day. This results in 72 takes by Level B harassment (12 California sea lions x 6 construction days = 72 takes by Level B harassment).

Across 169 monitoring days between 2015 and 2021, an average of 4.3 California sea lions were observed within 300 m from the PSO at Mukilteo New Terminal, which corresponds to the largest Level A harassment zone for this hearing group. As such, NMFS predicts that an average of 4.3 California sea lions could occur within the Level A harassment zone each construction day. This results in 24 takes by Level A harassment (4.3 California sea lions x 6 construction days = 26 takes by Level A harassment).

Takes by Level B harassment were modified to deduct the proposed amount of take by Level A harassment estimated (*i.e.*, 72 takes by Level B harassment – 26 takes by Level A harassment = 46 takes by Level B harassment). Therefore, for California sea lions, NMFS proposes to authorize 46 takes by Level B harassment and 26 takes by Level A harassment for a total of 72 takes across the 6 day project period.

Steller Sea Lion

NMFS predicts that 1 Steller sea lion could occur within the Level B harassment zone each construction day. This results in six takes by Level B harassment (1 Steller sea lion x 6 construction days = 1 takes by Level B harassment).

Across 169 monitoring days between 2015 and 2021, an average of 0.1 Steller sea lions were observed within 531 m from the PSO at Mukilteo New Terminal, which corresponds to the largest Level A harassment zone for this hearing group. Given the lower occurrence, NMFS conservatively predicts that two Steller sea lions could occur within the Level A harassment zone across the 6 day project period. This results in two takes by Level A harassment (1 group x 2 Steller sea lions across the 6-day project period = 2 takes by Level A harassment).

Takes by Level B harassment were modified to deduct the proposed amount of take by level A harassment estimated (*i.e.*, 6 takes by Level B harassment – 2 takes by Level A harassment = 4 takes by Level B harassment). Therefore, for Steller sea lions, NMFS proposes to authorize four takes by Level B harassment and two takes by Level A harassment for a total of six takes across the project period.

Harbor Seal

NMFS predicts that 21 harbor seals could occur within the Level B harassment zone each construction day. This results in 126 takes by Level B harassment (20.8 harbor seals x 6 construction days = 125 takes by level B harassment).

Across 169 monitoring days between 2015 and 2021, an average of 8.3 harbor seals were observed within 1,425 m from the PSO at Mukilteo New Terminal, which corresponds to the largest Level A harassment zone for this hearing group. As such, NMFS predicts that 50 harbor seals could occur within the Level A harassment zone across the 6-day project period (1 group x 8.3 California sea lions x 6 construction days = 50 takes by level A harassment).

Takes by Level B harassment were modified to deduct the proposed amount of take by Level A harassment estimated (*i.e.*, 125 takes by level B harassment – 50 takes by Level A harassment = 75 takes by Level B harassment). Therefore, for harbor seals, NMFS proposes to authorize 75 takes by Level B harassment and 50 takes by Level A harassment for a total of 126 takes across the project period.

Northern Elephant Seal

Because northern elephant seal can linger and a small number are known to use Whidbey Island in recent years, NMFS predicts that 1 northern elephant seal could occur within the project area each day of the 6-day project period. This results in 6 takes by level B harassment. Because exposure estimates are low and the Level A harassment zones are larger than are likely observable during impact pile driving, NMFS proposes to

authorize these six takes as Level A, acknowledging that instead the takes could be by the less severe Level B harassment.

Table 7 -- Take by Stock and Harassment Type and as a Percentage of Stock Abundance

Species	Stock	Level B harassment	Level A harassment	Total harassment proposed	Take as percentage of stock abundance
Gray whale	Eastern north pacific	1	0	1	<1
Minke whale	CA-OR-WA	1	0	1	<1
Killer whale	West Coast Transient	48	0	48	14
Dall's porpoise	CA-OR-WA	2		2	<1
Harbor porpoise	Washington Northern Inland	12		12	<1
California sea lion	U.S Stock	46	26	72	<1
Steller sea lion	Eastern U.S.	4	2	6	<1
Harbor seal	Washington Northern Inland	75	50	125	*1
Northern elephant seal	California Breeding	6			<1

* Reliable abundance estimates for this stock is currently unavailable.

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 the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the 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 the 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, NMFS considers 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, and impact on operations.

Shutdown Zones

For all pile driving and removal activities, WSDOT proposes to implement shutdowns within designated zones. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Shutdown zones vary based on the activity type and marine mammal hearing group (table 8).

For humpback whales and southern resident killer whales, WSDOT proposes to shut down at distances based on the estimated Level B harassment zones for each activity. During vibratory pile driving and removal, this corresponds to 20.6 km, which is the maximum Level B harassment distance before reaching land, and during impact pile driving, this corresponds to 0.8 km. If a southern resident killer whale, or killer whale of unknown stock, or humpback whale, or unidentified mysticete is observed approaching

the Level B harassment zone (*i.e.*, the shutdown zone) WSDOT would implement shutdown measures.

WSDOT also plans to take measures to ensure that they are aware of southern resident killer whales and humpback whale locations, so that work is not conducted when these species are within the vicinity of the project area. Such measures include, but are not limited to, contacting and/or reviewing the latest sightings data from the Orca Network and the Whale Report Alert System on a daily basis (see **Monitoring and Reporting** section).

With WSDOT's proposed shutdown zones, and efforts to determine the locations of the nearest marine mammal sightings, all incidental harassment would be prevented for southern resident killer whale and any stock of humpback whale.

For all other low-frequency and high-frequency cetaceans, the proposed shutdown zones are based on the estimated Level A harassment isopleths during all activities. The shutdown zones are also based on the estimated Level A harassment isopleths for very high-frequency cetaceans and otariids during vibratory pile driving and removal.

In cases where it would be challenging to detect marine mammals at the Level A harassment isopleth, (*e.g.,* very high-frequency cetaceans, phocids, and otariids during most impact pile driving), or where shutting down at the Level A harassment zone would create practicability concerns (*e.g.*, phocids during vibratory pile driving), smaller shutdown zones have been proposed (table 8).

Construction supervisors and crews, PSOs, and relevant WSDOT staff must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m of such activity, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction. If an activity is delayed or halted due to the presence of a marine mammal, the activity may not commence or

resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone indicated in table 8, or 15 minutes have passed without re-detection of the animal.

Finally, construction activities must be halted upon observation of a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met entering or within any harassment zone. If a marine mammal species for which take is not authorized enters a harassment zone, all in-water activities will cease until the animal leaves the zone or has not been observed for at least 15 minutes. Pile driving will proceed if the unauthorized species is observed leaving the harassment zone or if 15 minutes have passed since the last observation.

Table 8 – Proposed Shutdown Zones for 30-inch (76 cm) Steel Piles (m)

Pile Driving Method	LF	HF	VHF	PW	OW	Southern resident killer whale, humpback whale, or unknown killer whale or mysticete
Vibratory Installation and Removal	140	110	115	50	60	20.6 km*
Impact Pile Driving	1,604	205	115	50	60	0.7 km

*The calculated Level B harassment isopleth is 32 km, but 20.6 km is the maximum distance to land.

PSOs

The number and placement of PSOs during all construction activities (described in the **Proposed Monitoring and Reporting** section) would ensure that the shutdown zones are generally visible, such that PSOs are reasonably confident of their ability observe species at relevant distances. WSDOT would employ at least six PSOs during all vibratory pile driving and removal activities and at least four PSOs during all impact pile driving activities.

Monitoring for Level A and Level B Harassment

PSOs would monitor the shutdown zones and beyond to the extent that PSOs can see. Monitoring beyond the shutdown zones enables observers to be aware of and communicate the presence of marine mammals in the project areas outside the shutdown zones and thus prepare for a potential cessation of activity should the animal enter the shutdown zone.

Pre-and-Post-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs would observe the shutdown zones and as much of the harassment zones as possible for a period of 30 minutes. Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones are clear of marine mammals for which take is authorized. If the shutdown zone for which take is authorized is obscured by fog or poor lighting conditions, in-water construction activity will not be initiated until the entire shutdown zone is visible. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals. If a marine mammal is observed entering or within shutdown zones, pile driving activity must be delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal. If a marine mammal for which take by Level B harassment is authorized is present in the Level B harassment zone, activities may begin. If work ceases for more than 30 minutes, the pre-activity monitoring of the shutdown zones would commence.

Soft Start

The use of soft-start procedures are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave

the area prior to the hammer operating at full capacity. For impact pile driving, contractors would be required to provide an initial set of three strikes from the hammer at reduced energy, with each strike followed by a 30-second waiting period. This procedure would be conducted a total of three times before impact pile driving begins. Soft start would be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer. Soft start is not required during vibratory pile driving activities.

Bubble Curtain

A bubble curtain would be employed during impact installation or proofing of steel piles. A noise attenuation device would not be required during vibratory pile driving. If a bubble curtain or similar measure is used, it would distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column. Any other attenuation measure would be required to provide 100 percent coverage in the water column for the full depth of the pile. The lowest bubble ring would be in contact with the mudline for the full circumference of the ring. The weights attached to the bottom ring would ensure 100 percent mudline contact. No parts of the ring or other objects would prevent full mudline contact.

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 while conducting the activities. 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 activity; 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); and,
- Mitigation and monitoring effectiveness.

Visual Monitoring

Marine mammal monitoring during pile driving activities must be conducted by NMFS-approved PSOs in a manner consistent with the following:

- PSOs must be independent of the activity contractor (for example, employed by a subcontractor), and have no other assigned tasks during monitoring periods;
- At least one PSO must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization;
- Other PSOs may substitute other relevant experience, education (degree in biological science or related field) or training for experience performing the duties of a PSO during construction activities pursuant to NMFS-issued take authorization;
- Where a team of three or more PSOs is required, a lead observer or monitoring coordinator will be designated. The lead observer will be required to have prior experience working as a marine mammal observer during construction activity pursuant to a NMFS-issued incidental take authorization; and,
- PSOs must be approved by NMFS prior to beginning any activity subject to this IHA.

PSOs should also have the following qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

- Writing skills sufficient to prepare a report of observations including, but not limited to, the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and,
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

Visual monitoring would be conducted by trained PSOs positioned at suitable vantage points to generally be able to observe the entirety of the shutdown zones (see figures 1 and 2 in WSDOT's marine mammal monitoring plan), which includes the full extent of the Level B harassment zones for southern resident killer whale and humpback whale. WSDOT would place at least 6 PSOs during vibratory pile driving and removal at locations such as Mabana Beach, Camano Island State Park, Tuliap, Harborview Park, Mukilteo Terminal, and Clinton Ferry Terminal, and at least four PSOs would be placed during impact pile driving at locations at or near Mukilteo Ferry Terminal. At least one PSO would be placed near the pile driving site during all pile driving and removal activities.

Monitoring would be conducted 30 minutes before, during, and 30 minutes after all in water construction activities. In addition, PSOs will record all incidents of marine mammal occurrence, regardless of distance from activity, and will document any behavioral reactions in concert with distance from piles being driven or removed. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

Coordination with Local Marine Mammal Research Network

Before the project begins, WSDOT would contact the Orca Network and ask to be notified of sightings in the project area. Prior to pile driving each day, PSOs would also monitor the Orca Network Facebook page to stay informed about marine mammal sightings. The Orca Network consists of a list of over 600 (and growing) residents, scientists, and government agency personnel in the United States and Canada. Sightings are called or emailed into the Orca Network and immediately distributed to the NMFS Northwest Fisheries Science Center, the Center for Whale Research, Cascadia Research, the Whale Museum Hotline, and the British Columbia Sightings Network.

Sightings information collected by the Orca Network includes detection by hydrophone. The SeaSound Remote Sensing Network is a system of interconnected hydrophones installed in the marine environment of Haro Strait (west side of San Juan Island) to study orca communication, in-water noise, bottom fish ecology, and local climatic conditions. A hydrophone at the Port Townsend Marine Science Center measures average in-water sound levels and automatically detects unusual sounds. These passive acoustic devices allow researchers to hear when different marine mammals come into the region. This acoustic network, combined with the volunteer visual sighting network allows researchers to document presence and location of various marine mammal species.

WSDOT also participates in the Whale Report Alert System (WRAS/WhaleReport Alert System—Ocean Wise). In October 2018, the Ocean Wise Sightings Network (formerly the B.C. Cetacean Sightings Network) launched an alert system that broadcasts details of whale presence to large commercial vessels. Information on whale presence is obtained from real-time observations reported to the Ocean Wise Sightings Network via the WhaleReport app. The alerts inform shipmasters and pilots of cetacean occurrence in their vicinity. This awareness better enables vessels to undertake

adaptive mitigation measures, such as slowing down or altering course in the presence of cetaceans, to reduce the risk of collision and disturbance.

All WSDOT ferry vessel crews have been trained in the use of WRAS, and input new sightings of cetaceans so data would be available to other vessels and to PSOs on the project. The lead PSO will check the WRAS sightings regularly during the day to be aware of cetacean reports in the area.

With this level of coordination in the region of activity, WSDOT would be able to get additional real-time information on the presence or absence of cetaceans prior to start of in-water construction each day.

Reporting

WSDOT would submit a draft marine mammal monitoring report to NMFS within 90 days after the completion of pile driving activities, or 60 days prior to a requested date of issuance of any future IHAs for the project, or other projects at the same location, whichever comes first. The marine mammal monitoring report will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report will include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including: (1) the number and type of piles that were driven and the method (*e.g.*, impact or vibratory); and (2) total duration of driving time for each pile (vibratory driving) and number of strikes for each pile (impact driving);
- PSO locations during marine mammal monitoring;
- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;

- Upon observation of a marine mammal, the following information: (1) name of PSO who sighted the animal(s) and PSO location and activity at time of sighting; (2) time of sighting; (3) identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species; (4) distance and location of each observed marine mammal relative to the pile being driven for each sighting; (5) estimated number of animals (min/max/best estimate); (6) estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*); (7) animal's closest point of approach and estimated time spent within the harassment zone; (8) description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

- Number of marine mammals detected within the harassment zones, by species; and,

- Detailed information about implementation of any mitigation (*e.g.*, shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal(s), if any.

A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of receipt of the draft report, the report shall be considered final. All PSO data would be submitted electronically in a format that can be queried such as a spreadsheet or database and would be submitted with the draft marine mammal report.

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the WSDOT must report the incident to the OPR, NMFS (*PR.ITP.MonitoringReports@noaa.gov* and *itp.fleming@noaa.gov*) and West Coast region (WCR) Regional Stranding as soon as feasible. If the death or injury was clearly caused by the specified activity, the WSDOT must immediately cease the activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this IHA. WSDOT must not resume their activities until notified by NMFS. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animals(s), if alive;
- If available, photographs or video footage of the animal(s); and,
- General circumstances under which the animal was discovered.

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 impacts or responses (*e.g.*, intensity, duration), the context of any

impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), 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 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 the majority of our analysis applies to all the species listed in table 2, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are described independently in the analysis below.

Pile driving and removal associated with this project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment and, for some species, Level A harassment from underwater sounds generated by pile driving and removal. Potential takes could occur if individuals are present in the ensonified zone when these activities are underway.

No serious injury or mortality is expected in either year, even in the absence of required mitigation measures, given the nature of the activities. Further, no take by Level A harassment is anticipated for any low-frequency or high-frequency cetaceans, due to the rarity of the species near the project area and/or the application of proposed

mitigation measures, such as shutdown zones that encompass the Level A harassment zones for these species (see **Proposed Mitigation** section).

Level A harassment is proposed for very high-frequency cetaceans and pinnipeds that may occur in the project area (Dall's porpoise, harbor porpoise, California sea lion, Steller sea lion, harbor seal, and northern elephant seal). Any take by Level A harassment is expected to arise from, at most, a small degree of AUD INJ (*i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by impact pile driving such as the low-frequency region below 2 kHz), not severe hearing impairment or impairment within the ranges of greatest hearing sensitivity. Animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of PTS.

Additionally, the amount of take by Level A harassment proposed for authorization is very low. As stated above, for low-frequency and high-frequency cetaceans (three species), NMFS anticipates no take by Level A harassment over the duration of WSDOT's planned activities; NMFS expects no more than 2 takes by Level A harassment for Dall's porpoise; 12 takes by Level A harassment for harbor porpoise; 6 takes by Level A harassment for northern elephant seal; and 2 takes by Level A harassment for Steller sea lion. The proposed amount of take by Level A harassment for California sea lions and harbor seal is a bit larger – 24 takes and 49 takes, respectively. However, for all hearing groups, if hearing impairment occurs, it is most likely that the affected animal would lose only a few dB in its hearing sensitivity. Due to the small degree anticipated, any AUD INJ potentially incurred would not be expected to affect the reproductive success or survival of any individuals, much less result in adverse impacts on the species or stock.

Additionally, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time.

However, since the hearing sensitivity of individuals that incur TTS is expected to recover completely within minutes to hours, it is unlikely that the brief hearing impairment would affect the individual's long-term ability to forage and communicate with conspecifics, and would therefore not likely impact reproduction or survival of any individual marine mammal, let alone adversely affect rates of recruitment or survival of the species or stock.

Effects on individuals that are taken by Level B harassment in the form of behavioral disruption, on the basis of reports in the literature as well as monitoring from other similar activities, would likely be limited to reactions such as avoidance, increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,* Thorson and Reyff, 2006). Most likely, individuals would simply move away from the sound source and temporarily avoid the area where pile driving is occurring. If sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activities are occurring. We expect that any avoidance of the project areas by marine mammals would be temporary in nature and that any marine mammals that avoid the project areas during construction would not be permanently displaced. Short-term avoidance of the project areas and energetic impacts of interrupted foraging or other important behaviors is unlikely to affect the reproduction or survival of individual marine mammals, and the effects of behavioral disturbance on individuals is not likely to accrue in a manner that would affect the rates of recruitment or survival of any affected stock.

The project is also not expected to have significant adverse effects on affected marine mammals' habitats. The project activities would not modify existing marine mammal habitat for a significant amount of time. The activities may cause a low level of turbidity in the water column and some fish may leave the area of disturbance, thus temporarily 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 (with no known particular importance to marine mammals), the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

There is a Biologically Important Area for feeding gray whale that intersects with the project area, but it is active between February and May (Calambokidis et al., 2024), which does not intersect with the time period when project activities are planned (October). This suggests that impacts from the project would have minimal to no impact on gray whales and would therefore not affect reproduction and survival.

Finally, it is unlikely that minor noise effects in a small, localized area of habitat would have any effect on the reproduction or survival of any individuals, much less these stocks' annual rates of recruitment or survival. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activities would have only minor, short-term effects on individuals. The specified activities are not expected to impact rates of recruitment or survival and would therefore not result in population-level impacts.

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 any of the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or proposed for authorization;
- No take by Level A harassment is proposed for low and high-frequency cetaceans;
- Take by Level A harassment would be very small amounts for most species and of a low severity;

- Proposed takes by Level B harassment are relatively low for most stocks. Level B harassment would be primarily in the form of behavioral disturbance, resulting in avoidance of the project areas around where impact or vibratory pile driving is occurring, with some low-level TTS that may limit the detection of acoustic cues for relatively brief amounts of time in relatively confined footprints on their populations

- The lack of anticipated significant or long-term negative effects to marine mammal habitat.

- Effects on species that serve as prey for marine mammals from the activities are expected to be short-term and, therefore, any associated impacts on marine mammal feeding are not expected to result in significant or long-term consequences for individuals, or to accrue to adverse impacts on their populations from either project;

- The ensonified areas are small relative to the overall habitat ranges of all species and stocks, and overlap with known areas of important habitat is minimal;

- WSDOT would implement mitigation measures including visual monitoring and shutdown zones to minimize the numbers of marine mammals exposed to injurious levels of sound.

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 previously, only take of small numbers of marine mammals may be authorized under sections 101(a)(5)(A) and (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. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers (see 86 FR 5322, January 19, 2021). Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

We propose to authorize incidental take of nine marine mammal stocks each project year (table 7). The total amount of taking proposed for authorization is less than 1 percent for 8 of these stocks and 14 percent for one stock. Though the most recent SAR includes an unreliable population estimate for the Washington northern inland stock of harbor seal because it is more than 8 years old, Pearson *et al*., 2024 reports that the peak population estimate for this stock is 15,898. As such, the 77 proposed takes by Level B harassment, and 49 proposed takes by Level A harassment, compared to the abundance estimate, suggests that about 1 percent of the stock would be expected to be impacted. We consider these relatively small percentages and thus, small numbers.

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 would 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.

Endangered Species Act

Section 7(a)(2) of the ESA of 1973 (16 U.S.C. 1531 *et seq*.) requires that each Federal agency ensure 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 whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed species is proposed for authorization or expected to result from this activity. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to WSDOT for conducting the Mukilteo Wingwalls Repair Project in Puget Sound, Washington, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed Mukilteo Wingwalls Repair Project. We also request comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, 1-year renewal IHA following notice to the public providing an additional 15 days for public comments when

(1) up to another year of identical or nearly identical activities as described in the **Description of Proposed Activity** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activity** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond 1 year from expiration of the initial IHA).
- The request for renewal must include the following:

1. An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).
2. A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: June 25, 2025.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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