DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 250814–0142]

RIN 0648–BN34

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Interstate Bridge Replacement Project on Interstate 5 Between Portland, Oregon and Vancouver, WA

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

ACTION: Proposed rule; request for comments.

SUMMARY: Interstate Bridge Replacement Program (IBRP) applied for authorization to take small numbers of marine mammals incidental to the Interstate Bridge Replacement Project (IBR) on Interstate 5 (I–5) between Portland, Oregon, and Vancouver, Washington over the course of 5 years from the date of issuance. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations setting forth permissible methods of taking, other means of effecting the least practicable adverse impact on such marine mammal stocks (*i.e.,* mitigation measures), and requirements pertaining to monitoring and reporting such takes and requests comments on the proposed regulations. NMFS will consider public comments prior to making any final decision on the promulgation of the requested MMPA regulations, and NMFS's responses to public comments will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than September 18, 2025.

ADDRESSES: A plain language summary of this proposed rule is available at*https://www.regulations.gov/docket/NOAA-NMFS-2025-0273.* You may submit comments on this document, identified by NOAA–NMFS–2025–0273, by any of the following methods:

- *Electronic Submission:* Submit all electronic public comments via the Federal e-Rulemaking Portal. Go to *https://www.regulations.gov* and type NOAA–NMFS–2025–0273 in the Search box (note: copying and pasting the FDMS Docket Number directly from this document may not yield search results). Click on the ''Comment'' icon, complete the required fields, and enter or attach your comments.
- *Mail:* Submit written comments to: Permits and Conservation Division, Office of Protected Resources, 1315 East-West Highway, F/PR1 Room 13805, Silver Spring, MD 20910.

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *https://www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address, *etc.*), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous).

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/action/incidental-take-authorization-interstate-bridge-replacement-programs-interstate-bridge.* In case of problems accessing these documents, please call the contact listed below.

FOR FURTHER INFORMATION CONTACT: Cara Hotchkin, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Purpose of Regulatory Action

These proposed regulations, promulgated under the authority of the MMPA (16 U.S.C. 1361 *et seq.*), would provide a framework for authorizing the take of marine mammals incidental to construction activities associated with the IBR project, including impact and vibratory pile driving.

NMFS received an application from the IBRP requesting 5-year regulations and a letter of authorization issued thereunder to take individuals of three species, comprising three stocks of marine mammals by Level A harassment and Level B harassment incidental to the IBRP's activities. No serious injury or mortality is anticipated or proposed for authorization. Please see Background below for definitions of harassment.

The proposed regulations include mitigation, monitoring, and reporting requirements. These requirements, which were proposed by IBRP, are expected to minimize the number and/or intensity of incidents of marine mammal take, as well as to provide information to better understand the impacts of the action and document compliance. IBRP has agreed that all of the mitigation measures are practicable. As required by the MMPA, NMFS concurred that these measures are sufficient to achieve the least practicable adverse impact on the affected marine mammal species or stocks and their habitat.

Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region for up to 5 years if, after notice and public comment, the agency makes certain findings and promulgates regulations that set forth permissible methods of taking pursuant to that activity and other means of effecting the ''least practicable adverse impact'' on the affected species or stocks and their habitat (see the discussion below in the Proposed Mitigation section), as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I provide the legal basis for issuing this proposed rule containing 5-year regulations and for any subsequent letters of authorization (LOAs).

Summary of Major Provisions Within the Proposed Rule

Following is a summary of the major provisions of this proposed rule regarding the IBRP's activities. These measures include:

- Prescribing permissible methods of taking of small numbers of marine mammals by Level A harassment and/or Level B harassment incidental to the IBR project;
- Required monitoring of the construction areas to detect the presence of marine mammals before beginning construction activities;
- Establishment of shutdown zones;
- Bubble curtains required for impact driving of steel piles except as necessary to verify bubble curtain effectiveness during hydroacoustic monitoring;
- Soft start for impact pile driving to allow marine mammals the opportunity to leave the area prior to beginning impact pile driving at full power;
- Submittal of monitoring reports including a summary of marine mammal species and behavioral observations, construction shutdowns or delays, and construction work completed; and

• Hydroacoustic monitoring to verify effectiveness of noise attenuation devices and sound source level assumptions for modeling.

Through adaptive management, the proposed regulations would allow NMFS Office of Protected Resources to modify (*e.g.,* remove, revise, or add to) the existing mitigation, monitoring, or reporting measures summarized above and required by the LOA.

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Section 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) directs 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 incidental take regulations and an LOA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (ITAs 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 LOA qualifies to be categorically excluded from further NEPA review.

Fixing America's Surface Transportation Act

This project is covered under Title 41 of the Fixing America's Surface Transportation Act, or ''FAST–41.'' FAST–41 includes a suite of provisions designed to expedite the environmental review for covered infrastructure projects, including enhanced interagency coordination as well as milestone tracking on the public-facing Permitting Dashboard. FAST–41 also places a 2-year limitations period on any judicial claim that challenges the validity of a Federal agency decision to issue or deny an authorization for a FAST–41 covered project. 42 U.S.C. 4370m–6(a)(1)(A).

Summary of Request

On July 18, 2024, NMFS received application from the IBRP requesting authorization for take of marine mammals incidental to construction activities related to the IBR project on I–5 between Portland, OR and Vancouver, WA. After the IBRP responded to our questions on October 12, 2024, and January 14, 2025, we determined the application was adequate and complete on January 16, 2025. We published a notice of receipt (NOR) in the **Federal Register** on March 13, 2025 (90 FR 11950, March 13, 2025) and received 38 comments. Of these, 37 were opposed to the IBR project; most suggested an alternative project design unrelated to IBRP's request for incidental take authorization. Commenters additionally expressed concern about the cost of the project and described potential issues with the IBRP's supplemental environmental impact statement. One comment letter expressed support for the IBR project and the potential associated increases in employment and training opportunities for ironworkers. NMFS determined that these comments did not provide information relevant to our decision under the MMPA.

The requested regulations would be valid for 5 years, from September 15, 2027, through September 14, 2032. The IBRP plans to conduct necessary work, including pile driving (impact and vibratory) and rotary drilling, to construct replacement bridges for the I–5 roadway over the Columbia River and North Portland Harbor. The proposed action may incidentally expose marine mammals occurring in the vicinity to elevated levels of underwater sound, thereby resulting in incidental take by Level A and Level B harassment. Therefore, the IBRP requests authorization to incidentally take harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*), and Steller sea lions (*Eumetopias jubatus*). Neither IBRP nor NMFS expect serious injury or mortality to result from this activity.

These proposed incidental take regulations would cover 5 years of a larger project for which IBRP intends to request take authorization for subsequent facets of the project. The larger 9- to 15-year project involves full construction of new bridges over both the Columbia River and the North Portland Harbor, and the demolition and removal of the existing bridges.

Description of Proposed Activity

Overview

The IBR project would improve I–5 corridor mobility by addressing present and future travel demand and mobility needs in the project area. The project consists of multiple components and interchanges, extending from approximately Columbia Boulevard in the south to State Route (SR) 500 in the north; one component of the project is to replace the existing bridges over the Columbia River and North Portland Harbor to accommodate increasing travel demand and congestion, improve safety related to traffic accidents, and reduce vulnerability to seismic events. The existing bridges do not meet current seismic standards, and are vulnerable to failure in an earthquake. The IBR project is anticipated to take approximately 9 to 15 years to complete, and would require in-water work in up to 9 construction seasons. If promulgated, the regulations would be effective for the first 5 construction years (2027—2032). IBRP anticipates requesting additional, future incidental take authorizations as necessary in association with subsequent years of construction.

Exact project sequencing is still in development; however, it is currently anticipated that work to be conducted during the first 5 years of the IBR project would include construction of the new Columbia River Bridge and associated approaches, and the transit bridge crossing the North Portland Harbor. In-water pile driving for the first 5 construction years would include both impact and vibratory driving of temporary steel pipe (24-inch (in) (0.61 meters (m)) and 48-in (1.2 m) diameter) and steel sheet piles. Permanent bridge foundations would be constructed using 10-foot (ft) (3-m) diameter steel casings installed with an oscillator, analogous to a rotary drill. Impact driving would be conducted primarily with the use of a bubble curtain, with a minimal amount of unattenuated driving to confirm bubble curtain effectiveness. (Note that IBRP's plans to use bubble curtains are primarily related to concerns regarding potential effects to fishes, but would also be protective to marine mammals.) In-water pile driving associated with the project would include installation and potential removal of approximately 1,560 temporary steel pipe piles, and 1,500 linear ft (457 m) of steel sheet piles over the 5-year period.

Dates and Duration

IBRP anticipates that in-water construction activities associated with this project would begin on September 15, 2027, and extend through September 14, 2032. In-water pile installation for the first 5 years of the IBR project is expected to occur on approximately 1,725 non-consecutive days. While the exact project design and sequence of construction are not yet finalized, project elements and estimated durations are shown in table 1. Construction timing, sequencing, and duration are dependent on funding, design assumptions, contractor schedules and equipment, and weather, among other factors. The duration estimates shown are based on the best available information at the time of publication.

TABLE 1—PROJECT ELEMENTS, LOCATIONS AND ESTIMATED DURATIONS FOR THE IBR PROJECT

Project element	Estimated duration	Element location	Notes
Columbia River bridges	4 to 7 years	In-water	Construction is likely to begin with the main river bridges. General sequence will include initial preparation and installation of foundation piles, shaft caps, pier columns, superstructure, and deck.
North Portland Harbor bridges	4 to 10 years	In-water	Construction duration for North Portland Harbor bridges is expected to be similar to the duration for Hayden Island Interchange construction. The existing North Portland Harbor bridge will be demolished in phases to accommodate traffic during construction of the new bridges.
Hayden Island interchange	4 to 10 years	Land-based	Interchange construction duration will not necessarily entail continuous active construction. Hayden Island work could be broken into several contracts, which could spread work over a longer duration.
Marine Drive interchange	4 to 6 years	Land-based	Construction will need to be coordinated with construction of the North Portland Harbor bridges.
SR 14 interchange	4 to 6 years	Land-based	Interchange will be partially constructed before any traffic could be transferred to the new Columbia River bridges.
Demolition of the existing Interstate Bridge.	1.5 to 3 years	In-water	Demolition of the existing Interstate Bridge could begin only after traffic is rerouted to the new Columbia River bridges.
Three interchanges north of SR 14.	3 to 4 years for all three.	Land-based	Construction of these interchanges could be independent from each other and from construction of the Program components to the south.
Light-rail	4 to 6 years	Over-water	The light-rail crossing will be built with the Columbia River bridges. This phase includes all the infrastructure associated with LRT (*e.g.,* overhead catenary system, tracks, stations, and park and rides).

Impact driving would be restricted to an in-water work window between September 15 and April 15 of each year. This window was determined via coordination with state (Oregon Department of Fish and Wildlife [ODFW] and Washington Department of Fish and Wildlife [WDFW]) and Federal (U.S. Army Corps of Engineers [USACE], Federal Highway Administration, Federal Transit Administration, and NMFS) agencies, Tribal parties, and public input to reduce potential impacts to Endangered Species Act (ESA)-listed fishes. Vibratory pile driving would occur year-round.

Specific Geographic Region

The IBR project will replace the bridge spans across the Columbia River and North Portland Harbor and the associated highway interchanges on an approximately 5-mile (mi) (8 kilometer [km]) stretch of I–5 between Portland, OR and Vancouver, WA (figure 1). In-water work will occur in the subset of the project area between the north bank of the Columbia River in Washington and the south shore of the North Portland Harbor in Oregon, between river miles 106 and 107. The widths of the Columbia River and North Portland Harbor at this location are approximately 0.5 mi (841 m) and 0.18 mi (295 m), respectively.

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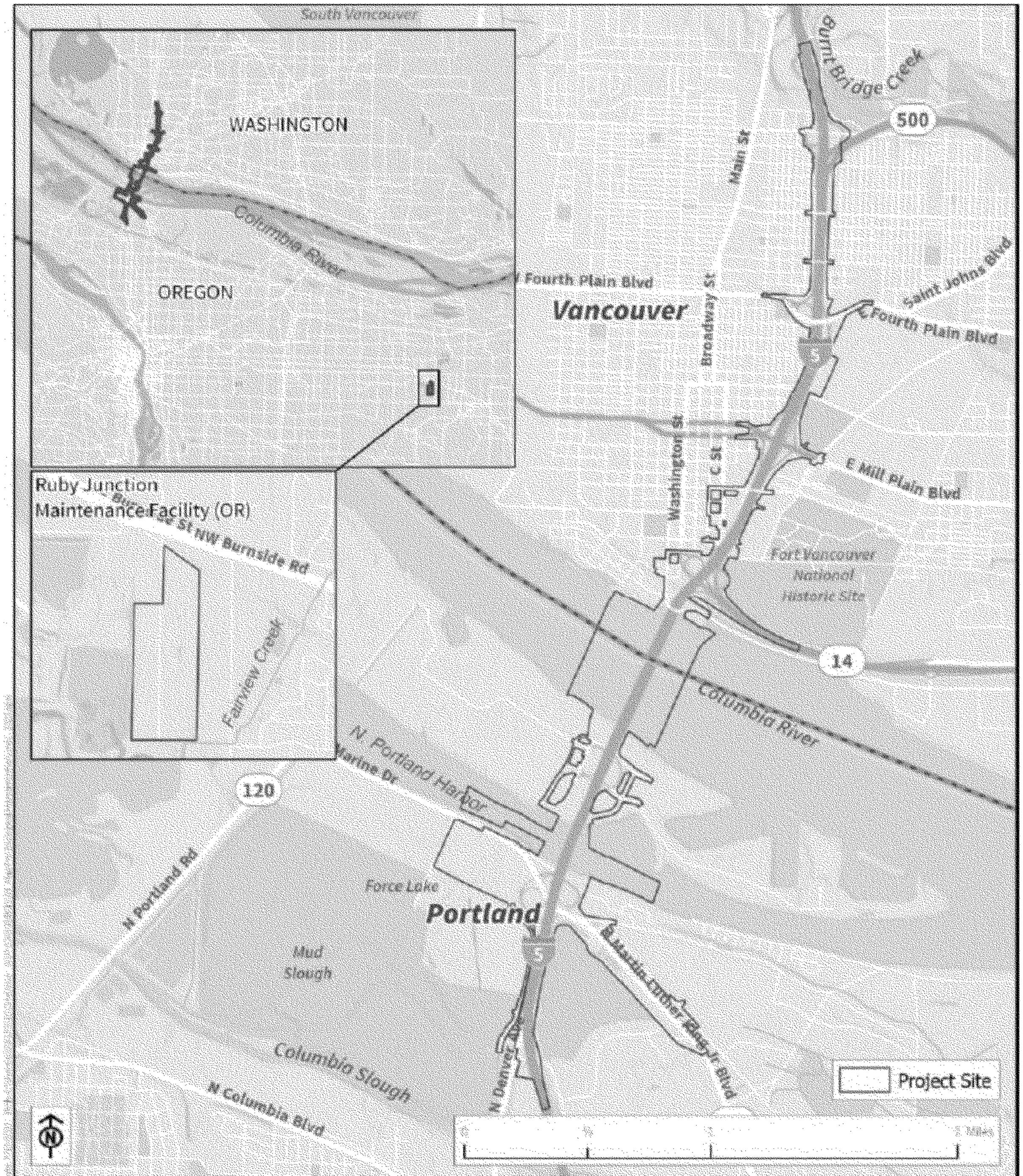

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Figure 1—Overview of IBR Project Location Along I–5 Between Portland, OR and Vancouver, WA

Detailed Description of the Specified Activity

The IBRP proposes to replace the existing I–5 crossings of the Columbia River and North Portland Harbor and associated interchanges to improve safety and traffic flow, and to reduce seismic vulnerabilities. A previous iteration of this project, called the Columbia River Crossing (CRC) project, was considered between 2005 and 2013 (77 FR 23548, April 19, 2012) and discontinued in 2014. The IBRP is a bi-state governmental committee formed in 2019 dedicated to improving the I–5 corridor between Washington and Oregon; it is made up of representatives from both the Washington and Oregon Departments of Transportation, in collaboration with representatives from eight partner agencies. The IBRP utilized the results of the CRC analyses to inform project planning, design, and preconstruction activities for this project. The IBR project is expected to take approximately 9 to 15 years, with up to 9 in-water construction seasons.

The IBR project consists of the basic elements shown in table 1. In-water work would include the construction of two new spans across the Columbia River (northbound and southbound) and six new spans across the North Portland Harbor (one for light rail, one for local traffic and pedestrians, and four for I–5 vehicle traffic), and the demolition of the existing bridge spans. Demolition would occur after the new spans are operational. Land-based work would consist of six redesigned interchanges (at Hayden Island, Marine Drive, SR–14, and three locations north of SR–14). Of these components, only the in-water work on the new and existing bridge spans would have the potential to impact marine mammals.

Land-based work related to the IBR project includes roadway improvements, light rail track work, and construction staging sites. Roadway improvements include updates to seven interchanges along a 5-mi (8-km) segment of I–5 between Victory Boulevard in Portland and SR 500 in Vancouver. These improvements also include some reconfiguration of adjacent local streets to complement the new interchange designs, as well as new facilities for bicyclists and pedestrians. Temporary earthwork, drainage, surfacing, and paving activities would be required, utilities may need to be relocated, drainage appurtenances put in place, and access to and from the freeway rerouted to accommodate the new roadway or interchange. Permanent work would proceed once traffic has been relocated to temporary facilities, if necessary.

Construction of the various components of the light rail system generally would include mobilization and site reparation; grading and excavation; installation of underground utilities and signal tie-ins; construction of systems foundations; installation of overhead catenaries; concrete surface work; and finish work and landscaping. This work would also require construction of an overhead catenary system over the guideway to provide electrical power to the trains.

Staging of construction materials and equipment arriving by truck or rail would be either within the limits of the project site or in approved off-site locations. IBRP anticipates that larger construction materials will arrive at the site by barge (addressed in in-water work, below). Materials and equipment delivered by barge may be offloaded to upland staging areas or may be temporarily staged on barges. Two potential major staging areas have been identified and are shown on figure 1–2 of the IBRP's application. The first site is the vacant 5.6-acre (0.023 km^2) former Thunderbird Hotel site on Hayden Island. The second is a former rest-area site east of I–5 north of McLoughlin Boulevard that is currently used as auxiliary parking for the Clark College Athletic Annex. Following construction, the staging sites could be converted for other uses. Key considerations for staging sites include: (1) size and capacity to provide for heavy machinery and material storage; (2) waterfront access for barges (either a slip or a dock capable of handling heavy equipment and material); and (3) roadway or rail access for landside transportation of materials by truck or train.

Further detail on land-based project elements is available in the IBRP's LOA application. These project elements would occur on land and would not have the potential to impact marine mammals; thus they are not discussed further in this notice.

In-water work would occur during the construction and demolition of new and existing bridge spans. While the final design and configuration of the new bridge spans is not yet available, three configurations for the new Columbia River bridge spans are under consideration: double-deck truss bridges with fixed spans, single-level bridges with fixed spans, and single-level bridges with movable spans over the primary navigation channel. The fixed-span bridges would provide up to 116 ft (35.4 m) of vertical navigation clearance, and the movable spans would provide at least 178 ft (54.3 m) of vertical navigation clearance depending on the movable-span type (such as lift or double leaf bascule). Since the project design is not finalized, the descriptions of construction means and methods are intended to be inclusive of all of the proposed design options. Where specific quantities or impacts differ between the various design options, the description reflects the design option with the greatest impact, or the largest quantities.

Temporary Work Structures

The proposed action would require the installation of several temporary in-water and overwater structures, both during new bridge construction and existing bridge demolition, to facilitate equipment access, materials delivery and debris removal. These structures would likely include a variety of temporary work platforms, bridges and piers, temporary isolation/confinement systems, barges, and temporary piles associated with these structures. Temporary work structures would be designed by the contractor after a contract is awarded, but prior to construction. For this reason, the exact size, quantity, type, and configuration of temporary work structures are unknown. The proposed action is designed based on reasonable assumptions, and typical construction practices, and is intended to represent a reasonable and realistic scenario.

Columbia River Bridge Spans

Construction of the Columbia River and North Portland Harbor bridges would require a combination of temporary work bridges, platforms, and piers (see figures 1–3 and 1–4 of the IBRP's LOA application for further details). For purposes of this discussion, work bridges are structures that have a point of connection with, and that can be accessed from, the adjacent land, whereas work platforms and piers are stand-alone structures that are accessed via barges. Temporary work bridges, platforms, and piers would be supported by a combination of 24-in (0.61 m) and 48-in (1.2 m) diameter hollow, steel pipe piles. All temporary structures would be fully removed prior to project completion. Bridge decking would be removed using appropriate containment measures, and temporary piles would be removed with a vibratory hammer or via direct pulling.

Table 2 shows the estimated number of temporary structures and pilings anticipated for the 9 in-water construction seasons; table 3 shows the temporary structures and pilings anticipated for the first 5 years which would be covered under these proposed regulations. Work is anticipated to begin first on the Columbia River bridge spans. In total, IBRP estimates that the temporary work bridges, platforms, and piers for construction of the Columbia River bridge would require up to 764, 24-in diameter piles, and approximately 447, 48-in diameter piles. These structures would temporarily displace approximately 8,017 square feet (sq ft) (744.8 square meters (m^2)) of benthic habitat and would temporarily shade approximately 184,187 sq ft (17,111.5 m^2) of water surface within the Columbia River. However, not all of these temporary structures would be in place at the same time, as construction would progress in a sequenced fashion and temporary work structures would be removed prior to project completion. IBRP estimates that a given temporary bridge, platform, or pier could be in place for up to approximately 500 days each.

A temporary suspended shaft cap isolation system would be constructed on top of permanent drilled shafts to avoid the need for cofferdams and permanent concrete seals on the bottom of the riverbed. The suspended shaft cap isolation system would be in place at each of the four piers (three through six) for up to approximately 120 days. This system would not involve temporary piles and is therefore not discussed further in this analysis.

TABLE 2—TEMPORARY IN-WATER AND OVERWATER COMPONENTS FOR COLUMBIA AND NORTH PORTLAND HARBOR BRIDGE SPANS FOR THE 9 YEARS OF THE IBR PROJECT

Temporary in-water and overwater work elements	Approximate quantity	
	Columbia River	North Portland Harbor
Work Platforms/Bridges/Piers and Associated Piles.	2 work bridges; 4 work platforms; 2 piers; 764 (24-inch) piles; 447 (48-inch) piles.	8 work bridges; 912 (24-inch) piles; 208 (48-inch) piles.
Other Temporary Piles	100 (24-inch) piles	100 (24-inch) piles.
Suspended Shaft Cap Isolation System	4.	
Sheet Pile Cofferdams (Construction)	2.	
Sheet Pile Cofferdams (Demolition)	9.	
Drilled Shaft Isolation Casings		52.
Barges and Barge Mooring Piles (Construction)	12 barges; 160 (24-inch) mooring piles	6 barges; 216 (24-inch) mooring piles.
Barges and Barge Mooring Piles (Demolition)	6 barges; 304 (24-inch) mooring piles	6 barges; 100 (24-inch) mooring piles.
Total	1,328 (24-inch) 447 (48-inch)	1,328 (24-inch) 208 (48-inch).

TABLE 3—TEMPORARY PILES ANTICIPATED FOR THE FIRST 5 YEARS OF THE IBR PROJECT

Project elements	Approximate quantities			
	Number of structures	24-inch piles	48-inch piles	Steel sheet piles (lineal ft)
Work Platforms/Bridges/Piers and Associated Piles.	4 work bridges; 4 work platforms; 2 piers;	840	460	
Other Temporary Piles	N/A	100		
Sheet Pile Cofferdams (Construction)	2 cofferdams			1,500
Barges and Barge Mooring Piles (Construction).	12 barges	160		
Total Temporary		1,100	460	1,500

In the Columbia River, temporary piles would also be installed as part of sheet pile cofferdams, barge moorings, and other temporary supports. Sheet pile cofferdams would be used to isolate certain in-water work areas from active flow during construction. It is assumed that two cofferdams would be required for the construction of nearshore piers two and seven in the Columbia River. The shallow water depth at these piers renders other methodologies less feasible. Sheet pile cofferdams may also be required during demolition of the nine existing bridge piers, but demolition is not anticipated to occur during the first five construction seasons.

The two cofferdams used would be constructed of steel sheet piles and would temporarily affect a combined area of approximately 25,095 sq ft (2,331 m^2) of benthic habitat. Piles would be installed and removed with a vibratory hammer, which would be operated from temporary work bridges or barges. Installation is expected to take approximately 10 to 15 days. Once sheet piles are installed, a permanent concrete seal would be installed at the base of each cofferdam, and they would be dewatered. Once construction of the pier is complete, sheet piles would be removed with a vibratory hammer, but the concrete seals would remain. Each cofferdam would be in place for a maximum of 500 calendar days. It is anticipated that these cofferdams would not be installed at the same time. However, the specific sequencing of installation and removal will be dependent upon contractor means and methods, and other scheduling factors.

Piles would also be installed to support stationary barges that would be used as platforms to conduct work activities within the Columbia River. Although multiple barges would be in use over the course of construction, there would likely be a maximum of up to 12 stationary barges operating in the Columbia River at one time. Because of wind, current, and wave action, temporary mooring piles will likely be installed for some of these barges to anchor in place. For purposes of this analysis, IBRP estimates that up to 160 temporary mooring piles (18- to 24-in diameter steel pipe piles) would be installed within the Columbia River, and that a given barge will be present in a given location for up to approximately 120 days each, on average.

Additional temporary piles would likely be necessary throughout construction for a variety of purposes, including supporting falsework and formwork, pile templates, reaction piles, and other non-load-bearing purposes. These piles would be 24-in diameter, open-ended steel pipes and would be installed and removed solely with a vibratory pile driver. These temporary piles would be fully removed prior to project completion. IBRP estimates that approximately 100 such piles may be required over the duration of construction in the Columbia River. These piles will temporarily displace approximately 628 sq ft (58.3 m^2) of benthic habitat and will be in place for up to approximately 150 days each.

North Portland Harbor Bridge Spans

If the final project sequencing changes, it is possible that work could begin with the North Portland Harbor bridges. In total, IBRP estimates that approximately 912, 24-in diameter piles, and approximately 208, 48-in diameter piles would be required for the temporary work bridges in North Portland Harbor. These structures would temporarily displace approximately 5,479 sq ft (509 m^2) of benthic habitat, and temporarily shade approximately 208,000 sq ft (19,323 m^2) of water surface within North Portland Harbor. Typically, only two of these temporary work bridges would be in place at any one time, though a contractor could potentially install a greater number of work bridges. No more than approximately 100,000 sq ft (9,290.3 m^2) of temporary work bridge would be installed at any given time. Each temporary bridge in North Portland Harbor could be in place for up to approximately 850 days each.

In the North Portland Harbor, temporary piles would also be installed to support barge moorings and other temporary supports. In addition, temporary 19-ft diameter hollow steel casings will be installed to isolate in-water work areas in which the permanent drilled shafts for the bridge foundations can be constructed. These casings are required in North Portland Harbor only due to the specific design requirements of these drilled shafts and the way they attach to the columns.

Construction within North Portland Harbor would most likely occur from temporary work bridges, and barges are not expected to be used extensively during construction or demolition within North Portland Harbor. However, a contractor may elect to use barges, and barges would also likely be used for delivery of materials. It is anticipated that up to six barges may be present at a given time within North Portland Harbor during construction and demolition. Construction barges may require up to 216 temporary mooring piles (18- to 24-in diameter steel pipe piles), and barges used during demolition may require up to 100 such temporary mooring piles. These barges would be in place for up to approximately 50 days each.

Construction in the North Portland Harbor may also require additional temporary piles as described for the Columbia River. These piles would be 24-in diameter, open-ended steel pipes and would be installed and removed solely with a vibratory pile driver. These temporary piles would be fully removed prior to project completion. IBRP estimates that approximately 100 such piles may be required over the duration of construction in the North Portland Harbor. These piles will temporarily displace approximately 628 sq ft (58.3 m^2) of benthic habitat and will be in place for up to approximately 150 days each.

Permanent Bridge Structures

As described previously, the first five years of construction would likely include construction of the Columbia River Bridge spans. However, if construction schedules shift, it is possible that work could begin in the North Portland Harbor as well. Thus, both project components are described below.

Columbia River Bridge Spans

The proposed replacement bridges over the Columbia River would consist of a steel or concrete superstructure constructed on top of a series of pier complexes, supported on foundations consisting of 10-foot-diameter drilled shafts with concrete shaft caps. Six of these pier complexes would be located below the Ordinary High-Water Mark (OHWM) of the Columbia River. In the double-decked bridge configuration that is proposed under IBRP's ''Modified Locally Preferred Alternative'' (LPA), each pier set would require approximately 12 drilled shafts with a single shaft cap measuring approximately 50 by 170 ft (15 by 52 m) at the water line.

The single-level bridge configurations would require the same number of piers as the Modified LPA (six in-water piers per bridge and two upland piers per bridge); however, each pier would require more drilled shafts (16 drilled shafts per in-water pier, and 96 total in-water drilled shafts), and longer shaft caps (approximately 230 ft (70 m) in length) compared to the Modified LPA configuration.

The single-level bridges with movable-span configuration would require the largest foundations of the three options. The foundations for piers two, three, four, and seven would be the same as the single-level fixed-span configuration. The foundations for piers 5 and 6, which would support the towers for the lift span, would require 22 drilled shafts each, and a continuous shaft cap measuring approximately 50 by 312 ft (15 by 95 m) at the water line.

Accounting for all potential design options under consideration, IBRP's proposed action may require up to 108 drilled shafts to support the in-water foundations for the Columbia River bridges (table 4) to accommodate the single-level bridge with a movable-span-design option. The foundations for nearshore piers two and seven would be constructed within dewatered sheet pile cofferdams. The concrete seals that would be placed to allow the cofferdam to be dewatered and isolated would remain when the cofferdams are removed, and represent a permanent benthic impact. In total, the foundations for the Columbia River bridges would permanently displace approximately 33,577 sq ft (3,119 m^2) of benthic habitat. Approximately 13,804 sq ft (1,282 m^2) of this permanent impact will occur in shallow water habitat (less than 20 ft (6.1 m) deep). All other pier foundations associated with the Columbia River bridges would be located in deep-water areas.

TABLE 4—PERMANENT IN-WATER AND OVERWATER COMPONENTS FOR THE COLUMBIA RIVER BRIDGE SPANS FOR THE 9 YEARS OF THE IBR PROJECT

Existing/ proposed	Permanent in-water and over-water work elements	Approximate quantity	Benthic impact (sf)
Proposed Bridges	Drilled Shafts (10-foot diameter) [a]	108	8,482
	Cofferdam Concrete Seals [a]	2	25,095
	Shaft Caps [a]	6	0
	Replacement Bridges Overwater Deck (total) [b].	2 spans	0
Existing Bridges (To be removed)	Existing Bridge Foundations	9 foundations; 2,664 timber piles	−33,289
	Existing Bridge Deck (total)	2 existing spans	0
Net Change			+288

[a] Single-level bridge with movable-span configuration.
[b] Single-level bridge with two-auxiliary-lane design option.
Key: sf = square feet.

The specific means and methods of construction, including sequencing, will be developed by the contractors that are awarded the contract for construction. A contractor may sequence the construction in a way that may not conform exactly to the conceptual sequence. However, all work will be conducted consistent with the avoidance and minimization measures described in section 11 of IBRP's application, and consistent with the permits that are ultimately issued for IBRP's proposed action.

Depending upon which pier is being constructed, in-water and over-water construction will likely occur according to the following general sequence.

- Mobilization, staging, and installation of Best Management Practices (BMPs).
- Install and dewater temporary cofferdam (piers two and seven only).
- Install temporary piles for barge mooring.
- Install temporary work bridges, platforms, and/or piers (including associated piles).
- Install drilled shafts for each pier.
- Install shaft cap isolation system (piers three through six only)
- Install shaft caps at the water level.
- Remove cofferdam (piers two and seven only), or shaft cap isolation system (piers three through six).
- Construct columns on the shaft caps.
- Construct bridge superstructure.
- Connect superstructure spans with mid-span closures.
- Remove all temporary work platforms, bridges, piers and associated piles.

One or more of the activities identified above may be occurring at more than one pier complex at a time, as the construction sequence progresses.

The piers supporting the Columbia River bridge would be supported on foundations of 10-foot (3.33-m) diameter drilled shafts. Construction of these drilled shaft foundations requires installing a permanent 10-foot diameter steel casing to a specified depth to the top of the competent geological layer known as the Troutdale Formation. The top layer of river substrate is composed of loose to very dense alluvium (primarily sand and some fines), beneath which is approximately 20 ft (6.1 m) of dense gravel, underlain by the Troutdale Formation.

Installation of drilled shafts would be conducted by first placing steel casing on the bottom of the river channel with a crane. The top of the casing would be above the waterline to provide containment during construction. The drilled shaft casing would be installed with an oscillator which would be operated from a work bridge or platform. As the shaft casing is being advanced, sand and substrate would be removed from inside the casing using an auger and clamshell. Drilled shaft casings would be advanced through primarily sandy substrates, and not socketed into solid rock. If occasional obstructions such as large boulders are encountered, these may be broken up with a drop chisel or similar equipment, but no activities that would constitute down-the-hole (DTH) drilling would be conducted. Equipment may be operated from a work bridge or platform, or may also be operated from a barge. Excavated soils would be temporarily placed onto a barge with appropriate containment, and ultimately taken to an approved upland site for disposal. No contaminated sediments have been documented at the project site, but if contaminated sediments are encountered, they would be managed and disposed of at a facility permitted for handling such materials.

Once the interior of a given drilled shaft casing has been excavated to the design depth (design depth would depend on design and would vary for each shaft), a steel reinforcement cage would be installed within the casing, and the shaft would be filled with concrete. Concrete would most likely be transported to the site via trucks, and pump trucks would be operated from the decks of temporary bridges, platforms, or from barges. Concrete would be installed via a tremie method. The interior of the casing would either be dewatered prior to concrete installation, or the rising water would be collected off the surface of the concrete as the pour elevation increases. Water collected in this manner would be pumped into tanks, treated to meet state water quality standards, and disposed of at an approved location. Water levels within the temporary casing would be maintained at a lower elevation than the surrounding river surface elevation to maintain negative pressure. Once the concrete is installed, it would be left to cure. Once cured, the casing would be permanent and left in place to support the shaft cap isolation system.

Once the drilled shafts are installed, a concrete shaft cap would be constructed atop the shafts at the waterline, and the concrete pier and superstructure would be installed atop the pile cap. The means and methods for the construction of the shaft caps would vary depending upon the pier being constructed.

Construction of the shaft caps for piers two and seven would occur within dewatered work areas within sheet pile cofferdams described above. Construction of these shaft caps would occur primarily from the temporary work bridges but would likely be supported by one or more work barges and material barges. Construction of the shaft caps for piers three through six would occur within a suspended shaft cap isolation system, as described previously. Construction of these shaft caps would occur primarily from temporary work platforms and would likely be supported by one or more work barges and material barges.

Once the foundations and shaft caps have been installed, the superstructure of the bridge will be constructed and installed. The superstructure will consist of both precast and cast-in-place concrete segments. Additional finish work will also be conducted, including surfacing, paving, and installation of other finish features, such as striping and signage.

Work on the superstructure may be conducted from the bridge deck, from the deck of temporary work platforms and bridges, and/or from barges. Construction of the superstructure would require cranes, work barges, and material barges in the river year-round. Construction of the superstructure, including cast-in-place concrete work, would occur either above the OHWM elevation or within isolated work areas below the OHWM (within sealed forms, cofferdams, or drilled shaft casings); therefore, this work would be fully isolated from the river.

North Portland Harbor Bridge Spans

As with the Columbia River bridges, the general sequence of construction of the North Portland Harbor bridges is expected to proceed in a manner comparable to that which was developed for the CRC project (75 FR78228, December 15, 2010). However, the specific means and methods of construction, including sequencing, would be developed by the contractors that are awarded the contract for construction. At each pier, construction would likely occur according to the following general sequence.

- Mobilization, staging, and installation of BMPs.
- Conduct debris removal as necessary to install temporary piles, isolation casings, or drilled shafts.
- Install temporary piles for barge mooring.
- Install temporary work bridges and associated piles.
- Install and dewater temporary isolation casing.
- Install drilled shaft.
- Construct columns on the drilled shafts.
- Remove temporary isolation casing.
- Construct a cap or crossbeam on top of the columns at pier location.
- Erect bridge girders on the caps or crossbeams.

- Place the bridge deck on the girders.
- Remove all temporary work bridges, isolation casings, and barge mooring piles.

One or more of the activities identified above may be occurring at more than one pier at a time, as the construction sequence progresses.

TABLE 5—PERMANENT IN-WATER AND OVERWATER COMPONENTS FOR THE NORTH PORTLAND HARBOR BRIDGE SPANS FOR THE 9 YEARS OF THE IBR PROJECT

Existing/ proposed	Permanent in-water and over-water work elements	Approximate quantity	Benthic impact (sf)
Proposed Bridges	Drilled Shafts (10-foot diameter)	52	4,804
	Isolation Casing Seal (19-ft diameter)	52	10,659
	Shaft Caps	0	0
	Replacement Bridges Overwater Deck (total).	6 Structures	0
Existing Bridges (To be removed)	Existing Bridge Foundations	18	−12,204
	Existing Bridge Deck (total)	1 Existing Structure	0
Net Change			2,539

Key: sf = square feet.

Table 5 shows the permanent elements to be installed over the duration of the IBR project in the North Portland Harbor. Installation of drilled shafts for the North Portland Harbor bridges would be conducted in a manner similar to that described for the Columbia River bridges, with two exceptions. In North Portland Harbor, drilled shafts would be installed within a temporary drilled shaft isolation casing approximately 19-ft (6.33-m) in diameter. Temporary isolation casings would be placed on the river bottom and then either pushed into the substrate approximately 5 to 10 ft (1.5 to 3 m) with weighted equipment, or with a vibratory hammer. Once installed, a permanent concrete seal would be cast-in-place at the base, which would allow them to be dewatered. The top of the seal would be established at a depth 3 ft (1 m) below the mudline.

Once a given temporary isolation casing has been installed, sealed, and dewatered, a single 10-ft diameter permanent drilled shaft casing would then be installed with an oscillator through the concrete seal. Once the permanent casing has been installed to design depth, steel reinforcement would be installed within the casing, and the shaft would be filled with concrete in a manner similar to that described for the Columbia River bridges. Once this process is complete, the temporary isolation casing would be removed, but the permanent concrete seal would remain.

The other difference in the construction of the foundations for the North Portland Harbor bridges is that no shaft caps would be constructed on the piers for the North Portland Harbor bridges. Once a given drilled shaft has been completed and structurally approved, cast-in-place columns would be installed directly on top of each drilled shaft.

Pile Installation Methods

Table 6 shows estimated number of piles, duration, and installation methods for the first 5 years of the IBR project. Installation of temporary pipe and sheet piles would be conducted with a vibratory hammer to the extent practicable. Removal of temporary piles may be via direct pull or vibratory hammer. Vibratory pile driving and removal activities are proposed to occur year-round with the possibility of up to two hammers operating simultaneously. Because temporary piles would be installed and removed throughout the duration of construction, IBRP estimates that vibratory installation and extraction of 24- and 48-in pipe piles could be conducted on up to approximately 250 days in each year, which translates to approximately 1,250 days during the initial 5-year period that would be covered under the proposed Incidental Take Regulations, and approximately 2,250 (nonconsecutive) days over the course of the anticipated 9-years of in-water construction.

Piles for non-load-bearing structures (*e.g.* falsework, battered piles, pile templates, barge mooring piles) would be installed and removed solely with a vibratory hammer. These piles would be vibrated into the sediment until refusal or specified elevation. Load-bearing temporary piles (such as those that would be used on the temporary work bridges and platforms) would also be installed to the extent practicable with a vibratory hammer before being finished and/or proofed, as necessary, with an impact hammer. Up to two vibratory pile-driving rigs could be in operation on a given day. The contractor may elect to have both a vibratory and impact pile-driving rig in operation simultaneously. At this rate of production, with two vibratory pile-driving rigs in operation, it is anticipated that up to approximately 20 temporary, hollow steel pipe piles could be installed and/or removed on a given day. However, on an average day, there would likely be fewer piles driven.

Steel sheet piles for temporary cofferdams would be installed and removed solely with a vibratory hammer. Sheet piles for cofferdams would generally be vibrated approximately 50 ft (15.2 m) into the sediment. With two vibratory pile-driving rigs in operation, it is anticipated that up to approximately 50 linear ft (15.2 m) of sheet pile (or approximately twenty-five 2 ft-wide (0.6 m) sheet pile sections) could be installed and/or removed on a given day. IBRP estimates that vibratory installation or removal of sheet piles could be conducted on up to approximately 200 (nonconsecutive) days.

Temporary drilled shaft isolation casings would be placed on the river bottom with a crane, and then either pushed into the substrate approximately 5 to 10 ft (1.5 to 3 m) deep with weighted equipment or vibrated to this depth with a vibratory hammer. Installation and removal of these temporary casings is estimated to take between 30 and 60 minutes per casing. At this rate of production, it is anticipated that up to approximately four casings could be installed and/or removed on a given day. For purposes of this consultation, it is conservatively estimated that installation or removal of these temporary isolation casings could be conducted on up to approximately 50 (nonconsecutive) days.

An impact pile driver would be required to complete the installation of load-bearing temporary piles and, and/or to proof these piles to verify load-bearing capacity. Impact pile driving would be limited to the in-water work window between September 15 and April 15 of each year. During construction up to two impact pile drivers may operate simultaneously in close proximity to one another. IBRP estimates that some amount of impact pile driving in the Columbia River or North Portland Harbor would occur on approximately 445 days during the initial 5-year period, and on approximately 735 days over the course of the approximately nine seasons of in-water work to construct the new bridges and demolish the existing bridges.

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Table 6 – Pile Driving duration, strikes, and estimated number of days for the first 5 years of IBR construction

		Time to drive (min)	# Strikes per pile	Piles per day*	Total days (5 years)	Total piles (5 years)	Year	# Days per year
Vibratory pile driving								
24-in and 48-in steel pipe	Installation / extraction	5 - 30	-	20	1,250	1,300	1	300
							2	
24-in steel sheet	Installation / extraction	10 - 60	-	25	200	750	3	
							4	
Isolation casings	Installation/ extraction	30 - 60	-	4	50	52	5	
Impact pile driving								
24-in and 48-in steel pipe	Installation (attenuated)	30 - 45	300	6	445	3,311	1	120
							2	100
							3	75
							4	75
							5	75
	Test (unattenuated)	10	75	1	30	30	1	10
							2	5
							3	5
							4	5
							5	5

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An impact pile driver would be required to complete the installation of load-bearing temporary piles and, and/or to proof these piles to verify load-bearing capacity. IBRP estimates that a total of approximately 3,311 temporary piles would be installed and removed during the 9-year construction of the Columbia River and North Portland Harbor bridges. These piles would be staged throughout the in-water construction and demolition periods, and it is assumed that between 100 and 400 temporary piles may be in the water at any given time. An average of six temporary, load-bearing piles could be installed per day using up to two impact drivers at the same time.

Rotary Drilling for Shafts

The 10-foot-diameter, hollow steel casings for the permanent drilled shafts would be installed with an oscillator, which would be operated from a temporary work bridge or platform. A total of 160 such casings would be required (108 for the Columbia River bridge, and 52 for the North Portland Harbor bridges). The amount of time that an oscillator would be operated to install a given permanent shaft casing would vary depending on the design depth of each shaft, its location, and other factors. IBRP estimates that it would take up to 5 days to completely install a typical 10-ft diameter casing. Some casings may be able to be installed more quickly, and others may proceed more slowly. Oscillation of permanent drilled shaft casings could be conducted on up to approximately 800 (nonconsecutive) days. Rotary drilling is not expected to produce sound that is likely to result in incidental take of marine mammals due to the relatively low source levels, position of the sound source in the sediment layers and associated higher transmission loss, and the industrial nature of the project location. Drilling is not addressed further in this proposed rule.

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 7 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 and Alaska SARs. All values presented in table 7 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 7—SPECIES WITH ESTIMATED TAKE FROM THE SPECIFIED ACTIVITIES

Common name	Scientific name	MMPA stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance N_{best}, (CV, N_{min}, most recent abundance survey) [2]	PBR	Annual M/SI [3]
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	>321
Steller sea lion	*Eumetopias jubatus*	Eastern	-, -, N	36,308 (N/A, 36,308, 2022).[4]	2,178	93.2
Family Phocidae (earless seals):						
Harbor seal	*Phoca vitulina*	OR/WA Coastal	-, -, N	22,549 (UND, 19,561, 2022).[5]	[6]UND	10.6

[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 SARs online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.* CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable (N/A).

[3] These values, found in NMFS' 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.

[4] Nest is best estimate of counts, which have not been corrected for animals at sea during abundance surveys. Estimates provided are for the United States only.

[5] Most recent SAR does not include an abundance estimate for this stock. These data are for the Washington coast and thus underestimate the size of the OR/WA Coastal stock; estimates are from Pearson *et al.* 2024.

[6] UND means undetermined.

As indicated above, all 3 species in table 7 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. In addition to what is included in sections 3 and 4 of the IBRP's application (*https://www.fisheries.noaa.gov/action/incidental-take-authorization-interstate-bridge-replacement-programs-interstate-bridge*), the SARs (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*), and NMFS' website, we provide further detail below informing the baseline for species likely to be found in the project area (*e.g.,* information regarding current UMEs and known important habitat areas, such as biologically important areas (BIAs; *https://oceannoise.noaa.gov/biologically-important-areas*) (Calambokidis *et al.,* 2024)).

California Sea Lion

California sea lions are the most frequently sighted sea lion found in Washington coastal waters and use haulout sites along the outer coast, the Strait of Juan de Fuca, and in the Puget Sound. California sea lions have been observed in increasing numbers farther up the Columbia River since the 1980s, first to the Astoria area, and then to the Cowlitz River and Bonneville Dam (WDFW, 2020). However, the number of California sea lions observed at Bonneville Dam has been in decline, ranging from 149 individuals in 2016 to 24 individuals in 2021, including no observations of California sea lions during fall and winter of 2019 to 2020 (van der Leeuw and Tidwell, 2022). No California sea lions were observed at Bonneville Dam during fall 2023 monitoring efforts between July 25 and December 31. During spring 2024, this species was sighted beginning on March 2 and were last seen on May 31. Peak California sea lion abundance at the dam was 40 individuals on March 13, 2024; average abundance was approximately 4 individuals during this counting period (Clark *et al.,* 2024).

Steller Sea Lion

Steller sea lions that occur in the Lower Columbia River, including the project vicinity, are members of the eastern distinct population segment (DPS), ranging from Southeast Alaska to central California, including Washington (Jeffries *et al.,* 2000; Scordino, 2006; NMFS, 2013). In Washington, Steller sea lions occur mainly along the outer coast from the Columbia River to Cape Flattery (Jeffries *et al.,* 2000). Smaller numbers use the Strait of Juan de Fuca, San Juan Islands, and Puget Sound south to about the Nisqually River mouth in Thurston and Pierce counties (Wiles, 2015). The eastern DPS of Steller sea lions has historically bred on rookeries located in Southeast Alaska, British Columbia, Oregon, and California. However, within the last several years, a new rookery has become established on the outer Washington coast at the Carroll Island and Sea Lion Rock complex (Muto *et al.,* 2019).

Similar to California sea lions, Steller sea lions have also been observed at the base of Bonneville Dam in recent years, feeding on white sturgeon (*Acipenser transmontanus*) and salmonids (WDFW, 2020). However, Steller sea lions were not observed entering the Columbia River in significant numbers until the 1980s and they were not observed at the dam until after 2003. In 2023, Steller sea lions were observed beginning on July 25 and were seen through December 31; average abundance was approximately 5 sea lions per day, and the peak abundance was 21 individuals on August 29, 2023. In the spring of 2024, Steller sea lions were sighted from January 3 through May 21, with an average abundance of approximately 7 individuals per day. Peak abundance for this species during this count period was 38 animals on May 1, 2024 (Clark *et al.,* 2024).

Harbor Seal

Harbor seals are the most common, widely distributed marine mammal found in Washington marine waters and are frequently observed in the nearshore marine environment. The Oregon/Washington Coastal Stock was most recently estimated at 24,732 harbor seals in 1999. More recent abundance data is not available and there is no current estimate of abundance for this stock (Carretta *et al.,* 2022). Harbor seals use hundreds of sites to rest or haul out along coastal and inland waters, including intertidal sand bars and mudflats in estuaries; intertidal rocks and reefs; sandy, cobble, and rocky beaches; islands; and log booms, docks, and floats in all marine areas of the state (Jeffries *et al.,* 2003).

Harbor seals in this population are typically non-migratory and reside year-round in the Columbia River, and generally remain in the same area throughout the year for breeding and feeding. Pupping seasons in coastal estuaries vary geographically; in the Columbia River, Willapa Bay, and Grays Harbor, pups are born from mid-April through June (Jeffries *et al.,* 2003). Harbor seals in the Columbia River do exhibit some seasonal movement upriver, including into or through the project area of ensonification, to follow winter and spring runs of Pacific eulachon (*Thaleichthys pacificus*) and outmigrating juvenile salmon (*Oncorhynchus* spp.), and they are observed regularly in portions of the Columbia River including the action area. Within the lower Columbia River, they tend to congregate to feed at the mouths of tributary rivers, including the Cowlitz and Kalama rivers (River Miles 68 and 73, respectively). WDFW's atlas of seal and sea lion haulout sites (Jeffries *et al.,* 2000) identifies shoals near the confluence of the Cowlitz and Columbia Rivers located approximately 38 mi (61 km) upstream of the project site as a documented haulout for harbor seals.

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 approximately 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 8. Of the species potentially present in the action area, California and Steller sea lions are otariid pinnipeds, and harbor seals are phocid pinnipeds.

TABLE 8—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.

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.

Acoustic effects on marine mammals during the specified activity are expected to potentially occur from impact and vibratory pile installation and removal. The effects of underwater noise from IBRP's proposed activities have the potential to result in Level B harassment of marine mammals in the action area and, for some individuals as a result of certain activities, Level A harassment.

The proposed activities would result in the construction of new bridge spans across the Columbia River and North Portland Harbor. There are a variety of types and degrees of effects to marine mammals, prey species, and habitat that could occur as a result of the IBR project. Below we provide a brief description of the types of sound sources that would be generated by the project, the general impacts from these types of activities, and an analysis of the anticipated impacts on marine mammals from the project, with consideration of the proposed mitigation measures.

The project location is within the Columbia River and North Portland Harbor, adjacent to existing bridges, marinas, and vessel transit channels. While there are limited existing data on the current sound levels, the site is a high-use area with regular vessel traffic, industrial waterfronts, and vehicle noise. Marine mammals passing through the area would potentially be exposed to the existing background conditions at any time, and to pile driving sounds when construction activities are ongoing.

Description of Sound Sources for the Specified Activities

Activities associated with the project that have the potential to incidentally take marine mammals though exposure to sound would include attenuated and unattenuated impact pile driving, vibratory pile installation, and vibratory pile extraction.

Impact hammers typically operate by repeatedly dropping and/or pushing a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is impulsive, 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 substrate. Vibratory hammers typically produce less sound (*i.e.,* lower levels) 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; California Department of Transportation (CALTRANS), 2015, 2020). Sounds produced by vibratory hammers are non-impulsive; compared to sounds produced by impact hammers, the rise time is slower, reducing the probability and severity of injury, and the sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2005).

The likely or possible impacts of the IBRP's proposed activities on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, given there are no known pinniped haul-out sites in the vicinity of the project site, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Potential Effects of Underwater Sound on Marine Mammals

The introduction of anthropogenic noise into the aquatic environment from impact and vibratory pile driving is the primary means by which marine mammals may be harassed from the IBRP's specified activity. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life from none or minor to potentially severe responses depending on received levels, duration of exposure, behavioral context, and various other factors. Broadly, underwater sound from active acoustic sources, such as those in the Project, can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2003; Nowacek *et al.,* 2007; Southall *et al.,* 2007; Götz *et al.,* 2009).

We describe the more severe effects of certain non-auditory physical or physiological effects only briefly as we do not expect that use of pile driving hammers (impact and vibratory) are reasonably likely to result in such effects (see below for further discussion). Potential effects from impulsive sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.,* 1973). Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (*e.g.,* change in dive profile as a result of an avoidance reaction) caused by exposure to sound include neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.,* 2006; Southall *et al.,* 2007; Zimmer and Tyack, 2007; Tal *et al.,* 2015). The project activities considered here do not involve the use of devices such as explosives or mid-frequency tactical sonar that are associated with these types of effects.

In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al.,* 2007, 2019). Exposure to anthropogenic noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.,* avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). It 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 degree of effect of an acoustic exposure on marine mammals is dependent on several factors, including, but not limited to, sound type (*e.g.,* impulsive vs. non-impulsive), signal characteristics, the species, age and sex class (*e.g.,* adult male vs. mom with calf), duration of exposure, the distance between the noise source and the animal, received levels, behavioral state at time of exposure, and previous history with exposure (Wartzok *et al.,* 2004; Southall *et al.,* 2007). In general, sudden, high-intensity sounds can cause hearing loss as can longer exposures to lower-intensity sounds. Moreover, any temporary or permanent loss of hearing, if it occurs at all, will occur almost exclusively for noise within an animal's hearing range. We describe below the specific manifestations of acoustic effects that may occur based on the activities proposed by IBRP.

Richardson *et al.* (1995) described zones of increasing intensity of effect that might be expected to occur in relation to distance from a source and assuming that the signal is within an animal's hearing range. First (at the greatest distance) is the area within which the acoustic signal would be audible (potentially perceived) to the animal but not strong enough to elicit any overt behavioral or physiological response. The next zone (closer to the receiving animal) corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. The third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e.,* when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

Below, we provide additional detail regarding potential impacts on marine mammals and their habitat from noise in general, starting with hearing impairment, as well as from the specific activities IBRP plans to conduct, to the degree it is available.

Hearing Threshold Shifts. NMFS defines a noise-induced threshold shift (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 threshold shift 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 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 (AUD INJ). NMFS (2024) defines AUD INJ as damage to the inner ear that can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy (Houser 2021; Finneran 2024). AUD INJ may or may not result in a permanent threshold shift (PTS). PTS is subsequently defined 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). PTS does not generally affect more than a limited frequency range, and an animal that has incurred PTS has some level of hearing loss at the relevant frequencies; typically animals with PTS or other AUD INJ are not functionally deaf (Au and Hastings, 2008; Finneran, 2016). Available data from humans and other terrestrial mammals indicate that a 40-dB threshold shift approximates AUD INJ onset (see Ward *et al.,* 1958, 1959; Ward, 1960; Kryter *et al.,* 1966; Miller, 1974; Ahroon *et al.,* 1996; Henderson *et al.,* 2008). AUD INJ levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (*Phoca vitulina*) (Kastak *et al.,* 2008), there are no empirical data measuring AUD INJ in marine mammals largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing AUD INJ are not typically pursued or authorized (NMFS, 2024).

Temporary Threshold Shift (TTS). TTS is 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, 2024), and is not considered an AUD INJ. Based on data from marine mammal TTS measurements (see Southall *et al.,* 2007, 2019), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Finneran *et al.,* 2000, 2002; Schlundt *et al.,* 2000). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with the 24-hour cumulative sound exposure level (SEL_{24}) in an accelerating fashion: at low exposures with lower SEL_{24}, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{24}, the growth curves become steeper and approach linear relationships with the sound exposure level (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 more impactful (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that 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 severe 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 (Kryter, 2013). 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) (Finneran 2015). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. For pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), bearded seals (*Erignathus barbatus*) and California sea lions (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 below the region of best sensitivity for a species or hearing group are less hazardous than those 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, SEL_{24} will overestimate the amount of TTS from intermittent exposures, such as sonars and impulsive sources.

Relationships between TTS and AUD INJ thresholds have not been studied in marine mammals, and there are no measured PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. AUD INJ typically occurs at exposure levels at least several dB above that inducing mild TTS (*e.g.,* a 40-dB threshold shift approximates AUD INJ 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 AUD INJ 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 AUD INJ 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 AUD INJ as compared with TTS, it is considerably less likely that AUD INJ could occur.

Behavioral Effects. Exposure to noise also has the potential to behaviorally disturb marine mammals to a level that rises to the definition of harassment under the MMPA. 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. In addition, 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 do 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 shown 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 (*e.g.,* Erbe et al., 2019). 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. 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.

Avoidance and displacement—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, Blair et al., 2016). 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. Acoustic and movement bio-logging tools also have been used in some cases to infer responses to anthropogenic noise. For example, Blair *et al.* (2015) reported significant effects on humpback whale (*Megaptera novaeangliae*) foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship nose. In addition, Wisniewska *et al.* (2018) reported that tagged harbor porpoises demonstrated fewer prey capture attempts when encountering occasional high-noise levels resulting from vessel noise as well as more vigorous fluking, interrupted foraging, and cessation of echolocation signals observed in response to some high-noise vessel passes. 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.

Respiration rates vary naturally 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 rates increased in response to pile driving sounds at and above a received broadband SPL of 136 dB (zero-peak SPL: 151 dB re 1 μPa; SEL of a single strike (SEL_{ss}): 127 dB re 1 μPa^2-s) (Kastelein *et al.,* 2013).

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 (*Eschrictius robustus*) are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme *et al.,* 1984). Harbor porpoises, Atlantic white-sided dolphins (*Lagenorhynchus actusus*), and minke whales have demonstrated avoidance in response to vessels during line transect surveys (Palka and Hammond, 2001). In addition, beluga whales (*Delphinapterus leucas*) in the St. Lawrence Estuary in Canada have been reported to increase levels of avoidance with increased boat presence by way of increased dive durations and swim speeds, decreased surfacing intervals, and by bunching together into groups (Blane and Jaakson, 1994). 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.

Physiological stress responses. 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.,* Selye, 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; Ayres *et al.,* 2012; Yang *et al.,* 2022). 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. In addition, Lemos *et al.* (2022) observed a correlation between higher levels of fecal glucocorticoid metabolite concentrations (indicative of a stress response) and vessel traffic in gray whales. Yang *et al.* (2022) studied behavioral and physiological responses in captive bottlenose dolphins exposed to playbacks of ''pile-driving-like'' impulsive sounds, finding significant changes in cortisol and other physiological indicators but only minor behavioral changes. 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, 2005), however distress is an unlikely result of this project based on observations of marine mammals during previous, similar construction projects.

Vocalizations and 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).

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 (*Orcinus orca*) 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). Fin whales (*Balaenoptera physalus*) have also been documented lowering the bandwidth, peak frequency, and center frequency of their vocalizations under increased levels of background noise from large vessels (Castellote *et al.* 2012). Other alterations to communication signals have also been observed. For example, gray whales, in response to playback experiments exposing them to vessel noise, have been observed increasing their vocalization rate and producing louder signals at times of increased outboard engine noise (Dahlheim and Castellote, 2016). Alternatively, in some cases, animals may cease sound production during production of aversive signals (Bowles *et al.,* 1994, Wisniewska *et al.,* 2018).

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, including modifications of the acoustic properties of the signal or the signaling behavior (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).

Masking occurs in the frequency band that the animals utilize, and is more likely to occur in the presence of broadband, relatively continuous noise sources such as vibratory pile driving. The energy distribution of vibratory pile driving sound covers a broad frequency spectrum, and is anticipated to be within the audible range of marine mammals present in the proposed action area. Since noises generated from the proposed construction activities are mostly concentrated at low frequencies (<2 kHz), these activities likely have less effect on mid-frequency sounds produced by marine mammals. However, lower frequency noises are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. Low-frequency noise may also affect communication signals when they occur near the frequency band for noise and thus reduce the communication space of animals (*e.g.,* Clark *et al.,* 2009) and cause increased stress levels (*e.g.,* Holt *et al.,* 2009). Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, in addition to individual levels. Masking affects both senders and receivers of the signals, and at higher levels for longer durations, could have long-term chronic effects on marine mammal species and populations. However, the noise generated by the IBRP's proposed activities will only occur intermittently in a relatively small area focused around the proposed construction site. While the project duration is expected to be long-term, marine mammal presence at the project site is transitory, as individuals move up and down the river following migratory prey. Individuals are not known or expected to spend more than a few days per year at the project site. Thus, while the IBRP's proposed 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.

While in some cases marine mammals have exhibited little to no obviously detectable response to certain common or routine industrialized activities (Cornick *et al.,* 2011; Horley and Larson, 2023), it is possible some animals may at times be exposed to received levels of sound above the AUD INJ and Level B harassment thresholds during the proposed project. This potential exposure in combination with the nature of planned activity (*e.g.,* vibratory pile driving, impact pile driving) means it is possible that take by Level A and Level B harassment could occur over the total estimated period of activities; therefore, NMFS in response to the IBRP's IHA application proposes to authorize take by Level A and Level B harassment from the IBRP's proposed construction activities.

Airborne Acoustic Effects. Pinnipeds that occur near the project site could be exposed to airborne sounds associated with construction activities that have the potential to cause behavioral harassment, depending on their distance from these activities. 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 airborne acoustic harassment criteria. Although pinnipeds are known to haul-out regularly on man-made objects, we believe that incidents of take resulting solely from airborne sound are unlikely due to the proximity between the proposed project area and the known haulout sites (*e.g.,* Powerline Islands, approximately 13 mi (21 km) upriver).

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 flush from haulouts, temporarily abandon the area, and or 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. Additionally, there are no known pinniped haulouts in the IBR project vicinity, and all animals are expected to be in the water for the duration of their passage and potential exposures. 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 here.

Potential Effects on Marine Mammal Habitat

The IBRP's proposed activities could have localized impacts on marine mammal habitat, including prey, by increasing in-water SPLs. Increased noise levels may affect acoustic habitat and adversely affect marine mammal prey in the vicinity of the project areas (see discussion below). Elevated levels of underwater noise would ensonify the project areas where both fishes and mammals occur and could affect foraging success. Additionally, marine mammals may avoid the area during the proposed construction activities; however, seals and sea lions in the area are typically transiting from the Pacific Ocean to haulouts and foraging areas upstream, and are not expected to spend more than a few days per year in the project area. Displacement due to noise is, therefore, expected to be temporary and is not expected to result in long-term effects to the individuals or populations.

The total area likely impacted by the IBRP's activities is relatively small compared to the available habitat in the Columbia River and nearby waterways. Avoidance by potential prey (*i.e.,* fish) of the immediate area due to increased noise is possible. The duration of fish and marine mammal avoidance of this area after construction stops 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.

The proposed project will occur in a relatively small portion of the Columbia River and North Portland Harbor adjacent to existing infrastructure. The habitat where the proposed project will occur is an area of high vessel traffic and no known consistent prey aggregations or haulouts, making it relatively low quality habitat, which is typically used as a transit corridor between the Pacific Ocean and upstream haulouts and foraging sites. Temporary, intermittent, and short-term habitat alteration may result from increased noise levels during the proposed construction activities. Effects on marine mammals will be limited to temporary displacement from pile installation and removal noise, and effects on prey species will be similarly limited in time and space.

Water quality—Temporary and localized reduction in water quality will occur as a result of in-water construction activities. Most of this effect would occur during the installation and removal of piles when bottom sediments are disturbed. The installation and removal of piles would disturb bottom sediments and may cause a temporary increase in suspended sediment in the project area. During pile extraction, sediment attached to the pile moves vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish (marine mammal prey) suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton, 1993).

Effects to turbidity and sedimentation are expected to be short-term, minor, and localized. Since the currents are so strong in the area, following the completion of sediment-disturbing activities, suspended sediments in the water column should dissipate and quickly return to background levels in all construction scenarios. Turbidity within the water column has the potential to reduce the level of oxygen in the water and irritate the gills of prey fish species in the proposed project area. However, turbidity plumes associated with the project would be temporary and localized, and fish in the proposed project area would be able to move away from and avoid the areas where plumes may occur. Therefore, it is expected that the impacts on prey fish species from turbidity, and therefore on marine mammals, would be minimal and temporary. In general, the area likely impacted by the proposed construction activities is relatively small compared to the available marine mammal habitat in the Columbia River and associated waterways.

Potential Effects on Prey. Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* crustaceans, cephalopods, fishes, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Studies regarding the effects of noise on known marine mammal prey are described here.

Fishes 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 that 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 fishes (*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.,* Peña *et al.,* 2013; Wardle *et al.,* 2001; Jorgenson and Gyselman, 2009; Cott *et al.,* 2012). More commonly, though, the impacts of noise on fishes are temporary.

SPLs of sufficient strength have been known to cause injury to fishes and fish mortality (summarized in Popper *et al.,* 2014). 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.* (2012b) showed that a TTS of 4 to 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.,* 2012a; Casper *et al.,* 2013, 2017).

Fish populations in the proposed project area that serve as marine mammal prey could be temporarily affected by noise from pile installation and removal. The frequency range in which fishes generally perceive underwater sounds is 50 to 2,000 Hz, with peak sensitivities below 800 Hz (Popper and Hastings, 2009). Fish behavior or distribution may change, especially with strong and/or intermittent sounds that could harm fishes. High underwater SPLs have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper, 2005).

The greatest potential impact to marine mammal prey during construction would occur during impact pile driving. However, the duration of impact pile driving would be limited to the final stage of installation (''proofing'') after the pile has been driven as close as practicable to the design depth with a vibratory driver. Impact pile driving would only occur during the in-water work window (September 15 through April 15 yearly), avoiding work during times when fishes would be most vulnerable to effects of noise. Additionally, most impact driving would be accomplished using a noise-attenuation system (bubble curtain) designed to reduce the potentially injurious effects of impulsive noise on fishes. Vibratory pile driving could 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. Construction also would have minimal permanent and temporary impacts on benthic invertebrate species, a marine mammal prey source. In addition, it should be noted that the area in question is low-quality habitat since it is already highly developed and experiences a high level of anthropogenic noise from normal operations and other vessel traffic.

Potential Effects on Foraging Habitat

The IBR project is not expected to result in any habitat related effects that could cause significant or long-term negative consequences for individual marine mammals or their populations, since installation and removal of in-water piles would be temporary and intermittent. The total area affected by pile installation and removal is a very small area compared to the foraging area available to marine mammals outside this project area. The Columbia River and North Portland Harbor waterways are not typical prey aggregation areas, are heavily used by humans, and have no valuable haulout areas for pinnipeds. Seals and sea lions in the area are typically transiting from the Pacific Ocean to haulouts and foraging areas upstream. The area impacted by the project is relatively small compared to the available habitat just outside the project area, and there are no areas of particular importance that would be impacted by this project. 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. As described in the preceding, the potential for the IBRP's construction to affect the availability of prey to marine mammals or to meaningfully impact the quality of physical or acoustic habitat is considered to be insignificant. Therefore, impacts of the project are not likely to have adverse effects on marine mammal foraging habitat in the proposed project area.

In summary, given the relatively small areas being affected, as well as the temporary and mostly transitory nature of the proposed construction activities, any adverse effects from the IBRP's activities on prey habitat or prey populations are expected to be minor and temporary. The most likely impact to fishes at the project site would be temporary avoidance of the area. 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 preliminarily conclude that impacts of the specified activities 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 under the regulations, 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.,* impact and vibratory 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 phocids because predicted AUD INJ zones are larger than for otariids. 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 recently updated (NMFS 2024) as reflected below in the Level A harassment section.

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. 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.

IBRP's proposed activity includes the use of continuous (vibratory) and impulsive (impact) 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), shown in table 9. IBRP's proposed activity includes the use of impulsive (impact) and non-impulsive (vibratory) 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 9—THRESHOLDS IDENTIFYING THE ONSET OF AUDITORY INJURY

Hearing group	AUD INJ onset acoustic thresholds * (received level)	
	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 μPa²s. In this Table, criteria are abbreviated to be more reflective of International Organization for Standardization standards (ISO 2017; ISO 2020). 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. Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. The maximum (underwater) area ensonified is determined by the topography of the Columbia River and North Portland Harbor, including intersecting land masses that will reduce the overall area of potential impact.

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:

$$TL = B \times \text{Log}_{10}\,(R_1/R_2),$$

Where

TL = transmission loss in dB;
B = transmission loss coefficient; for practical spreading equals 15;
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.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6-dB reduction in sound level for each doubling of distance from the source ($20\times\log_{10}$[range]). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source ($10\times\log_{10}$[range]). A practical spreading value of 15 is often used under conditions, such as the project site, where water increases with depth as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading loss is assumed here.

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. In order to calculate the distances to the Level A harassment and the Level B harassment sound thresholds for the methods and piles being used in this project, NMFS used acoustic monitoring data from other locations to develop proxy source levels for the various pile types, sizes and methods (table 10). Generally, we choose source levels from similar pile types from locations (*e.g.,* geology, bathymetry) similar to the project.

TABLE 10—PROXY SOUND SOURCE LEVELS AND REFERENCES

Pile type and size	Attenuated or unattenuated[1]	Single or concurrent	Peak SPL (re 1 μPa)	RMS SPL (re 1 μPa)	SEL (re 1 μPa²-s)	Reference for proxy source value
Impact						
24-in steel pipe	Unattenuated	Single	205	190	175	DEA (2011).
	Attenuated	Single	198	183	168	
		Concurrent[2 3]	198	186	168	
48-in steel pipe	Unattenuated	Single	214	201	184	
	Attenuated	Single	207	194	177	
		Concurrent[2 3]	207	197	177	
Vibratory[4]						
24-in steel pipe	Unattenuated	Single		175		CALTRANS (2020).
		Concurrent[3]		178		
48-in steel pipe	Unattenuated	Single		175		
		Concurrent[3]		178		
Steel sheet	Unattenuated	Single		175		
		Concurrent[3]		178		

[1] Bubble curtain effectiveness of 7 dB was assumed based on previous monitoring results from the Columbia River Crossing project.
[2] Concurrent impact driving of one 48-in and one 24-in steel pipe pile was conservatively analyzed as if two 48-in piles were driven concurrently.
[3] Proxy values for single piles were added according to the rules of decibel addition to develop proxy levels for concurrent driving.
[4] The proxy source level used for vibratory driving in this analysis is conservative; most source measurements for vibratory pile driving are at or below 170 dB RMS.

For this project, two hammers, including any combination of vibratory and impact hammers, may operate simultaneously. The calculated proxy source levels for the different potential concurrent pile driving scenarios are shown in table 10.

Two Impact Hammers

For simultaneous impact driving of two 48-in steel pipe piles (the most conservative scenario), the number of strikes per pile was doubled to estimate total sound exposure during simultaneous installation. While the likelihood of impact pile driving strikes completely overlapping in time is rare due to the intermittent nature and short duration of strikes, NMFS conservatively estimates that up to 20 percent of strikes may overlap completely in time. Therefore, to calculate Level B harassment isopleths for simultaneous impact pile driving, dB addition (if the difference between the two sound source levels is between 0 and 1 dB, 3 dB are added to the higher sound source level) was used to calculate the combined sound source level of 197 dB RMS.

One Impact Hammer, One Vibratory Hammer

To calculate Level B harassment isopleths for one impact and one vibratory hammer operating simultaneously, sources were treated as though they were non-overlapping and the isopleth associated with the individual source which results in the largest Level B harassment isopleth was conservatively used for both sources to account for periods of overlapping activities.

Two Vibratory Hammers

To calculate Level B harassment isopleths for two simultaneous vibratory hammers, the NMFS User Spreadsheet tool was used with modified inputs to account for accumulation, weighting, and source overlap in space and time. Using the rules of dB addition (if the difference between the two sound source levels is between 0 and 1 dB, 3 dB are added to the higher sound source level), the combined sound source level for the simultaneous vibratory installation of any two piles is 178 dB RMS.

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 like pile driving, 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, and the resulting estimated isopleths, are reported below.

To calculate Level A harassment isopleths for two impact hammers operating simultaneously, the NMFS User Spreadsheet calculator was used with modified inputs to account for the total estimated number of strikes for all piles. For concurrent impact driving of two identical steel pipe piles (the most conservative scenario), the number of strikes per pile was doubled while holding the number of piles per day constant at one. The source level for two simultaneous impact hammers was not adjusted because for identical sources the accumulation of energy depends only on the total number of strikes, whether or not they overlap fully in time. Therefore, the source level used for two simultaneous impact hammers was 177 dB SEL_{ss} for 48-in piles, and 168 dB SEL_{ss} for two 24-in piles.

To calculate Level A harassment isopleths of one impact hammer and one vibratory hammer operating simultaneously, sources were treated as though they were non-overlapping and the isopleth associated with the individual source which resulted in the largest Level A harassment isopleth was conservatively used for both sources to account for periods of overlapping activities.

To calculate Level A harassment isopleths of two vibratory hammers operating simultaneously, the NMFS acoustic threshold calculator was used with modified inputs to account for accumulation, weighting, and source overlap in space and time. Using the rules of dB addition (NMFS, 2024; if the difference between the two sound source levels is between 0 and 1 dB, 3 dB are added to the higher sound source level), the combined sound source level for the simultaneous vibratory installation of two piles is 178 dB RMS.

TABLE 11—NMFS USER SPREADSHEET INPUTS

Pile size and type	Spreadsheet tab used	Weighting factor adjustment (kHz)	Number of piles per day	Daily duration (minutes)	Number of strikes per pile	Maximum strikes per day
Impact Pile Installation						
24-in steel pipe (Unattenuated, single).	E.1. Impact pile driving.	2.0	1	10	75	75
24-in steel pipe (Attenuated, single)			3		300	900
24-in and 24-in steel pipes (Attenuated, concurrent).			6		300	1,800
48-in steel pipe (Unattenuated, single).			1	10	75	75
48-in steel pipe (Attenuated, single)			3		300	900
48-in and 24-in or 48-in steel pipes (Attenuated, concurrent).			6		300	1,800
Vibratory Pile Installation and Extraction						
24-in steel pipe (Unattenuated, single).	A.1. Vibratory pile driving.	2.5		600		
48-in steel pipe (Unattenuated, single).				600		
Steel sheet (Unattenuated, single)				600		
24-in and or 48-in and or sheet (Unattenuated, concurrent).				600		

TABLE 12—CALCULATED LEVEL A AND B HARASSMENT ISOPLETHS IN THE COLUMBIA RIVER

Pile size and type	Level A harassment zone (m/km²)	Level B harassment zone (m/km²)
	Phocids & Otariids [a]	
Impact Pile Installation—unattenuated		
24-in steel pipe (Unattenuated, single)	46 >0.01	1,000 1.59
48-in steel pipe (Unattenuated, single)	183.3 0.11	5,412 9.29
Impact Pile Installation—attenuated		
24-in steel pipe (Attenuated, single)	82.4 0.02	341 0.37
24-in and 24-in steel pipes (Attenuated, concurrent)	130.8 0.11	541 0.86
48-in steel pipe (Attenuated, single)	328 0.34	1,848 3.12
48-in and 24-in or 48-in steel pipes (Attenuated, concurrent)	520.7 0.83	2,929 4.82
Vibratory Pile Installation and Extraction		
24-in steel pipe (Unattenuated, single)	236.3 0.18	46,414 [b] 17.63
48-in steel pipe (Unattenuated, single)		
Steel sheet (Unattenuated, single)		
24-in and or 48-in and or sheet (Unattenuated, concurrent)	374.5 0.58	73,564 [b] 17.63

[a] Level A harassment zones for phocids have been conservatively applied to both phocids and otariids in this analysis.
[b] Level B harassment ensonified areas are limited by the river curvature and geography.

TABLE 13—CALCULATED LEVEL A AND B HARASSMENT ISOPLETHS IN THE NORTH PORTLAND HARBOR

Pile size and type	Level A harassment zone (m/km²) Phocids & Otariids [a]	Level B harassment zone (m/km²)
Impact Pile Installation—unattenuated		
24-in steel pipe (Unattenuated, single)	46 >0.01	1,000 0.6
48-in steel pipe (Unattenuated, single)	183.3 0.09	5,412 2.26
Impact Pile Installation—attenuated		
24-in steel pipe (Attenuated, single)	82.4 0.02	341 0.19
24-in and 24-in steel pipes (Attenuated, concurrent)	130.8 0.07	541 0.34
48-in steel pipe (Attenuated, single)	328 0.18	1,848 1.1
48-in and 24-in or 48-in steel pipes (Attenuated, concurrent)	520.7 0.33	2,929 1.69
Vibratory Pile Installation and Extraction		
24-in steel pipe (Unattenuated, single)	236.3 0.12	46,414 [b] 2.25
48-in steel pipe (Unattenuated, single)		
Steel sheet (Unattenuated, single)		
24-in and or 48-in and or sheet (Unattenuated, concurrent)	374.5 0.22	73,564 [b] 2.25

[a] Level A harassment zones for phocids have been conservatively applied to both phocids and otariids in this analysis.
[b] Level B ensonified areas are limited by the harbor geography.

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including density or other relevant information which will inform the take calculations. To ensure use of the best and most current marine mammal data, NMFS inquired about current sightings data from the ODFW and the WDFW in October 2024. These agencies provided information about the relative use of haulout areas and seasonality of pinniped presence in the Columbia and Willamette Rivers. Specifically, they listed major haulouts at the mouth of the Cowlitz River and the city of Rainier docks (38 mi; 62 km from the project site), and Bonneville Dam (37.5 mi; 60 km), with semi-regular haulouts at Coffin Rock (33 mi; 53 km), Powerline Islands (13 mi; 22 km), and Phoca Rock (25.5 mi; 41 km) (see figure 2). The peak seasonal presence noted was February through May, though sea lions are often present at Bonneville Dam in other months.

Figure 2—Pinniped Haulout Locations Along the Columbia River Between the Cowlitz/Kalama Rivers and Bonneville Dam

One of the best sources of current abundance data for California sea lions and Steller sea lions within the Columbia River is the most recent USACE report on pinniped presence and salmonid predation at Bonneville Dam, which reports data from pinniped monitoring conducted in 2022 (Tidwell *et al.,* 2023). These data provide the best estimate of the number of sea lions that transit the project site in a given year, as each sea lion that transits that project site is likely traveling to or from Bonneville Dam and, therefore, captured in the annual counts. Each animal counted at the dam would transit the project site twice in a given season. However, the USACE Bonneville Dam monitoring data likely underestimates the density of harbor seals that transit or are present at the project site. Harbor seals are relatively more common in the lower reaches of the river but are only occasionally observed as far upriver as Bonneville Dam.

In November 2024, NMFS received unpublished 2021–2024 pinniped abundance monitoring data for the Lower Columbia and Willamette Rivers from ODFW in collaboration with the Columbia River Inter-Tribal Fish Commission (CRITFC), and 2021–2024 Bonneville Dam pinniped counts from the USACE. CRIFTC data were taken via boat-based or aerial surveys of known pinniped haulouts along the Columbia and Willamette Rivers, and presented data on pinnipeds as a guild, not separated by species.

NMFS compiled these various datasets and analyzed sightings between the Bonneville Dam upriver of the project site, and Longview, WA, 46 mi (74 km) downriver. These data represent the anticipated average maximum number of daily pinniped transits within the portion of the Columbia River at the bridge location for each month of the year. Table 14 shows average estimated monthly occurrence of pinnipeds in three regions: downstream (Longview, WA to the Willamette river); the project area (Willamette River/Portland area); and upstream (Portland to Bonneville Dam). Downstream sites had significantly more pinniped sightings than upstream sites. From these data, NMFS conservatively used the maximum of the project area and upstream estimates as a proxy for monthly pinniped occurrence (table 14). Data were further condensed to evaluate pinniped presence for the two key periods of interest (fall and spring migrations as defined at Bonneville Dam) for the purpose of estimating incidental take (September through April, and May through August).

TABLE 14—DAILY OCCURRENCE ESTIMATES BY MONTH FOR THE COLUMBIA RIVER BETWEEN LONGVIEW, WA AND THE BONNEVILLE DAM, AND MAXIMUM OCCURRENCES USED IN TAKE ESTIMATIONS

	Downstream (RM 66 to 110)	Project area (RM 110 to 115)	Upstream (RM 115 to 146) (Bonneville Dam)	Maximum occurrence (pinnipeds per day)	Seasonal occurrence (pinnipeds per day)
September	-	1	15	15	15.2
October	-	3.3	10	10	
November	-	1.6	16.5	16.5	

TABLE 14—DAILY OCCURRENCE ESTIMATES BY MONTH FOR THE COLUMBIA RIVER BETWEEN LONGVIEW, WA AND THE BONNEVILLE DAM, AND MAXIMUM OCCURRENCES USED IN TAKE ESTIMATIONS—Continued

	Downstream (RM 66 to 110)	Project area (RM 110 to 115)	Upstream (RM 115 to 146) (Bonneville Dam)	Maximum occurrence (pinnipeds per day)	Seasonal occurrence (pinnipeds per day)
December	3	5.9	11.85	11.9	
January	81.4	4.4	2.15	4.4	
February	86.7	10.7	1.5	10.7	
March	207.5	3.4	9.65	9.7	
April	18.6	5.5	43.3	43.3	
May	4.3	4.8	14.7	14.7	6.7
June	-	1	0	1	
July	-	-	1	1	
August	56	-	10	10	

Note: "-" means no sightings data were available for this region and month; RM means river mile.

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization. The majority of the recent data obtained from ODFW and WDFW did not separate pinniped sightings by species. Thus, NMFS calculated occurrence rates for all three expected pinniped species as a guild (table 14).

Not all animals passing through the IBR project area are expected to be exposed to noise levels equated with take by Level A or Level B harassment. IBRP proposed and NMFS concurs with the exposure estimates shown in table 15. Animals in the project area are typically transiting through on their way to or from upriver haulouts and or foraging areas. While most of the activities will ensonify the full width of the river and or harbor, some animals will pass by the project site when no active pile driving is occurring, thus reducing the expected exposure percentages.

TABLE 15—EXPOSURE ESTIMATES BY ACTIVITY FOR TRANSITING PINNIPEDS

	Level A harassment		Level B harassment	
	Percentage (%)	Rationale	Percentage (%)	Rationale
Unattenuated impact pile installation.	5	• Very few days of activity per year. • Very short duration activity.	50	• Very few days of activity per year. • Very short duration activity.
Attenuated impact pile installation.	10	• Relatively short duration activity. • Ensonified area can be avoided by transiting pinnipeds in most pile driving scenarios.	50	• Relatively short duration activity. • Ensonified area cannot be avoided during activity.
Vibratory pile installation and extraction.	0	• Extended (~24 hours) exposure would be required to reach Level A harassment threshold; unlikely for transiting pinnipeds.	75	• Ensonified area cannot be avoided during activity.

The formula used for calculating estimated takes by both Level A and Level B harassment for each relevant activity is:

Incidental take estimate = number of days of Activity 1 × estimated number of animals per day × exposure percentage (Level A or Level B) for activity 1.

Estimated take by Level A and Level B harassment proposed to be authorized for each year of the IBR project is shown in table 16. Because occurrence estimates are only available at the guild level, take estimates are not calculated to the species level, and it is assumed that all takes could come from any of the three stocks. This results in an overestimate of the percentage of each stock taken.

TABLE 16—PROPOSED TAKE BY LEVEL A AND LEVEL B HARASSMENT FOR ALL PINNIPEDS OVER THE COURSE OF THE 5-YEAR LOA

Activity	Year	Level A	Level B	Total
Impact—Unattenuated	1	8	76	84
	2	4	38	42
	3	4	38	42
	4	4	38	42
	5	4	38	42
	5-Year Estimate	24	228	252
Impact—Attenuated	1	182	912	1,094
	2	152	760	912
	3	114	570	684
	4	114	570	684
	5	114	570	684
	5-Year Estimate	676	3,382	4,058
Vibratory	1	0	2,713	2,713
	2	0	2,713	2,713
	3	0	2,713	2,713
	4	0	2,713	2,713
	5	0	2,713	2,713
	5-Year Total	0	13,365	13,365
All Activities Totals				
	Maximum Annual	190	3,701	3,891
	5-Year Total	700	17,175	17,875

TABLE 17—PROPOSED TAKE ESTIMATES AND PERCENTAGE OF STOCKS TAKEN IN THE YEAR OF MAXIMUM ANNUAL TAKE

Species	Maximum annual estimated take			Percent of stock [a] (%)
	Level A	Level B	Total	
Harbor seal [b]	190	3,701	3,891	17.3
California sea lion.				1.5
Steller sea lion.				10.7

[a] NMFS conservatively assumes that all proposed estimated takes could come from a single stock due to the inability to distinguish between species detected during surveys. In reality, takes will occur to all three stocks and the percentages shown are thus overestimates.
[b] The SAR lists the abundance for this stock as unknown; Pearson *et al.,* 2024 report an estimate of 22,549, which we used in this analysis.

Proposed Mitigation

In order to promulgate a rulemaking under section 101(a)(5)(A) 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.

The mitigation requirements described in the following were proposed by IBRP, which has agreed that all of the mitigation measures are practicable. As required by the MMPA, NMFS concurred that these measures are sufficient to achieve the least practicable adverse impact on the affected marine mammal species or stocks and their habitat. NMFS describes these below as proposed mitigation requirements, and has included them in the proposed regulations.

In addition to the measures described later in this section, the IBRP would follow these general mitigation measures:

- Authorized take, by Level A and Level B harassment only, would be limited to the species and numbers listed in Table 16. Construction activities must be halted upon observation of either 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 is within the harassment zone.
- The taking by serious injury or death of any of the species listed in table 18 or any taking of any other species of marine mammal would be

prohibited and would result in the modification, suspension, or revocation of the ITR and associated LOA, if issued. Any taking exceeding the authorized amounts listed in table 16 would be prohibited and would result in the modification, suspension, or revocation of the ITR and associated LOA, if issued.

• Ensure that construction supervisors and crews, the marine mammal monitoring team, and relevant IBRP staff are trained prior to the start of all construction activities, so that responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work;

• The IBRP, construction supervisors and crews, Protected Species Observers (PSOs), and relevant IBRP 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.

• Employ PSOs and establish monitoring locations as described in section 5 of the IHA and the IBRP's Marine Mammal Monitoring and Mitigation Plan (see appendix A of the IBRP's application). The IBRP must monitor the project area to the maximum extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions;

Additionally, the following mitigation measures apply to the IBRP's in-water construction activities:

Establishment of Shutdown Zones—The IBRP would establish shutdown zones with radial distances as identified in table 18 for all construction activities. If a marine mammal is observed entering or within the shutdown zones indicated in table 18, 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 zones or 15 minutes have passed without re-detection of the animal.

TABLE 18—PROPOSED SHUTDOWN ZONES DURING PROJECT ACTIVITIES

Activity	Pile type/size	Shutdown zone (m)	Monitoring zones (m)	
			Level A	Level B
Impact—Unattenuated (Single Hammer)	24-in	10	46	1,000
	48-in		184	5,412
Impact—Attenuated (Single Hammer)	24-in	10	83	341
	48-in		328	1,848
Impact—Attenuated (Two Hammers)	24-in	10	131	541
	48-in		521	2,929
Vibratory (Single Hammer)	24-in, 48-in, and sheet	10	([a])	18,593 (upstream).[b]
Vibratory (Two Hammers)	24-in, 48-in, and sheet			8,230 (downstream).[b]

Notes: cm = centimeter(s), m = meter(s).
[a] While the results of the underwater noise modeling indicate Level A harassment isopleths exist for cumulative exposure to underwater noise during vibratory pile driving, take by Level A harassment is not anticipated, and no Level A harassment Monitoring Zone is proposed for vibratory pile driving.
[b] PSOs will monitor the Level B harassment zone to the extent possible based on positioning and environmental conditions.

Pre- and Post-Activity Monitoring—Monitoring would take place from 30 minutes prior to initiation of pile driving activity (*i.e.,* pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity. In addition, monitoring for 30 minutes would take place whenever a break in the specified activity (*i.e.,* impact pile driving, vibratory pile driving) of 30 minutes or longer occurs. Pre-start clearance monitoring would be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones indicated in table 18 are clear of marine mammals. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals.

Soft Start—The IBRP would use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of three strikes at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. A 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 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.

Noise Attenuation System

The IBRP would use a bubble curtain during impact pile driving in water depths greater than 0.67 m. The bubble curtain would be operated as necessary to achieve optimal performance. At a minimum, the bubble curtain would distribute air bubbles around 100 percent of the piling circumference for the full depth of the water column, the lowest bubble ring would be in contact with the substrate for the full circumference of the ring, and the weights attached to the bottom ring would ensure 100 percent substrate contact. No parts of the ring or other objects would prevent full substrate contact. In addition, air flow to the bubblers would be balanced around the circumference of the pile.

A hydroacoustic monitoring plan would be implemented during impact pile driving to confirm the attenuation device is installed and functioning as designed. This monitoring program would require some unattenuated pile strikes to confirm the amount of attenuation provided by the system. Some amount of unattenuated pile strikes are also factored in to account for periods when the bubble curtain may not be providing sufficient attenuation. IBRP estimates that up to 75 unattenuated strikes may be required for a period of approximately 10 minutes approximately 1 day per week. Testing would occur on up to approximately 30 days during the five year period covered under this LOA, and on approximately

40 days total over the course of the in-water construction period.

Hydroacoustic Monitoring—The IBRP would conduct hydroacoustic monitoring to verify the predicted sound source levels and the effectiveness of the bubble curtain. An acoustic monitoring plan would be submitted to NMFS no later than 60 days prior to the beginning of impact pile driving for approval.

Based on our evaluation of the applicant's proposed measures, 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 promulgate a rulemaking for an activity, section 101(a)(5)(A) 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.

The monitoring and reporting requirements described in the following were proposed by IBRP, which has agreed that all of the requirements are practicable. NMFS describes these below as proposed requirements, and has included them in the proposed regulations.

The IBRP would abide by all monitoring and reporting measures contained within the IHA, if issued, and their Marine Mammal Monitoring and Mitigation Plan (see appendix A of the IBRP's application). A summary of those measures and additional requirements proposed by NMFS is provided below.

Visual Monitoring—A minimum of two NMFS-approved PSOs must be stationed at monitoring locations as established in the marine mammal monitoring plan (see appendix A of the IBRP's LOA application) for the entirety of active pile driving operations. PSOs would 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 would have prior experience performing the duties of a PSO during an activity pursuant to a NMFS-issued incidental take authorization (ITA) or letter of concurrence (LOC). Other PSOs may substitute other relevant experience, education (degree in biological science or related field), or training for prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.

One of the PSOs would be responsible for monitoring the shutdown zone and will be stationed in a location with clear line of sight views of the entire shutdown zone. The second PSO will be responsible for monitoring the Level A and B monitoring zones. This PSO will be stationed in a location with clear line of sight views of the entire Level A monitoring zone. This PSO need not be able to observe the entire Level B monitoring zone, but they need to be able to observe the full width of the river and be able to spot and identify marine mammals passing through the Level B monitoring zone.

Where a team of three or more PSOs is required, a lead observer or monitoring coordinator would be designated. The lead observer must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued ITA or LOC.

PSOs should also have the following additional qualifications:

- The 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: (1) the number and species of marine mammals observed; (2) dates and times when in-water construction activities were conducted; (3) dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and (4) marine mammal behavior; and
- The 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.

Acoustic Monitoring

The IBRP must establish acoustic monitoring procedures as described in an acoustic monitoring plan, to be submitted to NMFS for approval no less than 60 days prior to the commencement of impact pile driving. At minimum, the hydroacoustic monitoring plan would include:

- A close range hydrophone placed at a horizontal distance of 10 m from the pile. Additional hydrophones may be placed at (1) a horizontal distance no less than three times the water depth and (2) in the far field, well away from the source. Hydrophones would be placed at a depth of half the water depth at each measurement location. Exact positioning of the hydrophone(s) would ensure a direct, unobstructed path between the sound source and the hydrophone(s);
- Measurement systems would be deployed using configurations which minimize self or platform noise and ensure stable positioning throughout the recordings;
- The recordings would be continuous throughout each acoustic event for which monitoring is required;

• The SSV measurement systems would have a sensitivity appropriate for the expected SPLs. The frequency range of SSV measurement systems would cover the range of at least 20 Hz to 20 kHz. The dynamic range of the measurement system would be sufficient such that at each location, the signals would avoid poor signal-to-noise ratios for low amplitude signals, and would avoid clipping, nonlinearity, and saturation for high amplitude signals;

• All hydrophones used in SSV measurements systems would be required to have undergone a full system laboratory calibration conforming to a recognized standard procedure, from a factory or accredited source to ensure the hydrophone(s) receives accurate SPLs, at a date not to exceed 2 years before deployment. Additional in-situ calibration checks using a pistonphone would be required to be performed before and after each hydrophone deployment. If the measurement system employs filters via hardware or software (*e.g.,* high-pass, low-pass, etc.), which are not already accounted for by the calibration, the filter performance (*i.e.,* the filter's frequency response) would be reported, and the data corrected before analysis;

• Environmental data would be collected, including but not limited to, the following: wind speed and direction, air temperature, humidity, surface water temperature, water depth, wave height, weather conditions, and other factors that could contribute to influencing the airborne and underwater SPLs (*e.g.,* aircraft, boats, *etc.*); and

• The project engineer would supply the acoustics specialist with the substrate composition, hammer model and size, hammer energy settings, and any changes to those settings during the monitoring.

For acoustically monitored construction activities, data from the continuous monitoring locations would be post-processed to obtain the following sound measures:

• Maximum peak sound pressure level recorded for all activities, expressed in dB re 1 μPa. This maximum value will originate from the phase of hammering during which hammer energy was also at maximum.

• From all activities occurring during the time that the hammer was at maximum energy, these additional measures will be made, as appropriate:

○ Mean, median, minimum, and maximum RMS SPL (dB re 1 μPa);

○ Mean duration of a pile strike (based on the 90 percent energy criterion);

○ Number of hammer strikes;

○ Mean, median, minimum, and maximum SEL_{ss} (dB re μPa² sec);

○ Median integration time used to calculate RMS SPL (for vibratory monitoring, the time period selected is 1-second intervals. For impulsive monitoring, the time period is 90 percent of the energy pulse duration);

○ A frequency spectrum (power spectral density) (dB re μPa² per Hz) based on all strikes with similar sound. Spectral resolution would be 1 Hz, and the spectrum would cover nominal range from 20 Hz to 20 kHz;

○ Finally, the SEL_{24} would be computed from all the strikes associated with each pile occurring during all phases, *i.e.,* soft start. This measure is defined as the sum of all SEL_{ss} values. The sum is taken of the antilog, with $\log_{10}$ taken of result to express (dB re μPa² sec).

Reporting—The IBRP would be required to submit an annual draft summary report on all construction activities and marine mammal monitoring results to NMFS within 90 days following the end of each construction year. Additionally, a draft comprehensive 5-year summary report must be submitted to NMFS within 90 days of the end of the project. The annual reports would include an overall description of construction work completed, a narrative regarding marine mammal sightings, and associated raw PSO data sheets (in a queryable electronic format). Specifically, the reports 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) or 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.

Upon observation of a marine mammal the following information must be reported:

• Name of PSO who sighted the animal(s) and PSO location and activity at the time of the sighting;

• Time of the 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 bearing of each observed marine mammal relative to the pile being driven or removed for each sighting;

• Estimated number of animals (min/max/best estimate);

• Estimated number of animals by cohort (*e.g.,* adults, juveniles, neonates, group composition, *etc.*);

• Animal's closest point of approach and estimated time spent within the estimated harassment zone(s);

• 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 estimated harassment zones, by species; and

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

Acoustic monitoring report(s) must be submitted on the same schedule as visual monitoring reports *(i.e.,* within 90 days following the completion of construction). The acoustic monitoring report must contain the informational elements described in the acoustic monitoring plan and, at minimum, must include:

• Hydrophone equipment and methods: (1) recording device, sampling rate, calibration details, distance (m) from the pile where recordings were made; and (2) the depth of water and recording device(s);

• Location, identifier, orientation (*e.g.,* vertical, battered), material, and geometry (shape, diameter, thickness, length) of pile being driven, substrate type, method of driving during recordings (*e.g.,* hammer model and energy), and total pile driving duration;

• Whether a sound attenuation device is used and, if so, a detailed description of the device used, its distance from the pile and hydrophone, and the duration of its use per pile;

• For impact pile driving: (1) number of strikes per day and per pile and strike rate; (2) depth of substrate to penetrate; (3) decidecade (one-third octave) band spectra in tabular and figure formats computed on a per-pulse basis, including the arithmetic mean or median for all computed spectra; (4) pulse duration and median, mean, maximum, minimum, and number of samples (where relevant) of the following sound level metrics: (5) RMS SPL; (6) SEL_{24}, peak (PK) SPL, and SEL_{ss}; and

- For any monitored vibratory pile driving: (1) duration of driving for each pile; (2) depth of substrate to penetrate; (3) decidecade (one-third octave) band spectra in tabular and figure formats, including the arithmetic mean or median for all computed spectra; (4) duration and median, mean, maximum, minimum, and number of samples (where relevant) of the following level metrics: RMS SPL; SEL_{24}; peak (PK) SPL; and $SEL_{ss.}$

If no comments are received from NMFS within 30 days after the submission of the draft summary report, the draft report would constitute the final report. If the IBRP received comments from NMFS, a final summary report addressing NMFS' comments would be submitted within 30 days after receipt of comments. The estimated harassment and shutdown zones (table 18) may be modified with NMFS' approval following NMFS' acceptance of an acoustic monitoring report.

Reporting Injured or Dead Marine Mammals—In the event that personnel involved in the IBRP's activities discover an injured or dead marine mammal, the IBRP would report the incident to the NMFS Office of Protected Resources (OPR) (*PR.ITP.MonitoringReports@noaa.gov, ITP.hotchkin@noaa.gov*) and to the West Coast Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, the IBRP would 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 IHA. The IBRP would not resume their activities until notified by NMFS. The report would include the following information:

- Description of the incident;
- Environmental conditions (*e.g.,* Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Photographs or video footage of the animal(s) (if equipment is available).
- 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 animal(s), if alive; 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 discussion of our analysis applies to harbor seal, California sea lion, and Steller sea lion, 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.

NMFS has identified key factors which may be employed to assess the level of analysis necessary to conclude whether potential impacts associated with a specified activity should be considered negligible. These include, but are not limited to, the type and magnitude of taking, the amount and importance of the available habitat for the species or stock that is affected, the duration of the anticipated effect to the species or stock, and the status of the species or stock. The potential effects of the specified activities on California sea lions, Steller sea lions, and harbor seals are discussed below.

Pile driving associated with the IBR project, as outlined previously, has 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 individuals, Level A harassment, from underwater sounds generated by pile driving. Potential takes could occur if marine mammals are present in zones ensonified above the thresholds for Level B harassment or Level A harassment, identified above, while activities are underway.

The IBRP's proposed activities and associated impacts would occur within a limited, confined area of the stocks' range. The work would occur in the vicinity of the IBR project site, and sound from the specified activities would be blocked by the shorelines of the river and North Portland Harbor and the curvature of the Columbia River. The intensity and duration of take by Level A and Level B harassment would be minimized through use of mitigation measures described herein. Further, the presence of pinnipeds in the area is limited and typically transitory as animals migrate up or downriver in pursuit of prey or to and from haulout locations, thereby reducing the potential for prolonged exposure or behavioral disturbance. In addition, NMFS does not anticipate that serious injury or mortality will occur as a result of the IBRP's planned activity given the nature of the activity, even in the absence of required mitigation.

Exposures to elevated sound levels produced during pile driving may cause the behavioral disturbance of some individuals. Behavioral responses of marine mammals to pile driving at the IBR project site are expected to be mild, short term, and temporary. Effects on individuals that are taken by Level B harassment, as enumerated in the Estimated Take section, on the basis of reports in the literature as well as monitoring from other similar activities at the IBRP and elsewhere, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging if such activity were occurring (*e.g.,* Ridgway *et al.,* 1997; Nowacek *et al.,* 2007; Thorson and Reyff, 2006; Kendall and Cornick, 2015; Goldbogen *et al.,* 2013b; Blair *et al.,* 2016; Wisniewska *et al.,* 2018; Piwetz *et al.,* 2021). Marine mammals within the Level B harassment zones may not show any visual cues that they are disturbed by activities, or they could become alert, avoid the area, leave the area, or display other mild responses that are not visually observable such as exhibiting increased stress levels (*e.g.,* Rolland *et al.,* 2012; Lusseau, 2005; Bejder *et al.,* 2006; Rako *et al.,* 2013; Pirotta *et al.,* 2015; Pérez-Jorge *et al.,* 2016). They may also exhibit increased vocalization rates, louder vocalizations, alterations in the spectral features of vocalizations, or a cessation of communication signals (Hotchkin and Parks 2013).

All three marine mammal species present in the region will only be present temporarily based on seasonal patterns or during transit between other habitats. Thus, individuals present will be exposed to only transient periods of noise-generating activity as they move up- or down-river past the project site. Most likely, individual animals will either be temporarily deterred from swimming past the construction activities and will pass by when no pile driving is occurring, or will swim through the area more quickly. Takes may also occur during important foraging seasons, when anadromous fishes are migrating past the project area and marine mammals follow. However, the IBR project area represents a small portion of available foraging habitat and impacts on marine mammal feeding for all species are expected to be minimal. No marine mammal species or individuals are known or expected to be resident in the project area, and impacts are unlikely to be more than temporary and low-intensity.

The activities analyzed here are similar to numerous other coastal construction activities conducted in the Columbia River (*e.g.,* 84 FR 53689, October 8, 2019; 89 FR 64420, August 7, 2024) which have taken place with no known long-term adverse consequences from behavioral harassment. Any potential reactions and behavioral changes are expected to subside quickly when the exposures cease, and therefore, no long-term adverse consequences are expected (*e.g.,* Graham *et al.,* 2017). While there are no long-term peer-reviewed studies of marine mammal habitat use in the Columbia River, studies from other areas indicate that most marine mammals would be expected to have responses on the order of hours to days. The intensity of Level B harassment events will be minimized through use of mitigation measures described herein, which were not quantitatively factored into the take estimates. The IBRP will use PSOs stationed strategically to increase detectability of marine mammals during in-water construction activities, enabling a high rate of success in implementation of shutdowns to minimize injury for most species. Further, given the absence of any major rookeries and haulouts within the estimated harassment zones, we assume that potential takes by Level B harassment will have an inconsequential short-term effect on individuals and will not result in population-level impacts.

As stated in the Mitigation section, the IBRP will implement shutdown zones (table 18). Take by Level A harassment may be authorized for all three marine mammal species to account for the potential that an animal could enter and remain unobserved within the estimated Level A harassment zone for a duration long enough to incur AUD INJ. Any take by Level A harassment is expected to arise from, at most, a small degree of AUD INJ because 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 AUD INJ.

Due to the levels and durations of likely exposure, animals that experience AUD INJ will likely only receive slight injury (*i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the frequency range of the energy produced by IBRP's in-water construction activities (*i.e.,* the low-frequency region below 2 kHz)), not severe hearing impairment or impairment in the ranges of greatest hearing sensitivity. If hearing impairment does occur, it is most likely that the affected animal will lose a few dBs in its hearing sensitivity, which, in most cases, is not likely to meaningfully affect its ability to forage and communicate with conspecifics. There are no data to suggest that a single instance in which an animal incurs AUD INJ (or TTS) would result in impacts to reproduction or survival. If AUD INJ were to occur, it would be minor and unlikely to affect more than a few individuals. 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. Because of the small degree anticipated, though, any AUD INJ or TTS potentially incurred here is not expected to adversely impact individual fitness, let alone annual rates of recruitment or survival for the affected species or stocks.

Repeated, sequential exposure to pile driving noise over a long duration could result in more severe impacts to individuals that could affect a population (via sustained or repeated disruption of important behaviors such as feeding, resting, traveling, and socializing; Southall *et al.,* 2007). Alternatively, marine mammals exposed to repetitious construction sounds may become habituated, desensitized, or tolerant after initial exposure to these sounds (reviewed by Richardson *et al.,* 1995; Southall *et al.,* 2007). However, given the relatively low abundance and generally transitory nature of marine mammals in the Columbia River near the project location compared to the stock sizes (table 19), population-level impacts are not anticipated. The absence of any pinniped haulouts or other known home-ranges in the action area further decreases the likelihood of population-level impacts.

The IBR project is also not expected to have significant adverse effects on any marine mammal habitats. The long-term impact on marine mammals associated with IBR project would be a small permanent decrease in low-quality potential habitat because of the expanded footprint of the bridges. Installation and removal of in-water piles would be temporary and intermittent, and the increased footprint of the facilities would destroy only a small amount of low-quality habitat, which currently experiences high levels of anthropogenic activity. Impacts to the immediate substrate are anticipated, but these would be limited to minor, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time but which would not be expected to have any effects on individual marine mammals. Further, there are no known biologically important areas (BIAs) near the IBR project zone that will be impacted by the IBRP's proposed activities.

Impacts to marine mammal prey species are also expected to be minor and temporary and to have, at most, short-term effects on foraging of individual marine mammals and likely no effect on the populations of marine mammals as a whole. Overall, the area impacted by the IBR project is very small compared to the available surrounding habitat and does not include habitat of particular importance. The river serves as spawning habitat for anadromous salmonids, but there are no documented spawning sites in the vicinity of the I–5 bridges. The most likely impact to prey would be temporary behavioral avoidance of the immediate area. During construction activities, it is expected that some fish and marine mammals would temporarily leave the area of disturbance, thus impacting marine mammals' foraging opportunities in a limited portion of their foraging range. But, because of the relatively small area of the habitat that may be affected and lack of any habitat of particular importance, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary and as described above, the following factors primarily support our preliminary negligible impact determinations for the affected stocks of California sea lions, Steller sea lions, and harbor seals:

- No takes by mortality or serious injury are anticipated or authorized;
- Any acoustic impacts to marine mammal habitat from pile driving are expected to be temporary and minimal;
- Take will not occur in places and/or times where take would be more likely to accrue to impacts on reproduction or survival, such as within habitats critical to recruitment or survival (*e.g.,* rookery);
- The IBR project area represents a very small portion of the available foraging area for all potentially impacted marine mammal species and does not contain any habitat of particular importance;
- Take will only occur within the Columbia River and North Portland Harbor, which is a limited, confined area of any given stock's home range;
- Monitoring reports from similar work have documented little to no observable effect on individuals of the same species impacted by the specified activities;
- The required mitigation measures (*i.e.,* soft starts, pre-clearance monitoring, shutdown zones, bubble curtains) are expected to be effective in reducing the effects of the specified activity by minimizing the numbers of marine mammals exposed to injurious levels of sound and by ensuring that any take by Level A harassment is, at most, a small degree of AUD INJ and of a lower degree that would not impact the fitness of any animals; and
- The intensity of anticipated takes by Level B harassment is low for all stocks consisting of, at worst, temporary modifications in behavior, and would not be of a duration or intensity expected to result in impacts on reproduction or survival.

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 section 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 maximum number of individuals taken in any year 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 maximum annual 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 stocks, the number of takes proposed for authorization is less than one-third of the best available population abundance estimate (*i.e.,* approximately 17.3 percent for harbor seals; approximately 10.7 percent for Steller sea lions; and approximately 1.5 percent for California sea lions; see table 17). The maximum annual number of animals that may be authorized to be taken from these stocks would be considered small relative to the relevant stock's abundances even if each estimated take occurred to a new individual. Due to the inability to discriminate between pinniped species in the most recent available survey data from ODOT, the number of takes proposed for authorization likely represents smaller numbers of all three species. For all species, PSOs will count individuals as separate unless they can be individually identified.

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 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.

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 Promulgation

As a result of these preliminary determinations, NMFS proposes to promulgate regulations that allow for the authorization of take, by Level A harassment and Level B harassment, incidental to construction activities associated with the IBR project for a 5-year period from September 15, 2027, through September 14, 2032, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Request for Information

NMFS requests interested persons to submit comments, information, and suggestions concerning the IBRP's request and the proposed regulations (see **ADDRESSES**). All comments will be reviewed and evaluated as we prepare a final rule and make final determinations on whether to issue the requested authorization. This proposed rule and referenced documents provide all environmental information relating to our proposed action for public review.

Classification

The Office of Management and Budget has determined that this proposed rule is not significant for purposes of Executive Order 12866. This proposed rule is not an Executive Order 14192 regulatory action because this proposed rule is not significant under Executive Order 12866.

Pursuant to section 605(b) of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. The IBRP is a bi-state governmental program focused on improving the transit corridor between Washington and Oregon. The IBRP is the sole entity that would be subject to the requirements in the proposed rule, and the IBRP is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA, because it is a department of the two state governments. Because of this certification, a regulatory flexibility analysis is not required and none has been prepared.

This proposed rule contains a collection-of-information requirement subject to the provisions of the Paperwork Reduction Act (PRA). Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid Office of Management and Budget (OMB) control number. These requirements have been approved by OMB under control number 0648–0151 and include applications for regulations, subsequent LOAs, and reports.

List of Subjects

Acoustics, Administrative practice and procedure, Construction, Marine mammals, Mitigation and monitoring requirements, Reporting requirements, Wildlife.

Dated: August 14, 2025.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, NMFS proposes to revise 50 CFR part 217 as follows:

PART 217—REGULATIONS GOVERNING THE TAKE OF MARINE MAMMALS INCIDENTAL TO SPECIFIED ACTIVITIES

■ 1. The authority citation for part 217 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.,* unless otherwise noted.

■ 2. Add Subpart O, consisting of §§ 217.141 through 217.149, to read as follows:

Subpart O—Taking Marine Mammals Incidental to the Interstate Bridge Replacement Project on Interstate 5 Between Portland, Oregon and Vancouver, WA

Sec.

Subpart O—Taking Marine Mammals Incidental to the Interstate Bridge Replacement Project on Interstate 5 Between Portland, Oregon and Vancouver, WA

§ 217.141 Specified activity and specified geographical region.

(a) The incidental taking of marine mammals by the Interstate Bridge Replacement Program (IBRP) may be authorized in a letter of authorization (LOA) only if it occurs at or around the Interstate 5 bridges over the Columbia River and North Portland Harbor between Portland, OR and Vancouver, WA incidental to the specified activities outlined in paragraph (b) of this section. Requirements imposed on the IBRP in this subpart must be implemented by those persons it authorizes or funds to conduct activities on its behalf.

(b) The specified activities are construction and demolition activities associated with the Interstate Bridge Replacement Project between Portland, OR and Vancouver, WA.

§ 217.142 Effective dates.

Regulations in this subpart are effective from September 15, 2027, until September 14, 2032.

§ 217.143 Permissible methods of taking.

Under a LOA issued pursuant to §§ 216.106 of this chapter and this subpart, the IBRP and those persons it authorizes or funds to conduct activities on its behalf may incidentally, but not intentionally, take marine mammals within the specified geographical region by harassment associated with the specified activities provided they are in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOA.

§ 217.144 Prohibitions.

(a) Except for the takings permitted in § 217.143 and authorized by a LOA issued under §§ 216.106 of this chapter and this subpart, it is unlawful for any person to do any of the following in connection with the specified activities:

(1) Violate or fail to comply with the terms, conditions, and requirements of this subpart or a LOA issued under this subpart;

(2) Take any marine mammal not specified in such LOA;

(3) Take any marine mammal specified in such LOA in any manner other than as specified;

(4) Take a marine mammal specified in such LOA after NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(5) Take a marine mammal specified in such LOA after NMFS determines such taking results in an unmitigable adverse impact on the species or stock of such marine mammal for taking for subsistence uses.

(b) [Reserved]

§ 217.145 Mitigation requirements.

(a) When conducting the specified activities identified in § 217.141(b), IBRP must implement the mitigation measures contained in this section and any LOA issued under §§ 216.106 of this chapter and this subpart. These mitigation measures include, but are not limited to:

(1) A copy of any issued LOA must be in the possession of the IBRP, its designees, and work crew personnel operating under the authority of the issued LOA;

(2) The IBRP must ensure that construction supervisors and crews, the monitoring team and relevant IBRP staff are trained prior to the start of all pile driving so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work; and

(3) The IBRP, construction supervisors and crews, Protected Species Observers (PSOs), and relevant IBRP 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;

(4) The IBRP must employ PSOs and establish monitoring locations pursuant to § 217.146 and as described in a NMFS-approved Marine Mammal Monitoring and Mitigation Plan;

(i) For all pile driving activities, land-based PSOs must be stationed at the best vantage points practicable to monitor for marine mammals and implement shutdown/delay procedures. A minimum of two locations must be used to monitor the harassment zones specified in any LOA issued under §§ 216.106 of this chapter and this subpart to the maximum extent possible based on positioning and daily visibility conditions. PSOs must be able to implement shutdown or delay procedures when applicable through communication with the equipment operator;

(ii) If during pile driving activities, PSOs can no longer effectively monitor the entirety of the shutdown zone (see § 217.146 (a) (6), below) due to environmental conditions (*e.g.,* fog, rain, wind), pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until conditions improve such that the shutdown zone can be effectively monitored. If the shutdown zone cannot be monitored for more than 15 minutes, the entire zone must be cleared again for 30 minutes prior to reinitiating pile driving;

(5) Pre-start clearance monitoring must take place from 30 minutes prior to initiation of pile driving activity (*i.e.,* pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity;

(i) 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;

(ii) Pile driving may only commence if, following 30 minutes of observation, it is determined by the lead PSO that the shutdown zones are clear of marine mammals;

(6) For all pile driving activity, the IBRP must implement shutdown zones with radial distances as identified in a LOA issued under §§ 216.106 of this chapter and this subpart;

(i) If a marine mammal is observed entering or within the shutdown zone, all pile driving activities, including soft starts, at that location must be halted. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and has been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal;

(ii) In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animal behavior must be monitored and documented;

(iii) If work ceases for more than 30 minutes, the shutdown zones must be cleared again for 30 minutes prior to reinitiating pile driving. A determination that the shutdown zone is clear must be made by the lead PSO during a period of good visibility;

(v) For in-water construction activities other than pile driving (*e.g.,* drilling; barge positioning; use of barge-mounted excavators; dredging), if a marine mammal comes within 10 m, IBRP must cease operations and reduce vessel speed to the minimum level required to maintain steerage and safe working conditions.

(7) The IBRP must use soft start techniques when impact pile driving. Soft start requires the IBRP to conduct three sets of strikes (three strikes per set) at reduced hammer energy with a 30-second waiting period between each set. A 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;

(8) The IBRP must use bubble curtains for impact pile driving in waters deeper than 0.67 m, except when necessary for testing of bubble curtain effectiveness during hydroacoustic monitoring. The bubble curtain must be operated to achieve optimal performance. At a minimum, the bubble curtain must comply with the following:

(i) The bubble curtain must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column;

(ii) The lowest bubble ring must be in contact with the mudline and/or rock bottom for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent mudline and/or rock bottom contact. No parts of the ring or other objects shall prevent full mudline and/or rock bottom contact;

(iii) Air flow to the bubblers must be balanced around the circumference of the pile;

(9) Pile driving activity must be halted upon observation of a species entering or within the harassment zone for either 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;

(b) [Reserved]

§ 217.146 Requirements for monitoring and reporting.

(a) The IBRP must submit a marine mammal monitoring plan to NMFS for approval at least 90 days before the start of construction and abide by the plan, if approved.

(b) The IBRP must submit a hydroacoustic monitoring plan to NMFS for approval at least 60 days before the start of impact pile driving, and abide by the plan, if approved.

(c) Monitoring must be conducted by qualified, NMFS-approved PSOs, in accordance with the following conditions:

(1) PSOs must be independent of the activity contractor (*e.g.,* employed by a subcontractor) and have no other assigned tasks during monitoring duties;

(2) PSOs must be approved by NMFS prior to beginning work on the specified activities;

(3) PSOs must be trained in marine mammal identification and behavior;

(i) A designated project lead PSO must be on site when more than two PSOs are on duty. The project lead PSO must have prior experience performing the duties of a PSO during in-water construction activities pursuant to a NMFS-issued ITA or letter of concurrence;

(ii) Other PSOs may substitute other relevant experience, education (degree in biological science or related field), or training for prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization;

(d) The IBRP must submit a draft annual summary monitoring report on all marine mammal monitoring conducted during each construction season which includes final electronic data sheets in a searchable format within 90 calendar days after the completion of each construction season or 60 days prior to a requested date of issuance of any future incidental take authorization for projects at the same location, whichever comes first. A draft comprehensive 5-year summary report must also be submitted to NMFS within 90 days of the end of year 5 of the project. The reports must detail the monitoring protocol and summarize the data recorded during monitoring. If no comments are received from NMFS within 30 days of receipt of the draft report, the report may be considered final. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt. At a minimum, the reports must contain:

(1) Dates and times (begin and end) of all marine mammal monitoring;

(2) Construction activities occurring during each daily observation period, including how many and what type of piles were driven or removed, by what method (*i.e.,* impact or vibratory), the total duration of driving time for each pile (vibratory driving), and number of strikes for each pile (impact driving);

(3) Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), 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 (if less than the harassment zone distance);

(4) Upon observation of a marine mammal, the following information must be collected:

(i) Name of the PSO who sighted the animal, observer location, and activity at time of sighting;

(ii) Time of sighting;

(iii) Identification of the animal (*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;

(iv) Distances and bearings of each marine mammal observed in relation to the pile being driven for each sighting (if pile driving was occurring at time of sighting);

(v) Estimated number of animals (min/max/best);

(vi) Estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*);

(vii) Animal's closest point of approach and estimated time spent within the harassment zone;

(viii) Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

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

(x) All PSO data in an electronic format that can be queried such as a spreadsheet or database (*i.e.,* digital images of data sheets are not sufficient).

(e) Acoustic monitoring report(s) must be submitted on the same schedule as visual monitoring reports (*i.e.,* within 90 days following the completion of construction). The acoustic monitoring report must contain the informational elements described in the acoustic monitoring plan and, at minimum, must include:

(i) Hydrophone equipment and methods: (1) recording device, sampling rate, calibration details, distance (m) from the pile where recordings were made; and (2) the depth of water and recording device(s);

(ii) Location, identifier, orientation (*e.g.,* vertical, battered), material, and geometry (shape, diameter, thickness, length) of pile being driven, substrate type, method of driving during recordings (*e.g.,* hammer model and energy), and total pile driving duration;

(iii) Whether a sound attenuation device is used and, if so, a detailed description of the device used, its distance from the pile and hydrophone, and the duration of its use per pile;

(iv) For impact pile driving: (1) number of strikes per day and per pile and strike rate; (2) depth of substrate to penetrate; (3) decidecade (one-third octave) band spectra in tabular and figure formats computed on a per-pulse basis, including the arithmetic mean or median for all computed spectra; (4) pulse duration and median, mean, maximum, minimum, and number of samples (where relevant) of the following sound level metrics: RMS SPL; SEL_{24}; peak (PK) SPL; and SEL_{ss}; and

(v) For any monitored vibratory pile driving: (1) duration of driving for each pile; (2) depth of substrate to penetrate; (3) decidecade (one-third octave) band spectra in tabular and figure formats, including the arithmetic mean or median for all computed spectra; (4) duration and median, mean, maximum, minimum, and number of samples (where relevant) of the following level metrics: RMS SPL; SEL_{24}; peak (PK) SPL; and $SEL_{ss.}$

(f) In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the IBRP must report the incident to NMFS Office of Protected Resources (OPR) and to the West Coast Regional Stranding Coordinator no later than 24 hours after the initial observation. If the death or injury was caused by the specified activity, the IBRP must immediately cease the specified activities described in § 217.141(b) until NMFS OPR is able to review the circumstances of the incident. The IBRP 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.

§ 217.147 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations, the IBRP must apply for and obtain an LOA.

(b) An LOA, unless suspended or revoked, may be effective for a period of time not to exceed the effective dates of this subpart.

(c) If an LOA expires prior to the end of the effective dates of this subpart, the IBRP may apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation and monitoring measures required by an LOA, the IBRP must apply for and obtain a modification of the LOA as described in § 217.148.

(e) The LOA must set forth the following information:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(f) Issuance of the LOA must be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under this subpart.

(g) Notice of issuance or denial of an LOA must be published in the **Federal Register** within 30 days of a determination.

§ 217.148 Modifications of Letters of Authorization.

(a) A LOA issued under §§ 216.106 of this chapter and 217.147 for the specified activities may be modified upon request by the IBRP, provided that:

(1) The specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for this subpart; and

(2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA were implemented.

(b) For LOA modification by the IBRP that includes changes to the specified activity or the mitigation, monitoring, or reporting measures that do not change the findings made for the regulations in this subpart or result in no more than a minor change in the total estimated number of takes (or distribution by species or years), NMFS may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis of the change and solicit public comment before issuing the LOA.

(c) A LOA issued under §§ 216.106 of this chapter and 217.147 for the specified activity may be modified by

NMFS under the following circumstances:

(1) NMFS may modify the existing mitigation, monitoring, or reporting measures, after consulting with the IBRP regarding the practicability of the modifications, if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring measures;

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include, but are not limited to:

(A) Results from the IBRP's monitoring;

(B) Results from other marine mammal and/or sound research or studies; and

(C) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by this subpart or subsequent LOAs; and

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS shall publish a notice of proposed LOA in the **Federal Register** and solicit public comment;

(2) If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in a LOA issued pursuant to §§ 216.106 of this chapter and 217.147, a LOA may be modified without prior notice or opportunity for public comment. Notification will be published in the **Federal Register** within 30 days of the action.

§ 217.149 [Reserved]

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