BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XF882

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Astoria Waterfront Bridge Replacement Project

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

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from the City of Astoria for authorization to take marine mammals incidental to pile driving and construction work during the Waterfront Bridge Replacement Project in Astoria, Oregon. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities.

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

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

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received

electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Amy Fowler, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

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

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

on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

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

The MMPA states that the term "take" means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal. Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (i.e., the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in CE B4 of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this

categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On October 17, 2017, NMFS received a request from the City of Astoria (City) for an IHA to take marine mammals incidental to replacement of bridges in downtown Astoria along the Columbia River. The application was considered adequate and complete on January 17, 2018. The City's request is for take of California sea lions (*Zalophus californianus*), Steller sea lions (*Eumetopias jubatus*), and harbor seals (*Phoca vitulina richardii*) by Level B harassment only. Neither the City nor NMFS expect mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

The City is seeking an IHA for the first year of a two-year project to remove and replace piles supporting six waterfront bridges in Astoria, Oregon. Phase I of the project, which would occur under this IHA, involves the removal and replacement of three bridges connecting 7^{th}, 9^{th}, and 11^{th} Streets to waterfront piers. The bridges are currently supported by decayed timber piles and concrete footings that will be removed and replaced with steel piles. Roadway construction, timber pile removal, and steel pile driving are expected to result in Level B auditory harassment of California sea lions, harbor seals, and Steller sea lions.

The proposed project would occur along the Lower Columbia River. The action area is not expected to exceed 1,600 meters (m) beyond each bridge site. Construction for Phase I of the

project, removing and replacing the 7th, 9th, and 11th Street bridge crossings, is expected to occur between October 2018 and April 2019.

Dates and Duration

Project work is expected to begin in October 2018 with roadway and rail superstructure removal. Timber pile removal and steel pile installation will occur within the Oregon Department of Fish and Wildlife (ODFW) prescribed in-water work period (IWWP) for the Lower Columbia River (November 1 through February 28). Timber pile and concrete foundation removal will be initiated at the onset of the IWWP. These activities will likely occur over the entire IWWP, or 80 work days. Vibratory timber pile removal is expected to take approximately 26 days and impact hammer pile installation will take approximately 42 days. The remaining 12 days in the IWWP will be used to remove all concrete footings and a concrete retaining wall. The contractor will likely remove existing structures concurrent with construction of new foundations. Pile removal and installation will occur over an eight hour period each day.

Additional above-water construction may be completed between March 2019 and August 2019. Rail superstructure construction is expected to occur over 13 work days between March 1 and April 11. Construction of approach superstructure and roadway improvements will be conducted between April and August 2019. An offsite storm water facility will be constructed during the summer of 2019.

Specific Geographic Region

The project site is located in the Baker Bay-Columbia River subwatershed. This section of the Columbia River represents the most saline portion of the river's estuarine environment. Tidal influence extends 146 miles upriver to the Bonneville Dam. The Columbia River is over nine miles wide in the area around Astoria and contains multiple islands, buoys, and sandbars

that marine mammals utilize to haul out. The upland portions of the region of activity have been highly altered by human activities, with substantial shoreline development and remnants of historical development. This includes thousands of timber piles, overwater buildings, a railroad trestle, and vehicular bridges. The downtown Astoria waterfront is a busy area for pedestrians, vehicles, and boats. In addition to onshore development, the Lower Columbia River is utilized by various types of vessels, including cargo ships, dredging vessels, fishing vessels, trawlers, pollution control vessels, and search and rescue vessels, among others.

The remainder of the region of activity is located within the river channel within the intertidal and subtidal zones. The substrate in this area is primarily made up of historical rip rap and other rocks/cobbles. All in-water construction will occur in the intertidal and subtidal zones. Some piles may be removed and installed completely in the dry while others may remain inundated in water over 75 percent of the time. Section 1 of the application describes the tidal conditions of each crossing in detail.

Detailed Description of Specific Activity

Phase I of the project involves the removal and replacement of three bridges connecting 7th, 9th, and 11th Streets to waterfront piers. Each bridge has pedestrian and vehicle access. A railroad trestle runs parallel to the shoreline between the bridges along the waterfront. Demolition of the existing bridge crossings will require the removal of bridge decks and other aboveground components for the rail trestle and roadway approaches. Demolition of the superstructures will likely be accomplished using standard roadway and bridge construction equipment. The existing bridge crossings are primarily founded on a timber substructure. All timber elements supporting the roadway approach and trestle crossing will be removed. Most of the structures are below the Mean High Water (MHW) elevation; the remaining timber elements

are below the Mean Higher-High Water (MHHW) or the Highest Measured Tide (HMT) elevation, with only a few piles being removed landward of the HMT elevation. Each bridge contains 85 timber structures to be removed. Most timber piles are 12 inches (in) diameter but some may be up to 14 in. The contractor will use a vibratory hammer or direct pull to remove the timber piles. In addition to timber structures, each bridge is supported by concrete footings ranging in size from 16 in by 16 in to 12 feet (ft) by 3 ft. Seven concrete structures will be removed from the 7th Street crossing, four from the 9th Street crossing, and eight from the 11th Street crossing (Table 1). A concrete retaining wall at the 9th Street crossing will also be removed to facilitate construction of the new roadway approach. The wall is located below the HMT elevation and is frequently exposed to surface flows. The contractor will use a concrete saw to cut the retaining wall into manageable pieces.

Abutment wingwalls will be constructed at the 9th Street crossing to help contain the roadway approach fill. The wingwalls will be cast-in-place concrete retaining walls. The eastern retaining wall will be located above the HMT and the western wall will be above the MHHW. As a result, the work will be completed in the dry; however, the contractor will install measures when necessary to isolate the work area.

Most of the piles to be installed are within 40 ft of the existing abutments, so the piles will be installed from a crane staged on the south side of the bridges. However, piling at the 9th Street crossing is up to 60 ft from the south abutment. The size and length of the piling as well as the weight of the pile hammer and leads places additional demand on the supporting crane. As a result, the contractor will construct temporary shoring consisting of two bents comprised of five 16-in piles each for a total of ten piles. Both bents will be located within two ft of the MLW elevation. Therefore, all piles are likely to be inundated by water levels greater than 2 ft deep at

least 75 percent of the time during installation and extraction. Construction of the work platform will be initiated following removal of the superstructures, retaining wall, and approach fill at the 9th Street crossing. Due to the soft soils, it is anticipated that each pile installed will advance predominately under its own weight with a limited number of impact hammer strikes prior to reaching the bedrock surface. To finish pile installation, the contractor will be required to use an impact hammer to secure the piles into the bedrock and verify the required bearing resistances. All temporary pilings will be installed and removed during the ODFW prescribed IWWP and will remain in place for only one construction season.

A total of 74 24-in diameter permanent steel piles are expected to be driven for Phase I of this project (21 at the 7th Street crossing, 25 at the 9th Street crossing, and 28 at the 11th Street crossing, Table 1). As with the temporary shoring, it is expected that the permanent piles will advance under their own weight with a limited number of hammer strikes before reaching the bedrock surface.

Table 1. Structures to be Removed and Installed

Structure	Timber Piles to be Removed	Concrete Footings to be Removed	Steel Piles to be Installed
7th Street	85	7	21
9th Street	85	4	25
11th Street	85	8	28
Temporary shoring (9th St. only)	-	-	10

The IWWP prescribed by ODFW includes 80 work days. Construction work is assumed to occur over an eight hour period each day. It is assumed that the contractor will drive the first 40 ft of piling for each pile location (each pile location consists of two 40-foot pile sections) over the first few days of pile driving, then splice on the additional 40 ft of piling at each location over the next few days. After the first 40-ft pile section is driven, a backer bar is tack welded on to the

first pile section, then the second pile section is aligned with a crane, and welded on. Once all of the piles are spliced, the contractor will resume pile driving activities to set each pile to the desired depth. It is estimated that the contractor can install four 40-foot piles a day at an estimated 250 strikes per pile. With a total of 84 piles to be driven (74 permanent and 10 temporary), given the rate of four 40-ft piles per day, impact pile driving will take 42 days with a total of 1000 strikes per day (Table 2). This would leave 38 work days for the removal of existing timber piling and concrete substructures. The contractor will attempt to extract the existing piles via direct pull or vibratory hammer. Vibratory removal of timber piles will take approximately 30 minutes per pile. A total of 255 timber piles are anticipated to be extracted. At an average of 10 piles removed per day, existing timber pile removal is expected to take 26 days (Table 2) which leaves 12 days remaining in the work period to cover the removal of all concrete footings and the 9th Street retaining wall. It is anticipated that the contractor will be removing existing substructure elements concurrent with the construction of the new foundations.

Table 2. Pile Driving Estimates per Day

	Number	**Method**	**Piles per Day**	**Number of Days[1]**	**Number of Strikes per Day**
Timber Piles to be Removed	255	Vibratory Hammer and Direct Pull	10	26	N/A
24" Steel Piles to be Installed	74	Impact Hammer	4	37	1000
16" Steel Piles to be Installed	10	Impact Hammer	4	5	1000

[1]It is assumed that the contractor will drive the first 40 ft of piling on one day, then splice on the additional 40 ft of piling and resume pile driving on another day, totaling two days required to drive all 80 ft of pile, hence double the amount of days than piles.

The construction activities that could potentially result in acoustic and visual disturbance to pinnipeds within the action area include rail and roadway superstructure and concrete

foundation removal activities, temporary work platform construction, piling installation, wingwall construction, and construction of the new rail and roadway superstructures. Most of these activities will require work in water during the IWWP (November 1 through February 28). Sound from pile removal and installation will likely extend out into the river channel where California sea lions, Steller sea lions, and harbor seals may be transiting. Work occurring in-air includes the removal of bridge decks and other aboveground components for the rail trestle crossings and roadway approaches as well as construction of the new rail superstructures and roadway improvements, which occurs directly above the river banks where hauled out California sea lions may be located. California sea lions may be harassed by the presence of construction equipment during above-water construction.

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. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; *https://www.fisheries.noaa.gov/topic/population-assessments/marine-mammals*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find-species*).

Table 3 lists all species with expected potential for occurrence in Astoria and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow

Committee on Taxonomy (2016). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. 2016 SARs (*e.g.*, Caretta *et al.* 2017). All values presented in Table 3 are the most recent available at the time of publication and are available in the 2016 SARs (Caretta *et al.* 2017, Muto *et al.*, 2017).

Table 3. Marine Mammals Potentially Present in the Vicinity of Astoria

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]	Relative Occurrence near Astoria
Order Carnivora – Superfamily Pinnipedia							
Family Otariidae (eared seals and sea lions)							
California sea lion	*Zalophus californianus*	U.S.	-; N	296,750 (N/A, 153,337, 2011)	9,200	389	Likely
Steller sea lion	*Eumetopias jubatus*	Eastern U.S.	-; N	41,638 (N/A, 41,638, 2015)	2,498	108	Likely
Family Phocidae (earless seals)							

Pacific harbor seal	*Phoca vitulina richardii*	Oregon/Washington Coast	-; N	Unknown (0.12, 24,732, 1999)	undet.	10.6	Likely

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

[2]NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks, abundance estimates are actual counts of animals and there is no associated CV.

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

All species that could potentially occur in the proposed survey areas are included in Table 3. As described below, all three species temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it.

California Sea Lion

California sea lions (*Zalophus californianus*) are distributed along the North Pacific waters from central Mexico to southeast Alaska, with breeding areas restricted primarily to island areas off southern California (the Channel Islands), Baja California, and in the Gulf of California (Wright *et al.*, 2010). California sea lions are dark brown with broad fore flippers and a long, narrow snout. There are five genetically distinct geographic populations. The population seen in Oregon is the Pacific Temperate stock, which are commonly seen in Oregon from September through May (ODFW 2015). The approximate growth rate for this species is 5.4 percent annually (Caretta *et al.*, 2004). Threats to this species include incidental catch and entanglement in fishing gear, such as gillnets; biotoxins, as a result of harmful algal blooms; and gunshot wounds and other human-caused injuries, as California sea lions are sometimes viewed as a nuisance by commercial fishermen (NOAA 2016).

Almost all California sea lions in the Pacific Northwest are sub-adult or adult males (NOAA 2008). California sea lions feed in both the Columbia River and adjacent nearshore

marine areas. Their population is lowest in Oregon in the summer months, from May to September, as they migrate south to the Channel Islands in California to breed. California sea lions have been observed near several crossings within the Project site; however, this is not their main haul out. Their main haul out is the East Mooring Basin, which is located over one mile upstream, outside of the Region of Activity. Construction activities are proposed between October and April, which includes the tail end of peak usage of the lower river by California sea lions. Counts of California sea lions are highest in September but taper off until March when the sea lions travel south past Oregon toward their breeding sites (Brown *et al.*, 2015). Recent years have shown an increase in the record numbers of California sea lions at the East Mooring Basin with a 2015 spring record of 2,340 individuals (up from 1,420 in 2014), though in past years, typical spring counts were closer to 100-300 individuals (Profita 2015). Changes in climate, food sources, and a growing population approaching 300,000 are all cited as possible reasons for these increases. Counts of California sea lions at the South Jetty haulout at the mouth of the Columbia River (10 miles downstream of project site) date back to 1995 (ODFW 2007) but more reliable monthly counts from Washington Department of Fish and Wildlife (WDFW) are available from 2000-2014 (WDFW 2014).

Harbor Seal

The Pacific harbor seal (*Phoca vitulina richardii*) is the most widespread and abundant resident pinniped in Oregon. They are generally blue-gray with light and dark speckling; they lack external ear flaps and have short forelimbs. Harbor seals are generally non-migratory and occur on both the U.S. east and west coasts. On the west coast they range from Alaska to Baja California, Mexico (ODFW 2015).

The Oregon/Washington Coast stock abundance was estimated in 1999 to be 24,732. However, the data used to establish that abundance was eight years old at the time and no more recent stock abundance estimates exist (Caretta *et al.*, 2017). The 1999 abundance estimate will be used for the purposes of this analysis. The Oregon/Washington Coast stock of Pacific harbor seals is not listed under the ESA nor are they considered depleted or strategic under the MMPA.

Harbor seals utilize specific shoreline locations on a regular basis as haulouts including beaches, rocks, floats, and buoys. They must rest at haulout locations to regulate body temperature, interact with one another, and sleep (NOAA 2016). Harbor seals are present throughout the year at the mouth of the Columbia River and adjacent nearshore marine areas. Harbor seals are an infrequent visitor at the Astoria Mooring Basin, but they are known to transit through the Region of Activity. Their closest haulout and pupping area is Desdemona Sands which is downstream of the Astoria-Megler Bridge and outside the Region of Activity. Pupping occurs from Mid-April to July, outside of the proposed project work period (Susan Riemer, pers. comm., 2016). Due to their year-round occurrence in the Columbia River, harbor seals are likely to be found transiting the area during in-water construction.

Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) range extends along the Pacific Rim, from northern Japan to central California. For management purposes, Steller sea lions inhabiting U.S. waters have been divided into two DPS: the Western U.S. and the Eastern U.S. The population known to occur within the Lower Columbia River is the Eastern DPS. The Western U.S. stock of Steller sea lions are listed as endangered under the ESA and depleted and strategic under the MMPA. The Eastern U.S. stock (including those living in Oregon) was de-listed in 2013 following a population growth from 18,000 in 1979 to 70,000 in 2010 (an estimated annual

growth of 4.18 percent) (NOAA 2013). The current abundance estimate for the Eastern U.S. stock is 41,638 (Muto *et al.*, 2017). Threats to Steller sea lions include: boat/ship strikes, contaminants/pollutants, habitat degradation, illegal hunting/shooting, offshore oil and gas exploration, and interactions (direct and indirect) with fisheries (NOAA 2016). Critical habitat was designated for Steller sea lions on August 27, 1993 (58 FR 45269), but is not present within the Region of Activity. Critical habitat is associated with specific breeding and haulout sites in Alaska, California, and Oregon (NOAA 2016).

Steller sea lions are present year-round at the mouth of the Columbia River, with the primary haulout point on the top South Jetty (approximately 10 miles downstream of the action area) and they are at their peak in the lower river from September through March. The South Jetty haulout is the only artificial structure Steller sea lions regularly use along the Oregon coast. Steller sea lions feed in both the Columbia River and adjacent nearshore marine areas. Due to their year-round presence and peak of presence during the winter months, Steller sea lions are likely to be transiting the area during in-water construction activities.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The *Estimated Take by Incidental Harassment* section later in this document 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 by Incidental Harassment* section, and the *Proposed Mitigation* section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of

individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

Description of Sound Sources

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds. Amplitude is the height of the sound pressure wave or the 'loudness' of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 microPascal (µPa). One Pascal is the pressure resulting from a force of one Newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 µPa). The received level is the sound level at the listener's position. Note that all underwater sound levels in the document are referenced to a pressure of 1 µPa and all airborne sound levels in this document are referenced to a pressure of 20 µPa.

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Rms is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick 1983). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted

for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. Ambient sound is defined as environmental background sound levels lacking a single source or point (Richardson *et al.*, 1995), and the sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, waves, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.*, vessels, dredging, aircraft, construction). A number of sources contributed to ambient sound, including the following (Richardson *et al.*, 1995):

- Wind and waves: The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kilohertz (kHz) (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore,

with measurements collected at a distance of 8.5 km from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.

- Precipitation: Sound from rain and hail impacting the water surface can become an important component of total noise frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.
- Biological: Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- Anthropogenic: Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.*, 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.*, a passing vessel) is sometimes termed background sound, as opposed to ambient sound. Representative levels of anthropogenic sound are displayed in Table 4.

Table 4. Representative Sound Levels of Anthropogenic Sources

Sound source	Underwater sound level	Reference
Vibratory removal of 12-in timber pile	150 dB rms at 16 m	Laughlin 2011a
Impact driving of 24-in steel pipe pile	184 dB rms at 10 m	WSDOT 2016; Reyff 2007
Concrete saw	93 dB rms at 20 m[1]	Hanan and Associates 2014

[1]Airborne sound only (dB rms re 20 µPa)

The sum of the various natural and anthropogenic sound sources at any given location and time – which comprise "ambient" or "background" sound – depends not only on the source

levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

In-water construction activities associated with the Project include impact pile driving and vibratory pile removal. The sounds produced by these activities fall into one of two general sound types: pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward 1997 in Southall *et al.*, 2007). Please see Southall *et al.*, (2007) for an in-depth discussion of these concepts.

Pulsed sound sources (*e.g.*, impact pile driving) product signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI 1986; Harris 1998; NIOSH 1998; ISO 2003; ANSI 2005) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband or broadband, brief or prolonged, and may be wither continuous or non-continuous (ANSI 1995; NIOSH 1998). Some of these non-pulsed sounds can be transient signals of short duration without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems (such as those used by the U.S. Navy). The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak 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.*, 2005).

Marine Mammal Hearing

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

techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The functional groups and the associated frequencies are indicated below in Table 5 (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group).

Table 5. Marine Mammal Hearing Groups and their Generalized Hearing Range

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* and *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

***** Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.*, 2007) and PW pinniped (approximation).

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended

frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016) for a review of available information. As mentioned previously in this document, three marine mammal species (zero cetacean and three pinniped (two otariid and one phocid) species) have the reasonable potential to co-occur with the proposed activities (Table 3). Harbor seals are classified as members of the phocid pinnipeds in water functional hearing group, while Steller and California sea lions are grouped under the otariid pinnipeds in water functional hearing group. A species' functional hearing group is a consideration when we analyze the effects of exposure to sound on marine mammals.

Acoustic Impacts

Please refer to the information given previously (*Description of Sound Sources*) regarding sound, characteristics of sound types, and metrics used in this document. 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. The potential effects of underwater sound form active acoustic sources 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.*, 2004; Nowacek *et al.*, 2007; Southall *et al.*, 2007; Gotz *et al.*, 2009). The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and

the animal; and the sound propagation properties of the environment. Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (*e.g.*, sand) would absorb or attenuate the sound more readily than hard substrates (*e.g.*, rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

In the absence of mitigation, impacts to marine species would be expected to result from physiological and behavioral responses to both the type and strength of the acoustic signature (Viada *et al.*, 2008). The type and severity of behavioral impacts are more difficult to define due to limited studies addressing the behavioral effects of impulse sounds on marine mammals. Potential effects from impulse 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).

Hearing Impairment and Other Physical Effects—Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak *et al.*, 1999; Schlundt *et al.*, 2000; Finneran *et al.*, 2002, 2005). TS can be permanent (PTS) in which case the loss of hearing sensitivity is not recoverable, or temporary (TTS), in which the animal's hearing

threshold would recover over time (Southall *et al.*, 2007). Marine mammals depend on acoustic cues for vital biological functions (*e.g.*, orientation, communication, foraging, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs. TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Repeated sound exposure that leads to TTS could cause PTS. PTS constitutes injury, but TTS does not (Southall *et al.*, 2007). The following subsections discuss in somewhat more detail the possibilities of TTS, PTS, and non-auditory physical effects.

Temporary Threshold Shift—TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data on sound levels necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall *et al.* (2007).

Permanent Threshold Shift—When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter 1985). There is no specific evidence that exposure to pulses of sound can call PTS in any marine mammal. However, given the possibility that mammals close to a sound source might incur TTS, there has

been further speculation about the possibility that some individuals might incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage but repeated (or in some cases) single exposures to a level well above that causing TTS onset might elicit PTS.

Relationships between TTS and PTS thresholds have not been studied in marine mammals—PTS data exists only for a single harbor seal (Kastak *et al.*, 2008)—but are assumed to be similar to those in humans and other terrestrial mammals. PTS might occur at a received sound level at least several decibels above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise time. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as pile driving pulses received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level threshold are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.*, 2007). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur. The City will enforce a Level A exclusion zone to prevent PTS for all activities (see Proposed Mitigation section below).

Non-auditory Physiological Effects—Non-auditory physiological effects or injuries that might theoretically occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.*, 2006; Southall *et al.*, 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that

extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.*, 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. However, the proposed activities do not involve the use of devices such as explosives or mid-frequency active sonar that are associated with these types of effects. Therefore, non-auditory physiological impacts to marine mammals are considered unlikely.

Disturbance Reactions

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Behavioral responses to sound are highly variable and context-specific and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors (Richardson *et al.*, 1995; Wartzok *et al.*, 2003; Southall *et al.*, 2007).

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.*, 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. 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. Behavioral state may affect the type of response as well. 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; NRC 2003; Wartzok *et al.*, 2003).

Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgeway *et al.*, 1997; Finneran *et al.*,

2003). Responses to continuous sound, such as vibratory pile installation, have not been documented as well as responses to pulsed sounds.

With vibratory pile driving (and removal, as in this project), it is likely that the onset of pile driving could result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al.*, 1995): changing durations of surfacing and dives; moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior; avoidance of areas where sound sources are located; and/or flight responses (*e.g.*, pinnipeds flushing into the water from haul-outs or rookeries). Pinnipeds may also increase their haul-out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. Significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction include:

- Drastic changes in diving/surfacing patterns;
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

The onset of behavioral disturbances from anthropogenic sound depends on both external factors (characteristics of sound sources and their paths) and the specific characteristics of the receiving animals (hearing, motivation, experience, demography) and is difficult to predict (Southall *et al.*, 2007).

Auditory Masking

Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals which utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. If the coincident (masking) sound were man-made, it could potentially be harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs only 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.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Because sound generated from in-water vibratory pile driving is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds by odontocetes, which may hunt harbor seals. However, lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. It may also affect communication signals when they occur near the sound band and thus reduce the communication

space of animals (*e.g.*, Clark *et al.*, 2009) and cause increased stress levels (*e.g.*, Foote *et al.*, 2004; Holt *et al.*, 2009).

Masking affects both senders and receivers of acoustic signals and can potentially have long-term chronic effects on marine mammals at the population level as well as the individual level. Low-frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, with most of the increase from distant commercial shipping (Hildebrand 2009). All anthropogenic sound sources, but especially chronic and lower-frequency signals (*e.g.*, from vessel traffic), contribute to elevated ambient sound levels, thus intensifying masking.

Vibratory pile removal is relatively short-term, with rapid oscillations occurring for approximately 30 minutes per pile. It is possible that the vibratory pile removal resulting from this proposed action may mask acoustic signals important to the behavior and survival of marine mammal species, but the short-term duration and limited affected area would result in insignificant impacts from masking. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for vibratory pile driving, and which have already been taken into account in the exposure analysis.

Acoustic Effects, Airborne—Marine mammals, specifically California sea lions, that occur in the project area could be exposed to airborne sounds associated with pile driving and other construction activities (e.g., concrete removal) that have the potential to cause harassment, depending on their distance from pile driving activities. Airborne construction sounds may be an issue for pinnipeds either hauled-out or looking with heads above water in the project area. Most likely, airborne sound would cause behavioral responses similar to those discussed above in

relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon their habitat and move further from the source. Studies by Blackwell *et al.* (2002) and Moulton *et al.* (2005) indicate a tolerance or lack of response to unweighted airborne sounds as high as 112 dB peak and 96 dB rms.

Visual Disturbance—While three species of pinnipeds occur in the project area, only California sea lions are known to haul out in the vicinity of the bridges. California sea lions hauled out on the riverbanks below the bridge crossings and rail trestle may be visually disturbed by the increased presence of humans and construction equipment. Much of the work will occur above the riverbanks but some work will occur on the shore (*e.g.*, concrete footing removal) in the vicinity of California sea lions. Sea lions may flush from their haul out site if construction equipment (*e.g.*, excavator, crane, concrete saw) or personnel are present. General construction work associated with the demolition and installation of roadway and railway superstructures has the potential to visually disturb California sea lions.

Anticipated Effects on Habitat

The primary potential effects to marine mammal habitat are associated with elevated sound levels produced by construction activities (e.g., pile driving, concrete removal) in the area. However, other potential impacts to the surrounding habitat from physical disturbance are also possible.

Potential Pile Driving Effects on Prey—Construction activities would produce continuous (*i.e.*, vibratory pile driving) and impulsive (*i.e.*, impact pile driving) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution.

Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies in support of large, multiyear bridge construction projects (*e.g.*, Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Sound pulses at received levels of 160 dB may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson *et al.*, 1992; Skalski *et al.*, 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality. The most likely impact to fish from pile driving activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe for the project.

Effects to Foraging Habitat—Pile installation and removal may temporarily increase turbidity resulting from suspended sediments. Any increases would be temporary, localized, and minimal. The City of Astoria must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area. In general, turbidity associated with pile installation is localized to about a 25-ft (7.62 m) radius around the pile (Everitt *et al.*, 1980). Natural tidal currents and flow patterns in the Columbia River routinely disturb sediments. High volume tidal events can result in hydraulic forces that re-suspend benthic sediments, temporarily elevating turbidity locally. Any temporary increase as a result of the proposed action is not anticipated to measurably exceed levels caused by these normal, natural periods.

In summary, given the short daily duration of sound associated with individual pile driving and removal events and the relatively small areas being affected, the proposed activities are not likely to have a permanent adverse effect on any fish habitat, or populations of fish species. Thus, any impacts to marine mammal habitat are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

Estimated Take

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

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment only, for individual marine mammals resulting from exposure to pile driving and construction activities. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (i.e., shutdown– discussed in detail below in Proposed Mitigation section), Level A harassment is neither anticipated nor proposed to be authorized.

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

Described in the most basic way, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area or volume of water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the proposed take estimate.

Acoustic Thresholds

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

Level B Harassment for non-explosive sources—Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (e.g., frequency, predictability, duty cycle), the environment (e.g., bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison et al., 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above

received levels of 120 dB re 1 µPa (rms) for continuous (e.g. vibratory pile-driving, drilling) and above 160 dB re 1 µPa (rms) for non-explosive impulsive (e.g., seismic airguns) or intermittent (e.g., scientific sonar) sources. For in-air sounds, NMFS predicts that pinnipeds exposed above received levels of 100 dB re 20 µPa (rms) will be behaviorally harassed.

The City's proposed activities include the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 µPa (rms) are applicable.

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

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in Table 6 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/resource/document/underwater-acoustic-thresholds-onset-permanent-and-temporary-threshold-shifts*.

Table 6. Thresholds Identifying the Onset of Permanent Threshold Shift

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

Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

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

Note: Peak sound pressure (Lpk) has a reference value of 1 µPa, and cumulative sound exposure level (LE) has a reference value of 1 µPa2s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

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

Level B Harassment

In-Air Disturbance during General Construction Activities—Level B behavioral disturbance may occur incidental to the use of construction equipment during general construction that is proposed in the dry, above water, or inland within close proximity to the river banks. These construction activities are associated with the removal and construction of the rail superstructures, and the removal of the existing concrete foundations and the 9th Street retaining wall. Possible equipment includes an excavator, crane, dump truck, and chain saw. It is estimated that the sound levels during these activities will range from 78 to 93 dB RMS at 20 m from the sound source, with the loudest airborne noise produced by the use of a concrete saw (Hanan & Associates, 2014). These noise levels are based on acoustic data collected during the City of San Diego Lifeguard Station Demolition and Construction Monitoring project. Using the Spherical

Spreading Loss Model (20logR), a maximum sound source level of 93 dB RMS at 20 m, sound levels in-air would attenuate below the 90dB RMS Level B harassment threshold for harbor seals at 28 m, and below the 100 dB RMS threshold for all other pinnipeds at 9 m. Harbor seals are only present in the main river channel and are not expected to occur within 28 m of the activity and are therefore not expected to be harassed by in-air sound. Additionally, the city is proposing a 10 m shutdown zone for all general construction work to prevent injury from physical interaction with equipment. The City would therefore shut down equipment before hauled out sea lions could be acoustically harassed by the sound produced. No Level B harassment is expected to occur due to increased sounds from railway and roadway construction. However, sea lions may be disturbed by the presence of construction equipment and increased human presence during above-water construction.

Although some piles may potentially be driven or removed in the dry due to tidal conditions, the City is assuming all pile driving and removal will occur in water. The Level B zone of influence for in-water pile driving and removal is greater than the airborne zone of influence so no airborne harassment is requested from pile driving or removal. All harassment due to pile driving and removal is assumed to be in-water.

In-Water Disturbance during Vibratory Pile Removal—Level B behavioral disturbance may occur incidental to the use of a vibratory hammer due to propagation of underwater noise during the removal of the existing timber substructures. An estimated 255 timber piles will need to be removed to facilitate construction of the three new crossings. It is anticipated that the contractor will need to utilize a vibratory hammer during extraction. Removal via vibratory hammer will result in the greatest amount of underwater noise during construction and will be the farthest reaching extent of aquatic impacts during pile removal activities. We note that some

pile removal will occur in the dry (depending on tidal stage); however, we are conservatively assuming all work would occur in-water since it is not feasible to determine how many piles would be removed in the dry. When piles are removed at lower tidal stages, we do not anticipate sound to propagate as far or, in the case of no water, at all.

Washington State Department of Transportation (WSDOT) monitored underwater noise during the removal of three 12-in timber dolphin piles at Port Townsend (Laughlin, 2011a). Most of the timber piles to be removed in this project are 12-in but some may be up to 14-in. Average noise levels during vibratory removal of the wood piles were measured at 150 dB RMS at 16 m from the source. The Practical Spreading Loss Model (15logR) was used to calculate the in-water Level B Zone of Influence (ZOI) during vibratory pile removal. Using a measurement of 150dB at 16 m, a 1,600 m Level B ZOI (120 dB RMS threshold) is expected for vibratory pile removal activities. Based on the contours of the shoreline and 1,600 m ZOI, a total of 4.5 square kilometers (km^2) is expected to be ensonified due to vibratory pile removal (see Figure 10 in application) (Table 7).

In-Water Disturbance during Impact Pile Driving—Level B behavioral disturbance may occur incidental to the use of an impact hammer due to the propagation of underwater noise during the installation of permanent and temporary steel piles. The City proposes to install a total of 74 24-in and 10 16-in steel piles. The City used the sound source levels from 24-in piles only to estimate the ZOI due to pile driving as the sound source levels from 24-in piles are greater than those of 16-in piles. The City will use the ZOI created by installation of 24-in piles during the installation of 16-in piles to be conservative.

Based on the most recent WSDOT data, the unmitigated sound pressure level associated with impact pile driving 24-in steel piles is 194 dB RMS at 10 m (WSDOT, 2016). The

contractor will be required to use a bubble curtain device during impact pile driving in compliance with the Federal Aid Highway Program (FAHP) Programmatic Biological Opinion which will be utilized for ESA coverage for listed salmonids. Use of a bubble curtain device was assumed to decrease initial sound levels by 10 dB (Reyff 2007), resulting in an initial SPL of 184 dB RMS at 10 m from the source. Using the values from WSDOT in the Practical Spreading Loss Model (15logR), the distance to the 160 dB behavioral disturbance threshold is calculated to be 398 m from the pile when a noise attenuation device is used (Table 7) as opposed to 1,848 m when a device is not used. The use of a noise attenuation device would shrink the distance at which noise exceeds the thresholds by approximately 80 percent, resulting in a significantly smaller area of potential impact. With a 398 m ZOI, a total of 0.40 km^2 is expected to be ensonified by impact pile driving (Figure 11 in application).

Table 7. Inputs and Resulting Distances to Level B harassment Isopleths

Activity	SL (distance measured)[1]	Threshold Level	Propagation Loss Coefficient	Level B isopleth (m)	Level B area (km^2)
Vibratory pile driving/removal	150 dB (16 m)	120 dB re 1 µPa	15	1,600	4.5
Impact pile driving (24-in piles)	184 dB (10 m)	160 dB re 1 µPa	15	398	0.4
General Construction (in-air)	93 dB (20 m)	100 dB re 20 µPa	20	9 m	n/a

Level A Harassment

When NMFS Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or

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

Table 8. PTS Isopleth Data for Vibratory Pile Removal

Source Level (RMS SPL)	150
Activity Duration (hours) within 24-hr period	8
Activity Duration (seconds)	28,800
10 Log (Duration)	44.59
Propagation (xLogR)	15
Distance of source level measurement (m)	16

Table 9. Resulting PTS Isopleths for Vibratory Pile Driving

	Phocid Pinnipeds	**Otariid Pinnipeds**
SEL_{cum} Threshold	210	219
PTS Isopleth to Threshold (meters)	4.9	0.3

Table 10. PTS Isopleth Data for Impact Pile Driving

Source Level (Single Strike/shot SEL)	168
a) Number of strikes in 1 h OR b) Number of strikes per pile	250
a) Activity Duration (h) within 24-h period OR b) Number of piles per day	4

Propagation (xLogR)	15
Distance of single strike SEL measurement (meters)	10

Table 11. Resulting PTS Isopleths for Impact Pile Driving

	Phocid Pinnipeds	**Otariid Pinnipeds**
SEL_{cum}-Threshold	185	203
PTS Isopleth to Threshold (m)	53.4	3.9

The resulting small PTS isopleths assume an animal would remain stationary at that distance for the duration of the activity. Given the extended durations and due to the relatively small distances to PTS onset from each activity, and the mitigation measures (See "Proposed Mitigation") proposed by the City, Level A take is neither expected nor authorized.

Marine Mammal Occurrence

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

The City used species counts from 2000-2014 taken by WDFW from the South Jetty at the mouth of the Columbia River to determine the number of pinnipeds that may be in the vicinity of the project. Although the South Jetty is over 10 miles away from the project site, WDFW monthly counts are the best available data for potential marine mammal occurrence near the project site. Numbers of California sea lions hauled out at the South Jetty ranged from 1 to 1,214, with a general trend of lower numbers in the summer and winter, and peak counts in the fall and spring. Monthly counts of Steller sea lions ranged from 177 to 1,663, with the highest numbers occurring in late fall and winter. Counts of harbor seals were not conducted every month, but the numbers of harbor seals at the South Jetty ranged from one to 57 seals.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

Although three species of pinniped occur in the vicinity of the project, they do not occur in equal numbers. Harbor seals and Steller sea lions are only known to occur out in the river channel and would only be harassed if they are transiting through the Zone of Influence (1,600 m for vibratory pile removal, 398 m for impact pile driving). Harbor seals and Steller sea lions would only be harassed during the in-water work period (November through February). California sea lions are the most commonly seen in the area, and are known to haul out on the riverbanks and structures near the bridges. California sea lions may be harassed by underwater sound resulting from vibratory pile removal and impact pile driving (at the distances listed above) as well as airborne sound resulting from roadway and railway demolition and construction. Using the highest sound source (concrete saw, 93 dB_{RMS} re: 20 µPa at 20 m), the isopleth to Level B harassment from airborne noise (100 dB re: 20 µPa) is 9 m. The City is proposing a 10 m shutdown zone during all railway and roadway above-water construction to prevent injury from physical interaction with equipment (see "Proposed Mitigation"). The City would therefore shut down equipment before sea lions would be acoustically harassed by the sound produced and no Level B acoustic harassment would occur. However, the City anticipates that California sea lions hauled out on the banks of the river in the vicinity of the construction work may be visually disturbed by the presence of construction equipment and may flush, resulting in Level B take. Therefore, the City is requesting take of California sea lions during the above-water work period (October 2018 and March-April 2019)

While harbor seals and Steller sea lions would only be harassed during the in-water work period (November through February), California sea lions may be harassed over the entire

duration of the project (October through April). To determine the estimated pinniped exposure and take, average monthly counts for each species from the South Jetty haulout (Table 12) were multiplied by the duration (months) of their expected exposure (Table 13).

Table 12. Average Counts of Pinnipeds at South Jetty Haulout

Month	Monthly Average # of California Sea Lions	Monthly Average # of Harbor Seals	Monthly Average # of Steller Sea Lions
October	508	N/A	N/A
November	1,214	24	1,663
December	725	57	1,112
January	10	24	249
February	28	1	259
March	17	N/A	N/A
April	99	N/A	N/A
Average over course of project	372	27	821

For example, California sea lion take was estimated by multiplying the average monthly count at the South Jetty haulout from October through April (372) by the number of months of project activity (7) for a total of 2,604.

Table 13. Estimated Pinniped Exposure and Take

	Average count per month	In-air months	In-water months	Total months of impacts	Total take	Percent of stock
California Sea Lion	372[1]	3	4	7	2,604	0.88%
Steller Sea Lion	821[2]	0	4	4	3,284	7.9%
Harbor Seal	27[2]	0	4	4	108	0.44%

[1]Average monthly counts from October through April at the South Jetty (WDFW 2014)
[2]Average monthly counts from November through February at the South Jetty (WDFW 2014)

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, "and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to

rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking" for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

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

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

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

Mitigation for Marine Mammals and their Habitat

General Construction Measures—All construction activities will be performed in accordance with the current Oregon Department of Transportation (ODOT) Standard

Specifications for Construction, the Contract Plans, and the Project Special Provisions. In addition, the following general construction measures will be adhered to.

- All work below the HMT will be completed during the ODFW prescribed IWWP of November 1 through February 28.
- All work shall be performed according to the requirements and conditions of the regulatory permits issued by federal, state, and local governments. Seasonal restrictions, *i.e.*, work windows, will be applied to the Project to avoid or minimize potential impacts to listed or proposed species based on agreement with, and the regulatory permits issued by Department of State Lands, and USACE in consultation with NMFS. The City will comply with all stipulations from the FAHP Biological Opinion for salmonids (*i.e.*, using air bubble curtains).
- The City will have an inspector onsite during construction. The role of the inspector is to ensure compliance with the construction contract and other permits and regulations. The onsite inspector will also perform marine mammal monitoring duties when protected species observers (PSOs) are not onsite (See Proposed Monitoring section).
- To ensure no contaminants enter the water, mobile heavy equipment will be stored in a staging area at least 150 ft from the river or in an isolated hard zone. Equipment will be inspected daily for fluid leaks before leaving the staging area. Stationary equipment operated within 150 ft of the river will be maintained and protected to prevent leaks and spills. Erosion and sediment control BMPs will be installed prior to initiating and construction activities.

- The contractor will be responsible for the preparation of a Pollution Control Plan (PCP). The PCP will designate a professional on-call spill response teams, and identify all contractor activities, hazardous substances used, and wastes generated. The PCP will describe how hazardous substances and wastes will be stored, used, contained, monitored, disposed of, and documented.

Pile Removal and Installation BMPs—The following mitigation measures will be implemented to minimize disturbance during pile removal and installation activities.

- An air bubble system shall be employed during impact installation unless the piles are driven on dry areas.
- The contractor will implement a soft-start procedure for impact pile driving activities. The objective of a soft-start is to provide a warning and/or give animals in close proximity to pile driving a chance to leave the area prior to an impact driver operating at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds. A soft-start procedure will be used at the beginning of each day that pile installation activities are conducted (*i.e.*, for impact driving, an initial set of three strikes would be made by the hammer at 40 percent energy, followed by a one minute wait period, then two subsequent three-strike sets at 40 percent energy, with one minute waiting periods, before initiating continuous driving).
- Monitoring of marine mammals shall take place starting 30 minutes before construction begins until 30 minutes after construction ends (See *Proposed Monitoring*).

- Before commencement of vibratory pile removal activities, the City will establish a 15 m Level A Exclusion Zone.
- Before commencement of impact pile driving activities, the City will establish a 53.4 m Level A Exclusion Zone.
- Before commencement of above water construction activities, the City will establish a 10 m Level A Exclusion Zone to prevent injury from physical interaction with construction equipment.
- The City shall shut down operations if a marine mammal is sighted within or approaching the Level A Exclusion Zone until the marine mammal is sighted moving away from the exclusion zone, or if not sighted for 15 minutes after the shutdown. The City will also shut down to prevent Level B takes when the take of a pinniped species is approaching the authorized take limits.
- If the exclusion zone is obscured by poor lighting conditions, pile driving will not be initiated until the entire zone is visible.
- In-water work will only commence once observers have declared the Exclusion Zone clear of marine mammals.

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

Proposed Monitoring and Reporting

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

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

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

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

- Mitigation and monitoring effectiveness.

Proposed Monitoring

1) Protected Species Observers: the City will employ qualified PSOs to monitor the extent of the Region of Activity for marine mammals. Qualifications for marine mammal observers include:

a. Visual acuity in both eyes (correction is permissible) sufficient for discerning moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars is necessary to correctly identify the target.

b. Advanced education (at least some college level course work) in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is preferred but not required).

c. Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).

d. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.

e. 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.

f. Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).

g. Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area; dates and times when

observations were conducted; dates and times when in-water construction activities were conducted; and dates and times when marine mammals were present at or within the defined Region of Activity.

2) Monitoring Schedule: PSOs shall be present onsite during IWW construction activities as follows:

a. During vibratory pile removal activities:

i. Two NMFS qualified observers will be onsite the first day of removal at each bridge, one NMFS qualified observer will be onsite every third day thereafter.

ii. One NMFS qualified observer will be stationed at the best practicable land-based vantage point to observe the downstream portion of the disturbance zone, and the other positioned at the best practicable land-based vantage point to monitor the upstream portion of the disturbance zone.

iii. When PSOs are not onsite, the contractor's onsite inspector will be trained in species identification and monitoring protocol, and will be onsite during all pile removal activities to ensure that no species enter the 15 m Exclusion Zone.

b. During pile driving activities:

i. Two NMFS qualified observers will be onsite the first two days of pile driving at each bridge, and every third day thereafter.

ii. One NMFS observer will be stationed at the best practicable land-based vantage point to observe the downstream portion of the disturbance and exclusion zones, and the other positioned at the best practicable land-based vantage point to monitor the upstream portion of the disturbance and exclusion zones.

iii. When PSOs are not onsite, the contractor's onsite inspector will be trained in species identification and monitoring protocol, and will be onsite during all pile driving activities to ensure that no species enter the Exclusion Zone.

c. During substructure demolition activities (not including pile driving/removal) and superstructure demolition and construction activities:

i. One NMFS qualified observer will be onsite once a week to monitor the Exclusion Zone within 10 m of the construction site.

ii. When PSO is not on-site, the contractor's inspector will be trained in species identification and monitoring protocol, and will be onsite during all construction activities to ensure that no species enter the 10 m Exclusion Zone during superstructure demolition and construction activities.

3) Monitoring Protocols: PSOs shall monitor marine mammal presence within the Level A Exclusion Zone and Level B ZOIs per the following protocols:

a. A range finder or hand-held global positioning system device will be used by PSOs to ensure that the defined Exclusion Zones are fully monitored and the Level B ZOIs monitored to the best extent practicable.

b. A 30-minute pre-construction marine mammal monitoring period will be required before the first pile driving or pile removal of the day. A 30-minute post-construction marine mammal monitoring period will be required after the last pile driving or pile removal of the day. If the contractor's personnel take a break between subsequent pile driving or pile removal for more than 30 minutes, then additional pre-construction marine mammal monitoring will be required before the next start-up of pile driving or pile removal.

c. If marine mammals are observed, the following information will be documented:

i. Species of observed marine mammals;

ii. Number of observed marine mammal individuals;

iii. Life stages of marine mammals observed;

iv. Behavioral habits, including feeding, of observed marine mammals, in both presence and absence of activities;

v. Location within the Region of Activity; and

vi. Animals' reaction (if any) to pile driving activities or other construction-related stressors including:

1. Impacts to the long-term fitness of the individual animal, if any

2. Long-term impacts to the population, species, or stock (*e.g.*, through effects on annual rates of recruitment or survival), if any

vii. Overall effectiveness of mitigation measures

d. During vibratory pule removal and impact driving, qualified PSOs will monitor the Level B ZOIs from the best practicable land-based vantage point to observe the downstream and upstream portions of the disturbance zone according to the above schedule.

e. PSOs shall use binoculars to monitor the Region of Activity.

Reporting

1) The City shall provide NMFS with a draft monitoring report within 90 days of the conclusion of the construction work. This report shall detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed.

2) If comments are received from the NMFS West Coast Regional Administrator or NMFS Office of Protected Resources on the draft report, a final report shall be submitted to NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

3) In the unanticipated event that the construction activities clearly cause the take of a marine mammal in a manner prohibited by the NMFS authorization, such as an injury, serious injury, or mortality (*e.g.*, gear interaction), the City shall immediately cease all operations and immediately report the incident to the Chief, Permits and Conservation Division, Office of Protected Resources, and the West Coast Regional Stranding Coordinators. The report must include the following information:

a. Time, date, and location (latitude/longitude) of the incident;

b. Description of the incident;

c. Status of all sound source use in the 24 hours preceding the incident;

d. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility, and water depth);

e. Description of marine mammal observations in the 24 hours preceding the incident;

f. Species identification or description of the animal(s) involved, including life stage and the fate of the animal(s); and

g. Photographs or video footage of the animal(s) (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with the City to determine what is necessary to minimize the

likelihood of further prohibited take and ensure MMPA compliance. Activities may not be resumed until notified by NMFS via letter, email, or telephone.

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

5) In the event that the City discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the City shall report the incident to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinators, within 24 hours of the discovery. The City shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. The City can continue its operations under such a case.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival" (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of

recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the discussion of our analyses applies to all three species proposed to be taken by this project (California sea lion, Steller sea lion, and harbor seal), 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.

Authorized takes are expected to be limited to short-term Level B harassment. Marine mammals present in the vicinity of the action area and taken by Level B harassment would most likely show overt brief disturbance (startle reaction, flushing) and avoidance of the area from elevated noise levels during pile removal and installation and railway superstructure construction. The project is not expected to have a significant adverse effect on affected marine

mammal habitat, as discussed in detail in the "Anticipated Effects on Marine Mammal Habitat" section. There is no critical habitat in the vicinity of the project and the project activities would not permanently modify existing marine mammal habitat. The impacts to marine mammal habitat from the proposed construction actions are expected to be temporary and include increased human activity and noise levels, minimal impacts to water quality, and negligible changes in prey availability near the individual bridge sites. Pinnipeds in the vicinity are likely habituated to high levels of human activity as the Astoria waterfront is a highly developed area. The project may benefit marine mammal habitat by removing several hundred treated timber piles from the Columbia River.

Impacts to exposed pinnipeds are expected to be minor and temporary. The area likely impacted by the construction is relatively small compared to the available habitat in the river. For California and Steller sea lions, sub-adult and adult males could be harassed during construction activities. For harbor seals, sub-adult and adult males and/or females could be harassed during construction activities. The project occurs outside of known pupping periods for all species, and there are no known rookeries within the region of activity. No pups or breeding adults are expected to be affected by the project activities.

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

- No mortality is anticipated or authorized;
- No injury or serious injury is anticipated or authorized;
- In-water work is limited to a four-month period, and likely only 80 days within that time;

- No permanent effects to marine mammal habitat or prey is expected;
- Marine mammals are currently exposed to high human use area and are likely habituated to disturbance;
- Any impacts from the project are expected to result in short-term, mild behavioral reactions such as avoidance or flushing;
- There are no known important feeding, pupping, or other areas of biological significance in the project area; and
- The project affects only a small percentage of each stock of marine mammal affected, and only in a limited portion of their overall range.

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

Small Numbers

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

The number of each species proposed to be taken as a result of this project is less than 10 percent of the total stock. In fact, the numbers of California sea lions and harbor seals is less than one percent of their respective stock abundance estimates. Additionally, the number of takes requested is based on the number of estimated exposures, not necessarily the number of individuals exposed. Pinnipeds may remain in the general area of the project sites and the same individuals may be harassed multiple times over multiple days, rather than numerous individuals harassed once.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population 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 preliminarily determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

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

Region Protected Resources Division Office, whenever we propose to authorize take for endangered or threatened species.

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

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the City of Astoria for conducting waterfront bridge removal and replacement in Astoria, OR from October 1, 2018 to September 30, 2019, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

INCIDENTAL HARASSMENT AUTHORIZATION

The City of Astoria (City) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to harass marine mammals incidental to the Waterfront Bridges Replacement Project in Astoria, Oregon, when adhering to the following terms and conditions.

1. This Incidental Harassment Authorization (IHA) is valid from October 1, 2018 to September 30, 2019.

2. This IHA is valid only for construction activities associated with the Waterfront Bridges Replacement Project in Astoria, Oregon.

3. General Conditions:

(a) A copy of this IHA must be in the possession of the City, its designees, and work crew personnel operating under the authority of this IHA.

(b) The species authorized for taking are the California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), and Pacific harbor seal (*Phoca vitulina richardii*).

(c) The taking, by Level B harassment only, is limited to the species listed in condition 3(b). The authorized take numbers are shown below and in Table 1:

i. 2,604 California sea lions

ii. 3,284 Steller sea lions

iii. 108 Pacific harbor seals

(d) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.

(e) The City shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, acoustical monitoring team, and City staff prior to the start of all construction work, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

4. Mitigation Measures

The holder of this Authorization is required to implement the following mitigation measures:

(a) General Construction Measures

i. All construction activities shall be performed in accordance with the current ODOT Standard Specifications for Construction, the Contract Plans, and the Project Special Provisions. In addition, the following general construction measures will be adhered to:

a. All work shall be performed according to the requirements and conditions of the regulatory permits issued by federal, state, and local governments. Seasonal restrictions, *i.e.*, work windows, shall be applied to the Project to avoid or minimize potential impacts to listed or proposed species based on agreement with, and the regulatory permits issued by Department of State Lands, and USACE in consultation with NMFS. The City shall comply with all stipulations from the FAHP Biological Opinion for salmonids (*i.e.*, using air bubble curtains).

b. The City shall have an inspector onsite during construction. The role of the inspector is to ensure compliance with the construction contract and other permits and regulations. The onsite inspector shall also perform marine mammal monitoring duties when protected species observers (PSOs) are not onsite (See Proposed Monitoring section).

c. To ensure no contaminants enter the water, mobile heavy equipment shall be stored in a staging area at least 150 ft from the river or in an isolated hard zone. Equipment shall be inspected daily for fluid leaks before leaving the staging area. Stationary equipment operated within 150 ft of the river shall be maintained and protected to prevent leaks and spills. Erosion and sediment control BMPs shall be installed prior to initiating and construction activities.

d. All work below the Highest Mean Tide (HMT) shall be completed during the ODFW prescribed IWWP of November 1 through February 28.

e. The contractor shall be responsible for the preparation of a Pollution Control Plan (PCP). The PCP shall designate a professional on-call spill response team, and identify all contractor activities, hazardous substances used, and wastes generated. The PCP shall describe

how hazardous substances and wastes will be stored, used, contained, monitored, disposed of, and documented.

(b) Pile Removal and Installation

i. The following mitigation measures shall be implemented to minimize disturbance during pile removal and installation activities:

a. An air bubble system shall be employed during impact installation unless the piles are driven on dry areas.

b. The contractor shall implement a soft-start procedure for impact pile driving activities. The objective of a soft-start is to provide a warning and/or give animals in close proximity to pile driving a chance to leave the area prior to an impact driver operation at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds. A soft-start procedure will be used at the beginning of each day that pile installation activities are conducted. For impact driving, an initial set of three strikes would be made by the hammer at 40 percent energy, followed by a one minute wait period, the two subsequent three-strike sets at 40 percent energy, with one minute waiting periods, before initiating continuous driving

c. Monitoring of marine mammals shall take place starting 30 minutes before construction begins until 30 minutes after construction ends.

d. Before commencement of non-pulse (vibratory) pile removal activities, the contractor shall establish a 15 m Level A Exclusion Zone (Table 2).

e. Before commencement of impact pile driving activities, the contractor shall establish a 53.4 m Level A Exclusion Zone (Table 2).

f. Before commencement of above-water construction activities, the contractor shall establish a 10 m Level A Exclusion Zone (Table 2).

g. Prior to initiating in-water pile driving, pile removal, and concrete removal activities, the contractor will establish Level B ZOIs (Table 2):

1. The Level B ZOI for all pile removal activities shall be established out to a distance of 1,600 m from the pile.

2. The Level B ZOI for all pile driving activities shall be established out to a distance of 398 m from the pile.

3. The Level B ZOI during rail superstructure demolition and construction shall be established out to a distance of 28 m from the construction area.

4. If a marine mammal enters the Level B ZOI, but does not enter the Level A Exclusion Zone, a "take" shall be recorded and the work shall be allowed to proceed without cessation. Marine mammal behavior will be monitored and documented.

5. The City shall shut down operations if a marine mammal is sighted within or approaching the Level A Exclusion Zone until the marine mammal is sighted moving away from the exclusion zone, or if not sighted for 15 minutes after the shutdown. The City shall also shut down to prevent Level B takes when the take of a pinnipeds species is approaching the authorized take limits.

h. If the exclusion zone is obscured by poor lighting conditions, pile driving shall not be initiated until the entire zone is visible.

i. In-water work shall only commence once observers have declared the Exclusion Zone clear of marine mammals.

j. A monitoring plan shall be implemented as described below. This plan includes Exclusion Zones and specific procedures in the event a marine mammal is encountered.

5. Monitoring

The holder of this Authorization is required to conduct marine mammal monitoring during construction activities.

(a) Protected Species Observers: The contractor shall employ qualified Protected Species Observers (PSOs) to monitor the extent of the Region of Activity for marine mammals. Qualifications for marine mammal observers include:

i. Visual acuity in both eyes (correction is permissible) sufficient for discerning moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars is necessary to correctly identify the target.

ii. Advanced education (at least some college level coursework) in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is preferred but not required).

iii. Experience or training in the field of identification of marine mammals (cetaceans and pinnipeds).

iv. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.

v. 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.

vi. Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).

vii. Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area; dates and times when observations were conducted; dates and times

when in-water construction activities were conducted; and dates and times when marine mammals were present at or within the defined Region of Activity.

ii. Monitoring Schedule: PSOs shall be present onsite during in-water construction activities as follows:

i. During vibratory pile removal activities:

a. Two NMFS qualified observers shall be onsite the first day of removal at each bridge, one NMFS qualified observer shall be onsite every third day thereafter.

b. One PSO observer shall be stationed at the best practicable land-based vantage point to observe the downstream portion of the disturbance zone, and the other positioned at the best practicable land-based vantage point to monitor the upstream portion of the disturbance zone.

c. When PSOs are not onsite, the contractor's onsite inspector shall be trained in species identification and monitoring protocol, and shall be onsite during all pile removal activities to ensure than no species enter the 15 m Exclusion Zone.

ii. During pile driving activities:

a. Two NMFS qualified observers shall be onsite the first two days of pile driving at each bridge, and every third day thereafter.

b. One PSO shall be stationed at the best practicable land-based vantage point to observe the downstream portion of the disturbance and exclusion zones, and the other positioned at the best practicable land-based vantage point to monitor the upstream portion of the disturbance and exclusion zones.

c. When PSOs are not onsite, contractor's onsite inspector shall be trained in species identification and monitoring protocol, and shall be onsite during all pile driving activities to ensure that no species enter the 53.4 m exclusion zone.

iii. During substructure demolition activities (not including pile removal) and superstructure demolition and construction activities:

a. One PSO shall be onsite once a week to monitor the Exclusion Zone within 10 m of the construction site.

b. When the PSO is not onsite, contractor's inspector shall be trained in species identification and monitoring protocol, and shall be onsite during all construction activities to ensure that no species enter the 10 m Exclusion Zone during superstructure demolition and construction activities.

iii. Monitoring Protocols: PSOs shall monitor marine mammal presence within the Level A Exclusion Zone and Level B ZOIs per the following protocols:

i. A range finder or hand-held global positioning system device shall be used by PSOs to ensure that the defined Exclusion Zones are fully monitored and the Level B ZOIs monitored to the best extent practicable.

ii. A 30-minute pre-construction marine mammal monitoring period shall be required before the first pile driving or pile removal of the day. A 30-minute post-construction marine mammal monitoring period shall be required after the last pile driving or pile removal of the day. If the contractor's personnel take a break between subsequent pile driving or pile removal for more than 30 minutes, then additional pre-construction marine mammal monitoring shall be required before the next start-up of pile driving or pile removal.

iii. If marine mammals are observed, the following information shall be documented:

a. Species of observed marine mammals;

b. Number of observed marine mammal individuals;

c. Life stages of marine mammals observed;

d. Behavioral habits, including feeding, of observed marine mammals, in both presence and absence of activities;

e. Location within the Region of Activity; and

f. Animals' reaction (if any) to pile driving activities or other construction-related stressors including:

1. Impacts to the long-term fitness of the individual animal, if any

2. Long-term impacts to the population, species, or stock (*e.g.*, through effects on annual rates of recruitment or survival), if any

g. Overall effectiveness of mitigation measures.

iv. During vibratory rule removal and impact driving, qualified PSOs shall monitor the Level B ZOIs from the best practicable land-based vantage point to observe the downstream and upstream portions of the disturbance zone according to the above schedule.

v. PSOs shall use binoculars to monitor the Region of Activity.

6. Reporting

The holder of this Authorization is required to:

(a) Submit a draft report on all monitoring conducted under the IHA within 90 calendar days of the completion of construction work. This report must contain the informational elements described in the Monitoring Plan, at minimum, and shall also include:

i. Detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any.

(b) If comments are received from the NMFS West Coast Regional Administrator or NMFS Office of Protected Resources on the draft report, a final report shall be submitted to NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

(c) Reporting injured or dead marine mammals:

i. In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality, the City shall immediately cease the specified activities and report the incident to the Office of Protected Resources (301-427-8401), NMFS, and the West Coast Regional Stranding Coordinator (206-526-4747), NMFS. The report must include the following information:

i. Time and date of the incident;

ii. Description of the incident;

iii. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);

iv. Description of all marine mammal observations and active sound source use in the 24 hours preceding the incident;

v. Species identification or description of the animal(s) involved;

vi. Fate of the animal(s); and

vii. Photographs or video footage of the animal(s).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with the City to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The City may not resume their activities until notified by NMFS.

ii. In the event that the City discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), the City shall immediately report the incident to the Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator, NMFS.

The report must include the same information identified in 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with the City to determine whether additional mitigation measures or modifications to the activities are appropriate.

iii. In the event that the City discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the City shall report the incident to the Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. The City shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

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

Table 1. Authorized take numbers, by species

Species	Authorized Take
Harbor seal (*Phoca vitulina*)	108
California sea lion (*Zalophus californianus*)	2,604
Steller sea lion (*Eumetopias jubatus*)	3,284

Table 2. Minimum radial distance to shutdown zones

Activity	Level B Zone of Influence	Level A Exclusion Zone
Vibratory pile removal	1,600 m	15 m
Impact pile driving	398 m	53.4 m
Roadway and railway demolition and construction	28 m (harbor seals) 9 m (sea lions)	10 m

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this Notice of Proposed IHA for the proposed bridge replacement project. We also request comment on the potential for renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

On a case-by-case basis, NMFS may issue a second one-year IHA without additional notice when 1) another year of identical or nearly identical activities as described in the Specified Activities section is planned or 2) the activities would not be completed by the time the IHA expires and a second IHA would allow for completion of the activities beyond that described in the Dates and Duration section, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to expiration of the current IHA.
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted beyond the initial dates either are identical to the previously analyzed activities or include changes so minor (e.g., reduction in pile size) that the changes do not affect the previous analyses, take estimates, or mitigation and monitoring requirements.

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

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

Dated: February 16, 2018.

Donna S. Wieting,

Director,

Office of Protected Resources,

National Marine Fisheries Service.

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