E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XC221]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Sand Island Pile Dikes Repairs in the Columbia River

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

ACTION: Notice; issuance of an incidental harassment authorization (IHA).

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued two consecutive IHAs to the U.S. Army Corps of Engineers (Corps) to incidentally harass marine mammals during in-water construction activities associated with the Sand Island Pile Dikes Repairs Project in the Columbia River. There are no changes from the proposed authorizations in these final authorizations.

DATES: These authorizations are effective from August 1, 2023 through July 31, 2024 and August 1, 2024 through July 31, 2025.

FOR FURTHER INFORMATION CONTACT: Amy Fowler, Office of Protected Resources, NMFS, (301) 427-8401. 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 above.

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 mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On March 4, 2022, NMFS received a request from the Corps for two IHAs to take marine mammals incidental to the Sand Island Pile Dikes Repairs Project in the Columbia River over the course of two years. The application was deemed adequate and complete on June 9, 2022. The Corps' request is for take of seven species of marine mammals by Level B harassment and, for a subset of these species (harbor seal (*Phoca vitulina*) and harbor porpoise (*Phocoena phocoena*)), Level A harassment. Neither the

Corps nor NMFS expect serious injury or mortality to result from these activities and, therefore, IHAs are appropriate.

There are no changes from the proposed IHA to the final IHA.

Description of Proposed Activity

Overview

The Sand Island pile dikes are part of the Columbia River pile dike system and are comprised of four pile dikes, which are named according to river mile (RM) location, at RMs 4.01, 4.47, 5.15, and 6.37. The purpose of the Sand Island Pile Dikes Repairs project is to perform needed repairs. The existing timber pile dikes at Sand Island consist of three rows of vertical timber pilings between 12 and 20 inches (in) in diameter with two rows of horizontal spreaders, which provide structural stability of the vertical timber pilings. A cluster of piles with one or more taller piles, called an outer dolphin with king piles, is used to anchor and mark the end for navigational safety. There is rock apron at the base of the vertical piles and at the shore connection to protect against scour. The existing pile dikes have deteriorated greatly due to lack of maintenance.

The major project elements planned to be conducted under these IHAs include work at pile dikes 6.37 and 5.15. The Corps plans to remove existing timber piles, drive new steel pipe piles and place rock for multiple purposes including scour protection at the base of the new piles, enhanced enrockment segments, shore connections, and revetment along the western portion of the shoreline at East Sand Island. In addition, the Corps plans to construct a temporary material off-loading facility (MOF) to support the planned construction work. All piles installed to construct the MOF will be subsequently removed in the same year.

Table 1 -- Year 1 Proposed Pile Driving

Project element	Pile size and type	Method	Number of piles	Maximum piles per day	Duration or strikes per pile	Estimated days of work	Estimated month of work

Pile dike 6.37	24-in steel pipe	Vibratory install	171[a]	14[b]	15 minutes	56	August-September
Pile dike 6.37	24-in steel pipe	Impact install			225 strikes		
MOF	24-in steel pipe	Vibratory install	Up to 24[c]	5	30 minutes	5	October
MOF	24-in steel pipe	Vibratory removal		20	5 minutes	1	October
MOF	24-in steel sheet	Vibratory install	Up to 100[c]	25	10 minutes	4	October
MOF	24-in steel sheet	Vibratory removal		50	3 minutes	1	October
					Total days of work	67	

[a] A total of 244 steel pipe piles will be installed at PD 6.37 over the two years, with approximately 70 percent installed in year 1 and the remaining 30 percent installed in year 2. These same 171 piles will be installed using both vibratory and impact hammers.
[b] The Corps estimates an average of 5 piles will be installed per day but could be up to 14 per day.
[c] The same MOF piles will be installed and subsequently removed.

Table 2 -- Year 2 Proposed Pile Driving

Project element	Pile size and type	Method	Number of piles	Maximum piles per day	Duration or strikes per pile	Estimated days of work	Estimated month of work
Pile dike 6.37	24-in steel pipe	Vibratory install	73[a]	14[b]	15 min	24	August
		Impact install			225 strikes		
Pile dike 5.15	24-in steel pipe	Vibratory install	150	14	15 min	71	August-November
		Impact install			225 strikes		
					Total days of work	95	

[a] These same 73 piles will be installed using both vibratory and impact hammers.
[b] The Corps estimates an average of 5 piles will be installed per day but could be up to 14 per day.

A detailed description of the planned activities is provided in the **Federal Register** notice of the proposed IHAs (87 FR 39481; July 1, 2022). Since that time, no changes have been made to the planned activities. Therefore, a detailed description is not

provided here. Please refer to that **Federal Register** notice for descriptions of the specific activities. Mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Mitigation** and **Monitoring and Reporting** sections).

Comments and Responses

A notice of NMFS' proposal to issue the IHAs to the Corps was published in the Federal Register on July 1, 2022 (87 FR 39481). That notice described, in detail, the Corps' activities, the marine mammal species that may be affected by the activities, and the anticipated effects on marine mammals. In that notice, we requested public input on the request for authorization described therein, our analyses, the proposed authorization, and any other aspect of the notice of proposed IHA, and requested that interested persons submit relevant information, suggestions, and comments. This proposed notice was available for a 30-day public comment period. No public comments were received on the proposed notice.

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, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *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 3 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 expected to occur, PBR and annual serious injury and mortality 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 and Alaska SARs. All values presented in Table 3 are the most recent available at the time of publication and are available in the 2020 SARs (Carretta *et al.*, 2021; Muto *et al.*, 2022) and draft 2021 SARs (available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*).

Table 3 -- Species Likely Impacted by the Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeangliae*	California/Oregon/Washington	E, D, Y	4,973 (0.05, 4,776, 2018)	28.7	≥ 48.6
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						

Killer Whale	*Orcinus orca*	West Coast Transient	-, -, N	349[4] (N/A, 349, 2018)	3.5	0.4
Family Phocoenidae (porpoises)						
Harbor Porpoise	*Phocoena phocoena*	Northern Oregon/Washington Coast	-, -, N	21,487 (0.44, 15,123, 2011)	151	≥3.0
Order Carnivora – Superfamily 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	>320
Steller Sea Lion	*Eumetopias jubatus*	Eastern	-, -, N	43,201[5] (see SAR, 43,201, 2017)	2,592	112
Family Phocidae (earless seals)						
Harbor Seal	*Phoca vitulina*	Oregon/Washington Coast	-, -, N	24,732[6] (UNK, UNK, 1999)	UND	10.6
Northern Elephant Seal	*Mirounga angustirostris*	California Breeding	-, -, N	187,386 (N/A, 85,369, 2013)	5,122	13.7

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

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

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

[4] Based on counts of individual animals identified from photo-identification catalogues. Surveys for abundance estimates of these stocks are conducted infrequently.

[5] Best estimate of pup and non-pup counts, which have not been corrected to account for animals at sea during abundance surveys.

[6] The abundance estimate for this stock is greater than eight years old and is therefore not considered current. PBR is considered undetermined for this stock, as there is no current minimum abundance estimate for use in calculation. We nevertheless present the most recent abundance estimates, as these represent the best available information for use in this document.

As indicated above, all seven species (with seven managed stocks) in Table 3 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 4 of the IHA application. While gray whales (*Eschrichtius robustus*) and killer whales from the Southern Resident Distinct Population Segment (DPS) and stock have been reported near the mouth of the Columbia River, the temporal and/or spatial occurrence of these species is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here.

Gray whales have not been documented near the proposed project area although anecdotal evidence indicates they have been seen at the mouth of the Columbia River. However, they are not a common visitor as they mostly remain in the vicinity of the offshore shelf-break (Griffith 2015). They migrate along the Oregon coast in three discernible phases from early December through May (Herzing and Mate 1984). Therefore, they are unlikely to occur near the project area between August and November. Monitoring reports from recent IHAs issued to the Corps for similar construction work on the Columbia River Jetty System (*e.g.*, 82 FR 15046; March 23, 2017) reported no observations of gray whales. Given the size of gray whales, they could be readily identifiable at a considerable distance. If a gray whale were to approach the established Level B harassment isopleths, shutdown would be initiated to avoid take. The Corps would employ at least one vessel-based protected species observer (PSO) who would be able to adequately monitor these zones. Therefore, NMFS does expect take of gray whales to occur and no take is anticipated or authorized.

Historically, killer whales were regular visitors in the vicinity of the estuary. However, they are much less common presently and are rarely seen in the interior of the Columbia River Jetty system (Wilson 2015). Southern Resident killer whales have been documented near the mouth of the Columbia River but these observations have most commonly been during the late-winter to early-spring months (NMFS 2021), outside of the proposed construction window for these projects. Monitoring reports from recent IHAs issued to the Corps for similar construction work on the Columbia River Jetty System (*e.g.*, 82 FR 15046; March 23, 2017) reported no observations of killer whales. While it is possible that killer whales from the West Coast Transient stock may enter the project area (see **Estimated Take** section), it is unlikely that take of Southern Resident killer whales would occur, and no take is anticipated or authorized.

A detailed description of the species likely to be affected by the Corps' Sand Island Pile Dikes Repairs Project, including brief introductions to the species and relevant stocks as well as information regarding population trends and threats, and information regarding local occurrence were provided in the **Federal Register** notice for the proposed IHA (87 FR 39481; July 1, 2022); since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to the **Federal Register** notice for these descriptions. Please also refer to NMFS's website (*https://fisheries.noaa.gov/find-species*) for generalized species accounts.

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.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.*

(2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 4.

Table 4 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 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 are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

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

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The effects of underwater noise from the City's construction activities have the potential to result in Level A and Level B harassment of marine mammals in the vicinity of the project area. The notice of proposed IHAs (87 FR 39481; July 1, 2022) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from the City's construction activities on marine mammals and their habitat. That information and analysis is incorporated by reference into the final

determinations for the IHAs and is not repeated here; please refer to the notice of proposed IHAs (87 FR 39481; July 1, 2022).

The **Estimated Take** 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** section, and the **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.

Estimated Take

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

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 are primarily by Level B harassment (in the form of behavioral disturbance and temporary threshold shift (TTS)), as use of the acoustic sources (*i.e.*, vibratory or impact pile driving and removal) have the potential to result in disruption of behavioral patterns and cause a temporary loss in hearing sensitivity for individual marine mammals. There is also some potential for auditory injury (Level A harassment)

to result for porpoises and harbor seals because predicted auditory injury zones are larger. The required 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 authorized for this activity. Below we describe how the authorized take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) 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 Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur permanent threshold shift (PTS) of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source 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.

The Corps' planned activities include the use of continuous (vibratory hammer) and impulsive (impact hammer) sources, and therefore the 120 and 160 dB re 1 μPa (RMS) thresholds are applicable.

Level A harassment – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The Corps' activities include the use of impulsive (impact hammer) and non-impulsive (vibratory hammer) sources.

These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

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

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that 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 by sound generated by the primary components of the project (*i.e.*, impact and vibratory pile driving).

In order to calculate distances to the Level A harassment and Level B harassment thresholds for the methods and piles being used in this project, NMFS used acoustic

monitoring data from other locations to develop source levels for the various pile types, sizes, and methods the Corps plans to use (Table 6).

Table 6 -- Source Levels

Pile type and method	Source Level (dB re 1 µPa)			Reference
	Peak	RMS	SEL	
24-in steel pipe impact installation	203 dB	190 dB	177 dB	CalTrans (2015)
24-in steel pipe pile vibratory installation/removal	Not available	161 dB	Not available	U.S. Navy (2015)
24-in steel sheet pile vibratory installation/removal	175 dB	160 dB	160 dB	CalTrans (2015)

Level B Harassment Zones

Transmission loss (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 * Log10 (R1/R2), where

TL = transmission loss in dB

B = transmission loss coefficient; for practical spreading equals 15

R1 = the distance of the modeled SPL from the driven pile, and

R2 = the distance from the driven pile of the initial measurement

The recommended TL coefficient for most nearshore environments is the practical spreading value of 15. This value results in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions, which is the most appropriate assumption for the Corps' planned activities in the absence of specific modelling. The Level B harassment zones for the Corps' planned activities are shown in Table 7.

Level A Harassment Zones

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 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 installation or removal, 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 PTS. The isopleths generated by the User Spreadsheet used the same TL coefficient as the Level B harassment zone calculations (*i.e.*, the practical spreading value of 15). Inputs used in the User Spreadsheet (*e.g.*, number of piles per day, duration and/or strikes per pile) are presented in Tables 1 and 2, and the resulting isopleths are reported below in Table 7. Due to the bathymetry and geography of the project areas, sound may not reach the full distance of the harassment isopleths in all directions.

Table 7 -- Level A Harassment and Level B Harassment Zones

Pile type and method	Level A Harassment zone (m)					Level B harassment zone (m)
	LF Cetacean	MF Cetacean	HF Cetacean	Phocid Pinniped	Otariid Pinniped	
24-in Steel Pile Impact Installation	430.0	15.3	512.2	230.1	16.8	1,000

24-in Steel Pile Vibratory Installation	7.9	0.7	11.7	4.8	0.3	5,412
Steel Sheet Pile Vibratory Installation	36.8	3.3	54.4	22.4	1.6	4,642
Steel Sheet Pile Vibratory Removal	9.6	0.9	14.2	5.8	0.4	4,642

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that informs the authorized take incidental to the Corps' pile driving activities. Unless otherwise specified, the term "pile driving" in this section, and all following sections, may refer to either pile installation or removal. Unless otherwise specified, the occurrence information described below is used to estimate take for both the Year 1 and Year 2 IHAs. NMFS has carefully reviewed the Corps' analysis and concludes that it represents an appropriate and accurate method for estimating incidental take caused by the Corps' activities.

Steller Sea Lion, California Sea Lion, and Harbor Seal

For Steller sea lions, California sea lions, and harbor seals, the numbers of individuals were referenced from the Washington Department of Fish and Wildlife's (WDFW's) surveys from 2000-2014 at the South Jetty for the months of in water work (August through October) and averaged to get an estimated daily count (Table 8). While animals were surveyed at the prominent haul out site along the South Jetty, since the Sand Island pile dikes are very close to the mouth of the river and the South Jetty, the Corps assumed each of these estimates represent the total number of individuals present in the project vicinity. In instances where planned activities will occur over a span of two or more months, the Corps derived potential take estimates from the average abundance

recorded over the specified period. For harbor seals, where abundance was only estimated in July, the Corps used that estimate for all projections.

Table 8 -- Pinniped Counts from the South Jetty from 2000-2014 (WDFW 2014)

	Steller sea lion	California sea lion	Harbor seal
August	324	115	57
Average August-September	267	182	57
September	209	249	57
October	384	508	57
Average (all months)	306	291	57

To calculate the total estimated takes by Level B harassment, the Corps multiplied the estimated days of activity within each month (or total across months) by the associated monthly (or average across months) count of each species (Table 9).

Table 9 -- Estimated take of Steller Sea Lions, California Sea Lions, and Harbor Seals by Level B harassment

Project element	Month(s)	Days of pile driving in month(s)	Steller sea lion average count	Steller sea lion calculated take	California sea lion average count	California sea lion calculate take	Harbor seal average count	Harbor seal calculated take
Year 1								
Pile Dike 6.37	August-September	56	267	14,952	182	10,192	57	3,192
MOF	October	11	384	4,224	508	5,588	57	627
Total takes by Level B harassment:				19,176	Total:	15,780	Total:	3,819
Year 2								
Pile Dike 6.37	August	24	324	7,776	115	2,760	57	1,368
Pile Dike 5.15	August through October	71	306	21,726	291	20,661	57	4,047
Total takes by Level B harassment:				29,502	Total:	23,421	Total:	5,415

Based on the relative proportion of the area expected to be ensonified above the Level A harassment threshold for phocid pinnipeds from impact pile driving of 24-in steel pipe piles (approximately 0.23 square kilometers (km^2)) to the area ensonified above the Level B harassment threshold (up to 94 km^2 for vibratory installation of 24-in steel pipe piles), the Corps estimated that of the total number of harbor seals that may be located within the greater Level B harassment zone, no more than 1 percent would approach the pile driving activities closer and enter the smaller Level A harassment zone (231 m). Thus, the Corps assumes that one percent of the total estimated takes of harbor seals (3,819 individuals in Year 1 and 5,415 individuals in Year 2; see Table 9) would be by Level A harassment. Therefore, the Corps has requested, and NMFS has authorized, 38 takes of harbor seals by Level A harassment and 3,781 takes by Level B harassment in Year 1 and 54 takes of harbor seals by Level A harassment and 5,361 takes by Level B harassment in Year 2 (Table 10).

The largest Level A harassment zone for otariid pinnipeds is 16.8 m. The Corps is required to enforce a minimum shutdown zone of 25 m for these species. At that close range, the Corps will be able to detect California sea lions and Steller sea lions and implement the required shutdown measures before any sea lions could enter the Level A harassment zone. Therefore, no takes of California sea lions or Steller sea lions by Level A harassment are requested or authorized.

Humpback Whale

Humpback whales have been observed in the immediate vicinity of the project area in recent years. Humpbacks have been arriving in the lower Columbia estuary as early as mid-June and have been observed as late as mid-November with a peak of abundance coinciding with the peak abundance of forage fish in mid-summer. No surveys were located for the project area, but it is assumed that they could be present during pile driving activities. Given the higher observed abundances in summer, the Corps assumes

up to two individuals per month could enter the Level B harassment zone during pile driving activities each year, for a total of 6 takes of humpback whales by Level B harassment in each year (Table 10).

The largest Level A harassment zone for low-frequency cetaceans for any pile type or method is 430 m. During impact pile driving, the Corps is required to implement a shutdown zone equivalent to the Level A harassment zone for low-frequency cetaceans. Given the visibility of humpback whales, the Corps will be able to detect humpback whales and shut down pile driving before any humpbacks could enter the Level A harassment zone. Therefore, no take of humpback whales by Level A harassment is requested or authorized.

Transient Killer Whale

Killer whales were not detected in fall and winter aerial surveys off the Oregon coast documented in Adams *et al*. (2014). Aerial seabird marine mammal surveys observed zero killer whales in January 2011, zero in February 2012, and 10 in September 2012 within an approximately 1,500 km^2 range near the MCR (Adams 2014). While a rare occurrence, a pod of transient killer whales were detected near the Astoria Bridge in May of 2018 (Frankowicz 2018). There have been no confirmed sightings of southern resident killer whales entering the project area. The Corps estimates that no more than two transient killer whales per year could be near the mouth of the Columbia River during proposed work and taken by Level B harassment (Table 10).

The largest Level A harassment zone for mid-frequency cetaceans for any pile type or method is 15.3 m. The Corps is required to implement a minimum 25 m shutdown zone for mid-frequency cetaceans. Given the visibility of killer whales, at that close range, the Corps will be able to detect transient killer whales and shut down pile driving before any killer whales could enter the Level A harassment zone. Therefore, no take of transient killer whales by Level A harassment is requested or authorized.

Harbor Porpoise

Harbor porpoises are regularly observed in the oceanward waters adjacent to the project area and are known to occur year-round. Their nearshore abundance peaks with anchovy presence, which is generally June through October. There was one recorded sighting of a harbor porpoise in the project area east of the jetties in the Sept-Nov timeframe (OBIS-SEAMAP 2019). Therefore, it is feasible that animals could be present during pile driving activities. During monitoring for pile driving at the Columbia River Jetty System, over the course of a 5-day monitoring period, observers detected five harbor porpoises (Grette Associates 2016). Given the potential for harbor porpoise to travel in pairs, the Corps estimates that one pair of harbor porpoises per day may enter the Level B harassment zone per day of pile driving (67 days in Year 1 and 95 days in Year 2) for a total of 134 harbor porpoises taken in Year 1 and 190 taken in Year 2.

For impact installation of 24-in steel pipe piles, the Level A harassment zone for high-frequency cetaceans is 512 m. Although the Corps is required to implement a shutdown zone of 515 m during this activity (see **Mitigation**), due to the cryptic nature and lower detectability of harbor porpoises at large distances, the Corps anticipates that up to 16 of the harbor porpoises (2 per week over the course of 8 weeks of impact pile driving) that enter the Level B zone in Year 1 could approach the project site closer and potentially enter the Level A harassment zone undetected during impact installation. Similarly, the Corps estimates that up to 27 of the harbor porpoises that enter the Level B harassment zone in Year 2 (2 per week over the course of 13.5 weeks of impact pile driving) could approach the project site closer and potentially enter the Level A harassment zone undetected during impact installation. These takes by Level A harassment could occur as one group in one day or single animals over multiple days. In total, the Corps has requested, and NMFS has authorized, take of 134 harbor porpoises in Year 1 (118 takes by Level B harassment and 16 takes by Level A harassment) and 190

harbor porpoises in Year 2 (163 takes by Level B harassment and 27 takes by Level A harassment) (Table 10).

Northern Elephant Seal

Northern elephant seals have been observed near the mouth of the Columbia River, but there are no known haulout locations for northern elephant seals in the project vicinity. Given the rarity of sightings in and around the Columbia River, the Corps estimates that no more than two northern elephant seals per month may enter the project area and be taken by Level B harassment each year, for a total of six takes by Level B harassment in Year 1 and six takes by Level B harassment in Year 2 (Table 10).

The largest Level A harassment zone (230 m) occurs during impact installation of 24-in steel pipe piles. It is unlikely that northern elephant seals would be found within this zone, and even more unlikely that northern elephant seals would be found within the Level A harassment zones for vibratory pile driving of any pile size (less than 23 m for all pile types). However, even if northern elephant seals were encountered in the project areas, at that close range, the Corps will be able to detect them and implement the required shutdown measures before any northern elephant seals could enter the Level A harassment zones. Therefore, no take of northern elephant seals by Level A harassment is requested or authorized.

Table 10 -- Authorized Take of Marine Mammals by Level A and Level B Harassment by Year, by Species and Stock and Percent of Take by Stock

Species	Authorized Take by Level A Harassment	Authorized Take by Level B Harassment	Total Proposed Take	Stock	Stock Abundance	Percent of Stock
Year 1						
Humpback whale	0	6	6	California/Oregon/Washington	2,900	0.21
Killer whale	0	2	2	West Coast Transient	349	0.57

Harbor porpoise	16	118	134	Northern Oregon/Washington Coast	21,487	0.60
California sea lion	0	15,780	15,780	U.S.	257,606	6.13
Steller sea lion	0	19,176	19,176	Eastern	52,932	36.23
Harbor seal	38	3,781	3,819	Oregon/Washington Coast	24,732	15.44
Northern elephant seal	0	6	6	California Breeding	179,000	0.003
Year 2						
Humpback whale	0	6	6	California/Oregon/Washington	2,900	0.21
Killer whale	0	2	2	West Coast Transient	349	0.57
Harbor porpoise	27	163	190	Northern Oregon/Washington Coast	21,487	0.88
California sea lion	0	23,421	23,421	U.S.	257,606	9.09
Steller sea lion	0	29,502	29,502	Eastern	52,932	55.74
Harbor seal	54	5,361	5,415	Oregon/Washington Coast	24,732	21.89
Northern elephant seal	0	6	6	California Breeding	179,000	0.003

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.

Time Restrictions

The Corps has provided in its description of the project that pile driving will occur only during daylight hours (no sooner than 30 minutes after sunrise through no later than 30 minutes before sunset), when visual monitoring of marine mammals can be conducted. In addition, to minimize impacts to ESA-listed fish species, all in-water construction will be limited to the months of August through November.

Shutdown Zones

Before the commencement of in-water construction activities, the Corps must establish shutdown zones for all activities. 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). Pile driving must also not commence until all marine mammals are clear of their respective shutdown

zones. Shutdown zones are meant to encompass the Level A harassment zones and therefore would vary based on the activity type and marine mammal hearing group (Table 11). At minimum, the shutdown zone for all hearing groups and all activities is 25 m. For in-water heavy machinery work other than pile driving (*e.g.*, standard barges, *etc.*), if a marine mammal comes within 25 m, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include, for example, the movement of the barge to the pile location or positioning of the pile on the substrate via a crane.

The Corps must also establish shutdown zones for all marine mammals for which take has not been authorized or for which incidental take has been authorized but the authorized number of takes has been met. These zones are equivalent to the Level B harassment zones for each activity (see Table 11).

Table 11-- Shutdown Zones

Pile type and method	Shutdown zones by hearing group (m)					Shutdown zones for unauthorized species (m)
	LF Cetacean	MF Cetacean	HF Cetacean	Phocid Pinniped	Otariid Pinniped	
24-in Steel pipe Pile Impact Installation	430	25	515	50[a]	25	1,000
24-in Steel pipe pile Vibratory Installation	25	25	25	25	25	5,412
24-in Steel Sheet Pile Vibratory Installation[b]	40	25	55	25	25	4,642
24-in Steel Sheet Pile Vibratory Removal[b]	25	25	25	25	25	4,642

[a] 50 m is for harbor seals, shutdown zone for northern elephant seals is 235 m.
[b] Vibratory installation and removal of 24-in steel sheet piles only applicable in Year 1. No sheet piles will be installed or removed in Year 2.

Protected Species Observers

The placement of protected species observers (PSOs) during all pile driving activities (described in the **Monitoring and Reporting** section) must ensure that the entire shutdown zone is visible. Should environmental conditions deteriorate such that the entire shutdown zone would not be visible (*e.g.*, fog, heavy rain), pile driving must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.

Monitoring for Level A and Level B Harassment

PSOs must monitor the Level B harassment zones to the extent practicable, and all of the Level A harassment zones. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable 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-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 must observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone is considered cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zones listed in Table 11, 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 must not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zones or 15 minutes have passed without re-detection of the animal. When a marine mammal for which Level B harassment take is authorized is present in the Level B harassment zone, activities may begin and Level B harassment take will be recorded. If work ceases for more than 30 minutes, the pre-activity monitoring of the shutdown zones must

commence. A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.*, the entire shutdown zone and surrounding waters must be visible to the naked eye).

Soft Start

Soft-start procedures are used 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 are required to provide an initial set of three strikes from the hammer at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. Soft start must 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.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has determined that the required 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.

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 action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

Visual Monitoring

Marine mammal monitoring during pile driving activities must be conducted by PSOs meeting NMFS' standards and in a manner consistent with the following:

- Independent PSOs (*i.e.,* not construction personnel) who have no other assigned tasks during monitoring periods must be used;

- 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 education (degree in biological science or related field) or training for experience; and
- Where a team of three or more PSOs is required, a lead observer or monitoring coordinator must be designated. The lead observer is required to have prior experience working as a marine mammal observer during construction.

PSOs must have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the 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.

The Corps must have at least two PSOs stationed in the project area to monitor during all pile driving activities. One PSO must be positioned at the work site on the construction barge to observe Level A harassment and shutdown zones. At least one PSO

must monitor from a boat to ensure full visual coverage of the Level B harassment zone(s) and alert construction crews of marine mammals entering the Level B harassment zone and/or approaching the Level A harassment zones. Additional PSOs may be employed during periods of low or obstructed visibility to ensure the entirety of the shutdown zones are monitored.

Monitoring must be conducted 30 minutes before, during, and 30 minutes after all in water construction activities. In addition, observers must record all incidents of marine mammal occurrence, regardless of distance from activity, and must 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.

Reporting

A draft marine mammal monitoring report must be submitted 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 report must include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report must include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including: (a) How many and what type of piles were driven or removed and the method (*i.e.,* impact or vibratory); and (b) the total duration of time for each pile (vibratory driving) number of strikes for each pile (impact driving);
- PSO locations during marine mammal monitoring; and

- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance.

For each observation of a marine mammal, the following must be reported:

- Name of PSO who sighted the animal(s) and PSO location and activity at time of sighting;
- Time of sighting;
- 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;
- Distance and location of each observed marine mammal relative to the pile being driven or hole being drilled for each sighting;
- Estimated number of animals (min/max/best estimate);
- Estimated number of animals by cohort (adults, juveniles, neonates, group composition, etc.);
- 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 specified actions that ensued, and resulting changes in behavior of the animal(s), if any.

If no comments are received from NMFS within 30 days, the draft reports will constitute the final reports. If comments are received, a final report addressing NMFS' comments must be submitted within 30 days after receipt of comments. All PSO datasheets and/or raw sighting data must 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 Corps must report the incident to the Office of Protected Resources (OPR) (*PR.ITP.MonitoringReports@noaa.gov*), NMFS and to the West Coast Region (WCR) regional stranding coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, the Corps must immediately cease the specified activities until NMFS 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 the IHAs. The Corps must not resume their activities until notified by NMFS.

The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
2. Species identification (if known) or description of the animal(s) involved;
3. Condition of the animal(s) (including carcass condition if the animal is dead);
4. Observed behaviors of the animal(s), if alive;
5. If available, photographs or video footage of the animal(s); and
6. 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 discussion of our analysis applies to all species listed in Table 10, given that the anticipated effects of this activity on these different marine mammal stocks are expected to be similar. There is little information about the nature or severity of the impacts, or the size, status, or structure of any of these species or stocks that would lead to a different analysis for this activity. We note, though, that there are far fewer estimated takes of cetaceans than pinnipeds, and some additional pinniped-specific analysis is included.

Pile driving activities associated with the Sand Island Pile Dikes Repairs Project have the potential to disturb or displace marine mammals. Specifically, the project activities may result in take, in the form of Level A and Level B harassment, from

underwater sounds generated from pile driving. Potential takes could occur if individuals are present in the ensonified zone when these activities are underway.

The takes from Level A and Level B harassment would be due to potential behavioral disturbance, TTS, and PTS. No serious injury or mortality is anticipated given the nature of the activities and measures designed to minimize the possibility of injury to marine mammals. The potential for harassment is minimized through the construction method and the implementation of the required mitigation measures (see **Mitigation** section).

In both years, take by Level A harassment is authorized for two species (harbor seals and harbor porpoise) to account for the possibility that an animal could enter a Level A harassment zone prior to detection, and remain within that zone for a duration long enough to incur PTS before being observed and the Corps shutting down pile driving activity. Any take by Level A harassment is expected to arise from, at most, a small degree of PTS, *i.e.*, minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by impact pile driving (*i.e.* 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 authorized take by Level A harassment is very low for all marine mammal stocks and species. For both IHAs, for 5 of 7 affected stocks, NMFS anticipates and proposes to authorize no Level A harassment take over the duration of the Corps' planned activities; for the other 2 stocks, NMFS authorizes no more than 54 takes by Level A harassment in any year. If hearing impairment occurs, it is most likely that the affected animal would lose only a few decibels in its hearing sensitivity. These takes of individuals by Level A harassment (*i.e.,* a small degree of

PTS) are not expected to accrue in a manner that would affect the reproductive success or survival of any individuals, much less result in adverse impacts on the species or stock.

As described above, NMFS expects that marine mammals would likely move away from an aversive stimulus, especially at levels that would be expected to result in PTS, given sufficient notice through use of soft start. The Corps must also shut down pile driving activities if marine mammals approach within hearing group-specific zones that encompass the Level A harassment zones (see Table 11) further minimizing the likelihood and degree of PTS that would be incurred. Even absent mitigation, no serious injury or mortality from construction activities is anticipated or authorized.

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, including the Sand Island Pile Dike System Test Piles Project conducted by the Corps in preparation for the proposed Sand Island Pile Dikes Repairs Project (84 FR 61026; November 12, 2019), 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, particularly as the project is located on a busy waterway at the mouth of the Columbia River with high amounts of vessel traffic. 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.

Additionally, and as noted previously, 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.

The project is also not expected to have significant adverse effects on affected marine mammals' habitats. The project activities will not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to 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. The shores along the Columbia River are occasionally used by harbor seals for pupping, but the Corps' proposed activities will occur outside of the harbor seal pupping season. There are no known important areas for other marine mammals, such as feeding or pupping areas.

For all species and stocks, and in both years, take would occur within a limited, relatively confined area (the mouth of the Columbia River) of the stock's range. Given the availability of suitable habitat nearby, any displacement of marine mammals from the project areas is not expected to affect marine mammals' fitness, survival, and reproduction due to the limited geographic area that would be affected in comparison to

the much larger habitat for marine mammals within the lower Columbia River and immediately outside the river along the Oregon and Washington coasts. Level A harassment and Level B harassment would be reduced to the level of least practicable adverse impact to the marine mammal species or stocks and their habitat through use of mitigation measures described herein.

Some individual marine mammals in the project areas may be present and be subject to repeated exposure to sound from pile driving on multiple days. However, pile driving is not expected to occur on every day of the in-water work window, and these individuals would likely return to normal behavior during gaps in pile driving activity within each day of construction and in between workdays. As discussed above, there is similar foraging and haulout habitat available for marine mammals within and outside of the Columbia River along the Washington and Oregon coasts, outside of the project area, where individuals could temporarily relocate during construction activities to reduce exposure to elevated sound levels from the project. Therefore, any behavioral effects of repeated or long duration exposures are not expected to negatively affect survival or reproductive success of any individuals. Thus, even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any effects on rates of reproduction and survival of the stock.

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

- No mortality or serious injury is anticipated or authorized for either year;
- In both years, Level A harassment is not anticipated or authorized for five of the seven species. For the other two species (one high-frequency cetacean and one phocid pinniped), the amount of Level A harassment is low and would be in the form of a

slight degree of PTS in limited low frequency ranges (< 2 kHz) which are not the most sensitive primary hearing ranges for these species and would not interfere with conspecific communication or echolocation;

- For both years, Level B harassment would be in the form of behavioral disturbance, primarily resulting in avoidance of the project areas around where impact or vibratory pile driving is occurring, and some low-level TTS that may limit the detection of acoustic cues for relatively brief amounts of time in relatively confined footprints of the activities;
- Nearby areas of similar habitat value (*e.g.*, foraging and haulout habitats) within and outside the lower Columbia River are available for marine mammals that may temporarily vacate the project areas during construction activities for both projects;
- 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 in both years are very small relative to the overall habitat ranges of all species and stocks, and will not adversely affect ESA-designated critical habitat for any species or any areas of known biological importance;
- The lack of anticipated significant or long-term negative effects to marine mammal habitat from either project;
- The efficacy of the mitigation measures in reducing the effects of the specified activities on all species and stocks for both projects;
- The enhanced mitigation measures (*e.g.*, shutdown zones equivalent to the Level B harassment zones) to eliminate the potential for any take of unauthorized species; and

- Monitoring reports from similar work in the lower Columbia River, including previous work at the Sand Island Pile Dikes, that have documented little to no behavioral effect on individuals of the same species that could be impacted by the specified activities from both projects, suggesting the degree/intensity of behavioral harassment would be minimal.

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 finds that the total marine mammal take from the planned activities in Year 1 will have a negligible impact on all affected marine mammal species or stocks. NMFS also finds that the total marine mammal take from the planned activities in Year 2 will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only small numbers of incidental take 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. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

For all species other than Steller sea lions, the authorized take in each year is below one third of the population for all marine mammal stocks (Table 10). In Year 1 and Year 2, the authorized take of Steller sea lions, as a proportion of the stock abundance is

36.23 percent and 55.74 percent, respectively, if all takes are assumed to occur for unique individuals. In reality, it is unlikely that all takes would occur to different individuals. The project area represents a small portion of the stock's overall range (from Alaska to California (Muto *et al.*, 2019)) and based on observations at other Steller sea lion haulouts, it is reasonable to expect individual animals to be present at the haulout and in the water nearby on multiple days during the activities. Therefore, it is more likely that there will be multiple takes of a smaller number of individuals within the project area, such that the number of individuals taken would be less than one third of the population.

Based on the analysis contained herein of the planned activity (including the required mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS 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.

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 NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human

environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has determined that the issuance of the IHAs qualifies to be categorically excluded from further NEPA review.

Endangered Species Act

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

NMFS is authorizing incidental take of humpback whales from the Mexico and Central America DPSs, which are listed under the ESA. The effects of this Federal action were adequately analyzed in the NMFS West Coast Region's Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Sand Island Pile Dike Repair Project, dated June 14, 2022, which concluded that the take NMFS authorizes through this IHA is not likely to adversely affect humpback whales from the Mexico and Central America DPSs or their designated critical habitat and would not jeopardize the continued existence of any endangered or threatened species.

Authorization

As a result of these determinations, NMFS has issued two consecutive IHAs to the Corps for conducting the Sand Island Pile Dikes Repairs Project in the lower Columbia River, beginning in August 2023, with the previously mentioned mitigation, monitoring, and reporting requirements incorporated.

Dated: August 16, 2022.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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