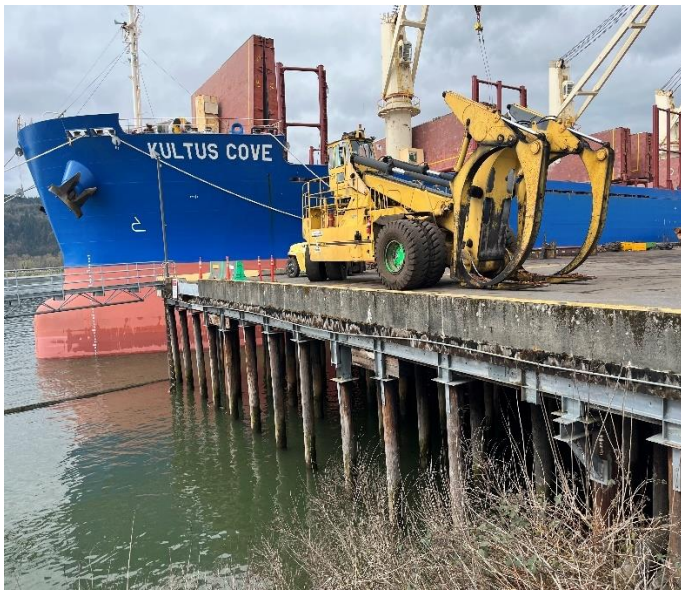

Request For Incidental Harassment Authorization Under Marine Mammal Protection Act

Weyerhaeuser Log Export Dock Replacement, Longview, WA

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March 14, 2024

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Acronyms and Abbreviations

BMP	best management practices
dB	decibels
DPS	Distinct Population Segment
Dock	Log Export Dock
ESA	Endangered Species Act
FR	Federal Register
IHA	incidental harassment authorization
LOA	Letter of Authorization
µPa	micropascal
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OHWM	ordinary high water mark
PK	peak sound pressure
Project	Log Export Dock Replacement Project
PS	permanent shift
PTS	permanent threshold shift
RM	river mile
RMS	root mean square
SD	standard deviation
SEL	sound exposure level
SELcum	cumulative sound exposure level
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SPL	sound pressure level
USACE	U.S. Army Corps of Engineers
TL	transmission loss
TS	threshold shift
TTS	temporary threshold shift
USC	United States Code

WDFW	Washington Department of Fish and Wildlife
Weyerhaeuser	Weyerhaeuser Company
WSDOT	Washington State Department of Transportation

1 Description of Specified Activity

1.1 Overview

The Weyerhaeuser Company (Weyerhaeuser) is submitting this request to the National Oceanic and Atmospheric Administration (NOAA) for Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA) for Phase 1 of the Log Export Dock Replacement Project (Project). Weyerhaeuser is proposing to reconstruct their existing Log Export Dock (Dock) located on the Columbia River near Longview, Washington. The Dock is an integral part of Weyerhaeuser's marine terminal facility and is used primarily to stage and load logs onto ships for transport along the Columbia River. It is also used for berthing ships and unloading log barges.

The existing Dock is a vintage timber structure originally constructed in the early 1970s and has exceeded its designed life span. The original timber structure, including Berths A and B, consists of more than 2,000 16-inch-diameter creosote timber piles, with 16-inch square timber caps supporting a glulam deck. Over the past decade, the Dock has required significant maintenance to repair deteriorated structural elements. These repairs have included the replacement of deteriorated creosote-treated timber piles with steel piles and the reinforcement of creosote-treated timber pile caps with steel. Recent structural condition assessments indicate that deterioration is accelerating due to age and increased shipping operations at the Dock in recent years.

Continued deterioration and the associated repairs of timber structural elements that support the Dock have led Weyerhaeuser to pursue a reconstruction design that will replace all of the timber elements with steel and concrete. Weyerhaeuser desires a new, modern structure that requires less maintenance and is capable of supporting larger ships and heavier equipment. Further, previous geotechnical investigations (GRI 2020) determined that the substrate in which the Dock's existing piles are embedded would likely liquefy during a large-magnitude earthquake, causing significant damage to the Dock and potentially to surrounding aquatic resources.

To simplify construction and allow the Dock to remain operational during construction, Dock replacement will be divided into two phases. Phase 1, the subject of this authorization request, entails primarily the removal and installation of a new berth (Berth A), which represents approximately half of the existing Dock area at the upstream end. Phase 2, which will replace the downstream portion of the berth (Berth B), is proposed to occur a few years following Phase 1. A separate IHA application will be submitted for that portion of the Project.

Both phases of the Project will require work in waters that support marine mammal species. The MMPA of 1972 defines "take" to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 United States Code [USC] Chapter 31, Section 1362(13)). The MMPA further defines ''harassment'' as "any act of pursuit, torment, or annoyance which (Level A Harassment) has the potential to injure a marine mammal or marine mammal stock in the wild; or (Level B Harassment) 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." Section 101(a)(5)(D) of the MMPA allows for the issuance of an IHA for specified activities, provided that the activity will potentially impact only small numbers of marine mammals, have negligible impacts to marine mammals, and will not have unmitigable adverse impacts on the availability of such species for subsistence uses.

This IHA application assesses potential and predicted effects on marine mammals from activities associated with construction of the Project, in particular the proposed pile installation and removal. The primary focus on in-water pile installation and removal is appropriate because these activities have the potential to produce noise in the aquatic marine environment at amplitudes and frequencies that could affect marine mammals. Both vibratory (continuous) and impact (impulsive) pile driving are proposed as part of the Project.

Based on an analysis of the potential and predicted effects on marine mammals, Weyerhaeuser is requesting authorization for incidental harassment of marine mammals under the MMPA. This application describes the species and numbers of marine mammals that may be affected by Project construction, and the number of requested Level A and Level B takes to be authorized for each species. Weyerhaeuser requests authorization for incidental take through an IHA. An IHA application is appropriate because the Project (Phase 1) is anticipated to take 1 year to complete with harassment (Level A and Level B) and will not cause serious injury or mortality of marine mammals.

The revised acoustic technical guidance issued by NOAA (2018) provides acoustic thresholds for onset of permanent threshold shifts (PTS) and temporary threshold shifts (TTS) in marine mammal hearing for all sound sources (NOAA 2018). To demonstrate compliance with the NOAA MMPA guidelines, this document identifies in-water noise thresholds for each marine mammal species based on the calculated behavioral effects levels and PTS isopleths identified using in-water sound transmission equations and spreadsheets provided by NOAA in the 2018 revised guidance (NOAA 2018). The evaluation used data from monitoring reports in Washington State. Comparisons between NMFS' calculated marine mammal noise thresholds and predicted noise values from pile installation and removal are also presented in this document and allow for projected effects to be assessed at varying distances from a noise source (i.e., the site of the pile installation or removal). To facilitate the development of take estimates and monitoring zones, this document identifies the PTS zone for each hearing group, which is then used as the basis for establishing the proposed Level A Harassment Zone for monitoring. The noise evaluation identifies Level B (non-injurious) harassment zone isopleths for vibratory and impact driving and vibratory removal of steel piles for each hearing group based on the Level B thresholds. Estimates of take are calculated based on conservative estimates of the number of individuals of each species anticipated to transit or occur in the area of ensonification for both Level A and Level B harassment zone isopleths and the anticipated duration of Project pile removal and installation.

Three marine mammal species have known distribution ranges that include the portion of the mainstem Columbia River in which construction will occur: harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and Steller sea lion (*Eumatopius jubatus*). Pursuant to Section 101(a)(5)(A–D) of the MMPA, as amended (16 USC 1371(a)(5)), Weyerhaeuser requests that NOAA's National Marine Fisheries Service (NMFS) issue an IHA for incidental take of harbor seal, California sea lion, and Steller sea lion during Phase I of the Project.

1.2 Phase 1 Project Activities

Elements of Phase 1 of the proposed Project are described below. A range of likely and feasible means and methods is considered for each element. However, construction methods will ultimately be determined by the Contractor. If any unforeseen Project element arises that differs from those considered in this assessment, Weyerhaeuser will coordinate with NMFS to ensure that coverage is provided for marine mammals protected under the MMPA.

Phase 1 includes the following elements:

- Removal of existing piles and overwater structures
- Temporary relocation of on-site facilities, as needed
- Installation of new permanent piles, and temporary piles for construction
- Restoration of slope armoring
- Completion of deck work and fender system installation

Phase 1 consists of demolition and replacement of Berth A and two rows of Berth B (approximately 52 percent of the Dock); Berth A is 612 feet long and is located on the upstream end of the Dock (Figure 1-1). Phase 1 is currently scheduled for 2025 and is the proposed Project component considered for this IHA request.

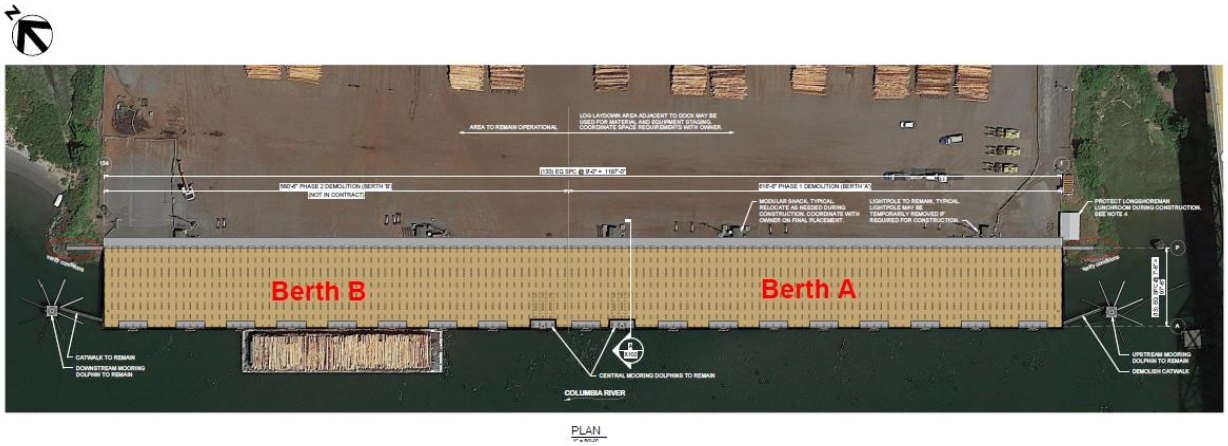

Figure 1-1. Log Export Dock Replacement Plan View

Construction staging will occur within already developed areas at the marine terminal facility adjacent to the existing Dock. No clearing of vegetation is required. Under both phases, the new Dock will have the same overwater footprint as the existing Dock, and no expansion of the Dock footprint is proposed.

The existing mooring system at the current facility consists of four mooring dolphins, including two central mooring dolphins and an upstream and a downstream dolphin. The central, interior mooring dolphins were constructed such that the Dock wraps around them. All four mooring dolphins are constructed of steel pipe piles and reinforced concrete and are in good condition. These structures were designed and installed in 1998 and are adequate for anticipated vessel use following Dock replacement. Therefore, the existing mooring system will not be removed or replaced.

1.2.1 Existing Pile and Overwater Structure Removal

Under Phase 1, existing piles will be removed from the substrate using the direct pull method. If direct pulling is unsuccessful, piles will be removed via extraction with a vibratory hammer. Broken or damaged pilings that cannot be removed by either the vibratory hammer or direct pull will be cut off at or below the mudline. Based on the significant depth of soft substrates at the site, it is anticipated

that the majority (i.e., approximately 75%) of existing timber piles are expected to be removed by direct pull. Existing steel piles will be removed by vibratory hammer.

Phase 1 will include the removal of 60,109 square feet of the existing deck and removal of 983 16-inch creosote timber piles, 53 steel piles (approximately 36 16-inch steel pipe piles , 10 12-inch H-piles, and 7 12-inch pipe piles), and 20 fender piles (14-inch or 16-inch steel pipe piles). The existing concrete bulkhead at Berth A will also be removed during Dock replacement. All bulkhead removal work will occur above the water. The existing sheet pile wall will remain.

The existing deck will be cut from above using a chainsaw. Netting or a similar system will be used to prevent construction materials from falling into the river below. Because the existing timber is creosote-treated, the selected Contractor will dispose of demolished materials at an approved disposal facility in accordance with applicable laws and regulations.

1.2.2 Pile Removal and Installation

Existing Pile Removal

As noted previously, existing piles will be removed from the substrate using the direct pull method. If direct pulling is unsuccessful, vibratory extraction will be utilized. Broken or damaged piles that cannot be removed by either the vibratory hammer or direct pull will be cut off at or below the mudline. Based on the substrate conditions at the site, it is anticipated that most (i.e., approximately 75%) of the existing timber piles will be removed by direct pull. Existing steel piles will likely be removed by vibratory hammer.

As described above, Phase 1 will include the removal of 983 16-inch creosote timber piles, 53 steel piles (approximately 36 16-inch steel pipe piles, 10 12-inch H-piles, and 7 12-inch pipe piles), and 20 fender piles (14-inch or 16-inch steel pipe piles).

New Pile Installation

To attain the required seismic resilience, the Project will utilize 30-inch-diameter steel pipe piles rather than the 12-inch and 16-inch-diameter steel pipe piles that have been used in recent years to replace several of the 16-inch timber piles that were particularly deteriorated. The 30-inch piles will also be installed much deeper than the existing timber piles and the previously installed steel replacement piles.

Phase 1 of the Project will install 325 30-inch steel pipe piles with a wall thickness of 0.5 inch; however, heavier wall thickness, likely 0.75 inch, may be considered in selected locations as the design progresses. As mentioned previously, the replacement Dock will have the same general footprint as the existing structure; no expansion of the Dock is proposed.

In addition, the Project may require the installation of temporary piles during construction. During Phase 1, a total of up to 26 24-inch temporary steel pipe piles may be installed for temporary construction use or to address unforeseen conditions. The temporary piles will be placed and removed as necessary during the proposed pile installation work window (September 1 to January 31) and will be driven and removed with a vibratory hammer. All pile installation will occur during the pile installation work window. This window minimizes potential exposure of fish listed under the

Endangered Species Act (ESA) to impact pile driving and was authorized by NMFS for a pile driving project in the vicinity of the Dock (NMFS 2017).

To complete pile installation within the pile installation work window of September 1 to January 31, it is assumed that multiple crews will need to work simultaneously to remove and install piles. It is therefore possible that up to two hammers, a combination of impact or vibratory hammers, could coincidentally be in use simultaneously at any point during the pile installation work window. In-water pile installation is an intermittent activity, and it is common for installation to start and stop multiple times as each pile is adjusted, and its progress is measured and documented. However, there is the potential for more than one piece of equipment (vibratory and/or impact hammers) to operate within a day or simultaneously. The likelihood of such an occurrence is anticipated to be infrequent but would be for short durations on that day. Installation will require a derrick barge driving piles from the river and another crane driving piles from the shore. The barge will be anchored into the substrate using four spud pipes. When the barge needs to change position and move to the next pile, the spuds are raised, the barge is moved to the next location using the tug, and the spuds are dropped into the mudline again. Up to two additional barges may be tied to the derrick barge and used to stage pile and Dock construction materials, construction equipment, refuse, and personnel. Construction materials will be brought to the site via land-based transport using existing highways or via barge, whichever proves more cost-effective.

Each permanent 30-inch steel pipe pile will be installed with both vibratory and impact hammers due to the nature of the substrate. In general, piles can be installed with a vibratory hammer to the dense gravel layer and then will require impact driving between 20 and 30 feet into the gravel layer to achieve the required 400,000-pound allowable capacity. Piles will be aligned with steel templates to ensure the correct position of the piles relative to each other. An alternative approach to pile installation sequencing involves cutting holes in the existing deck and using the existing Dock as a driving template to install new piles. Under this alternative, the existing deck will be demolished and removed following permanent pile installation.

Pile Driving Schedule

Pile installation will be conducted during standard daylight working hours. Each pile will be installed alternately with vibratory and impact hammers. Each pile will require approximately 1 hour of vibratory hammering and up to 1,000 impact hammer strikes to install. Vibratory pile installation will likely be intermittent and involve multiple starts and stops, as opposed to 1 continuous hour of use. The large number of pile strikes is estimated based on a conservative scenario where the Contractor uses the minimum required hammer size and encounters obstructions in the substrate, with 500 to 700 strikes more likely in most cases. Therefore, it is likely that impact installation will require fewer than 1,000 impact hammer strikes; however, a conservative estimate using the maximum number has been provided to assist NMFS in their take evaluation for marine mammals. To reduce underwater noise produced by impact pile driving, an unconfined bubble curtain will be used during impact pile installation.

The Project will install a total of 325 permanent piles and 26 temporary piles (Table 1-1). The Project will also remove those 26 temporary piles, as well as remove a total of 1,056 existing piles, the vast majority of which are existing creosote timber piles. It is conservatively assumed that up to a maximum of eight piles will be installed each day. This gives a total of 8 hours of vibratory driving and up to 8,000 impact hammer strikes per day. Within the pile installation window (September 1 to

January 31), it is anticipated that pile driving will occur for up to 120 total days (not necessarily consecutive) during Phase 1.

Summary of Pile Removal and Installation

A summary of pile removal and installation for Phase 1 is presented below (Table 1-1).

Table 1-1. Phase 1 Pile Installation and Removal Plan

Pile Type and Size	Activity	Method	Number of Piles	Estimated Dates of Activity	Total Days of Operation	Hours or Strikes per Pile
Removal of Existing Piles						
16-inch creosote timber pile	Timber pile removal	Direct pull[1]	983	Year-round	60 days with approximately half subsumed in the 120 days required for pile installation[1]	N/A
12-inch steel pipe pile	Steel pipe pile removal	Vibratory hammer[1]	7	Year-round	60 days with approximately half subsumed in the 120 days required for pile installation[1]	Up to 1 hour[2]
12-inch steel H-pile	Steel pipe pile removal	Vibratory hammer[1]	10	Year-round	60 days with approximately half subsumed in the 120 days required for pile installation[1]	Up to 1 hour[2]
16-inch steel pipe pile	Steel pipe pile removal	Vibratory hammer[1]	36	Year-round	60 days with approximately half subsumed in the 120 days required for pile installation[1]	Up to 1 hour[2]
Fender piles (14-inch or 16-inch steel pipe piles)	Fender pile removal	Vibratory hammer[1]	20	Year-round	60 days with approximately half subsumed in the 120 days required for pile installation[1]	Up to 1 hour[2]
24-inch steel pipe pile	Temporary steel pipe pile removal	Vibratory hammer[1]	26[6]	September 1 – January 31	Subsumed in the 120 days for pile installation	Up to 1 hour[2]
Installation of New Piles						
24-inch steel pipe pile	Temporary steel pipe pile install	Vibratory hammer	26[6]	September 1 – January 31	Subsumed in the 120 days for pile installation	Up to 1 hour[4]

Pile Type and Size	Activity	Method	Number of Piles	Estimated Dates of Activity	Total Days of Operation	Hours or Strikes per Pile
30-inch steel pipe pile	Steel pipe pile preliminary install	Vibratory hammer	325[3]	September 1 – January 31	120 days	Up to 1 hour per pile[4] (up to 8 piles per day)
30-inch steel pipe pile	Steel pipe pile final install	Impact hammer	325[3]	September 1 – January 31	120 days	Up to 1,000 strikes per pile[5] (up to 8 piles per day)

[1] Based on substrate conditions at the site, it is anticipated that most (i.e., approximately 75%) of the existing timber piles will be removed by direct pull. Existing steel piles will likely be removed by vibratory hammer. It is anticipated to take a total of 60 days with up to 30 days possibly occurring outside the work window.

[2] It is conservatively assumed that the duration of vibratory pile removal will be roughly the same as for vibratory pile installation (i.e., up to 1 hour per pile).

[3] Each 30-inch steel pipe permanent pile will be installed with both vibratory and impact hammers due to the nature of the substrate. In total, approximately 325 permanent piles will be installed during Phase 1.

[4] Vibratory pile installation will likely be intermittent and involve multiple starts and stops, as opposed to 1 continuous hour of use.

[5] It is likely that impact installation will require fewer than 1,000 impact hammer strikes; however, a conservative estimate has been provided to assist NMFS in their take evaluation for ESA-listed fish.

[6] Up to 26 24-inch steel pipe piles will be installed by vibratory hammer for temporary construction use and later removed by vibratory hammer.

In-Air Noise

The geographic extent of construction-related noise is calculated based on reference data provided by the Washington State Department of Transportation (WSDOT) Biological Assessment Preparation Manual (WSDOT 2020). Based on this guidance, the three loudest noise-producing activities associated with the Project consist of an impact pile driver and two vibratory pile drivers. This equipment produces peak noise levels of 105 dB each (WSDOT 2020). These noise levels have been used to conservatively estimate peak noise levels, assuming that multiple pile drivers will operate simultaneously during pile installation and removal. Based on the rules of decibel addition (WSDOT 2020), the resultant maximum combined noise level from simultaneous pile driving will be 110 dB at 50 feet from the source.

Given the industrial nature of the facility and its proximity to road, train, and river traffic, ambient in-air sound was estimated at approximately 60 dB. Existing sources of noise within the Project vicinity include industrial activities at the Weyerhaeuser marine terminal and surrounding properties, vehicle traffic on State Routes 432 and 433, heavy rail traffic on the BNSF Railway, and tugboat, tanker ship, and other waterborne vessel traffic on the river.

The area is mainly flat and treeless due to the river, the industrial and urban areas of Longview and Rainier, and the agricultural area south of the Dock. Within these “hard-site” conditions, noise attenuates at approximately 6 dB per doubling distance from the source beginning at 50 feet (WSDOT

2020). The spherical spreading loss model was used for hard site conditions, and a 110 dB equipment noise level (WSDOT 2020).

Underwater Sound Source Levels

Sound source levels for each activity are estimated based on the pile type and size, installation methodology, and substrate conditions. Ideally, sound source levels would be available for the same project area, pile type and size, and installation method; however, this is often not possible. Therefore, source sound levels are estimated conservatively using data from similar and recent projects. Table 1-2 lists the estimated underwater sound source levels used for this application.

Table 1-2. Estimates of Underwater Sound Source Levels Generated during Vibratory and Impact Pile Installation and Vibratory Pile Removal

Method and Pile Type	Sound Source Level at 10 Meters			Literature Source
Vibratory Hammer	**dB RMS**			
16-inch timber piles (removal of existing)	162			Caltrans 2020
12-inch steel pipe piles (removal of existing)	158			Laughlin 2012
12-inch steel H-pile (removal of existing)	153			Laughlin 2019
16-inch steel piles (removal of existing)[1]	161			Navy 2015
24-inch steel piles (install and removal of temporary piles)	161			Navy 2015
30-inch steel piles (preliminary install with vibratory hammer)	163			Anchor QEA 2021; Greenbusch 2019, as cited by NMFS in 87 FR 31985; Denes et al. 2016, Table 72
Impact Hammer	**dB RMS**	**dB SEL**	**dB peak**	
30-inch steel piles[2]	190	177	210	Caltrans 2020; Cara Hotchkin, NMFS, pers. comm 01/18/2024

Note: It is assumed that noise levels during vibratory pile installation and vibratory pile removal are similar.
dB peak = peak sound level; FR = *Federal Register*; NMFS = National Marine Fisheries Service: RMS = root mean square; SEL = sound exposure level.

[1] For the purposes of this analysis, the underwater sound source level for removal of existing 16-inch steel piles (i.e., 161 dB RMS per Navy 2015) has been used for the removal of approximately 36 16-inch steel pipe piles and 20 fender piles (14-inch or 16-inch steel pipe piles).

[2] Using an unconfined bubble curtain.

Impact Installation of Steel Piles

For impact installation of 30-inch steel piles, 190 decibels (dB) (root mean square [RMS] at 10 meters) was used as the estimated sound pressure level (SPL) for calculating Level B isopleths. This sound source level was requested by NMFS (Rachel Wachtendonk, NMFS, pers. comm 12/19/2023) and is based on the average dB RMS measurement of the loudest of six 30-inch steel piles installed on the Siuslaw River with a bubble curtain (Caltrans 2020). An unconfined bubble curtain will be used for all impact pile driving for the Project.

Vibratory Installation and Removal of Steel Piles; Vibratory Removal of Timber Piles

For vibratory installation of 30-inch steel piles, 163 dB (RMS at 10 meters) is used as the sound source level, as the highest RMS level measured for the Pier 62 Project (Greenbusch 2019) for vibratory installation of 30-inch steel piles. This sound source level was used in a recent IHA application for the installation of 30-inch steel piles in substrate similar to that of the proposed project at Pier 58 in Seattle (Anchor QEA 2021; IHA issued May 26, 2022: 87 FR 31985). For vibratory installation and removal of the temporary 24-inch steel piles, as well as vibratory removal of the existing 16-inch steel pipe piles and fender piles, a sound source level of 161 dB (RMS at 10 meters) was used based on measurements from the United States Navy (2015). For vibratory removal of 12-inch steel pipe piles, a sound source level of 158 dB RMS was used based on the highest RMS level measured during vibratory pile driving of four 13-inch plastic on steel piles at the Anacortes Ferry Terminal (Laughlin 2012). A sound source level of 153 dB RMS was used for the vibratory removal of the 12-inch steel H-piles based on the highest RMS level measured during the vibratory installation of three 12-inch steel H-piles at two WSDOT ferry terminals in Puget Sound, Washington (Laughlin 2019).

If vibratory removal is needed to pull the existing 16-inch timber piles, a sound source level of 162 dB RMS was estimated from Caltrans (2020), as requested by NMFS during early coordination for the proposed Project (Rachel Wachtendonk, NMFS, pers. comm 12/19/2023 and 1/18/2024).

Simultaneous Pile Driving

As noted previously, to complete pile installation within the pile installation work window of September 1 to January 31, it is assumed that multiple crews will need to work simultaneously to remove and install piles. It is therefore possible that two hammers, including any combination of impact and vibratory hammers, could be used concurrently on any day during the pile installation work window. Following interim guidance provided by NMFS (2024) and in coordination with NMFS biologists (Cara Hotchkin, NMFS, pers. comm 1/18/2024 and 2/21/2024), the following methods consider the potential for simultaneous sound sources (i.e., those that have isopleths that overlap in both space and time) resulting from the use of up to two crews to remove and install piles:

Scenario 1: Two Impact Hammers

Level A and Level B isopleths for the simultaneous impact installation of two 30-inch steel piles were calculated using the sound source levels described in Table 1-2. To calculate Level A isopleths, and considering that the sound sources are the same (i.e., 177 dB SEL for the impact installation of up to two 30-inch steel piles), the NMFS acoustic threshold calculator (Appendix B) was used with modified inputs suggested by NMFS (2024) to account for the total estimated number of strikes for all piles.

Although there is potential for the isopleths of two impulsive sources to overlap in space, the likelihood of these isopleths to *completely* overlap in time is rare, as impact pile driving is intermittent with a typical strike rate of approximately one strike per second (NMFS 2024). However, NMFS (2024) conservatively estimates that up to 20 percent of strikes may overlap completely in time. Therefore, to calculate Level B isopleths for simultaneous impact pile driving that spatially overlaps, decibel addition was used to calculate the combined sound source level of 193 dB RMS that was used in this analysis.

Scenario 2: One Impact Hammer and One Vibratory Hammer

For the simultaneous installation of up to two piles, using one impact hammer and one vibratory hammer, sound source levels for the impact and vibratory installation of 30-inch steel piles were used (Table 1-2). To calculate Level A isopleths, sources were treated as though they were non-overlapping and the largest Level A isopleth was used (NMFS 2024). As described further in Section 6.1.2, the largest Level A isopleth in this scenario results from the impact installation of a 30-inch steel pile.

Similarly, to calculate Level B isopleths, the isopleth associated with the individual source which results in the largest Level B harassment isopleth was used for both sources to account for periods of overlapping activities (NMFS 2024). In this scenario, the largest Level B harassment isopleth results from the vibratory installation of a 30-inch steel pile (Section 6.1.2).

Scenario 3: Two Vibratory Hammers

Level A and Level B isopleths for the simultaneous vibratory installation of two 30-inch steel piles were calculated using the sound source levels described in Table 1-2. To calculate Level A isopleths, the NMFS acoustic threshold calculator (Appendix B) was used with modified inputs suggested by NMFS (2024) to account for accumulation, weighting, and source overlap in space and time. Using the rules of decibel addition (NMFS 2024), the combined sound source level for the simultaneous vibratory installation of two 30-inch steel piles is 166 dB RMS. This adjusted sound source level was used to calculate both the Level A and Level B isopleths (Section 6.1.2).

1.2.3 Slope Armoring Restoration

After pile removal and installation is complete for Phase 1, the slope under Berth A will be graded to restore the intended slope and restore the riprap and filter rock blanket. Approximately 1,040 cubic yards of filter rock and 1,387 cubic yards of Class II riprap will be placed underneath the Dock. Excavation of the slope will be conducted using land-based or barge-mounted excavators or a clamshell bucket and derrick barge. Riprap will be placed using a clamshell bucket or conveyor. All in-water materials will be placed under the footprint of the existing Dock.

1.2.4 Deck Construction and Fender System Installation

The Berth A structure will be a concrete deck supported on steel piles, matching the footprint of the existing berth. Most of the concrete elements will be designed as precast. Working from the top of the pile caps up, the structure will be built up as follows:

- 12-inch (nominal) precast deck planks
- 5-inch cast-in-place topping slab
- Varying thicknesses of aggregate base
- 4-inch asphalt wearing surface

The existing fender system uses leg-type fenders to dissipate energy from ships with high-density polyethylene pipe sleeves around the piles that allow for barges to use the facility. The fender system will be demolished and replaced with a new fender system. Twenty steel fender piles will be

removed from Berth A during Phase 1. The new fender panel system will have rubber fender units, similar to the existing system; however, no fender piles will be used. The fender panels will be of sufficient length to allow smaller barges to berth, in addition to Handysize vessels, with concrete dropdowns cast into the bullrail to support an additional conical fender unit (two per fender panel).

1.2.5 Substrate Disturbance

Substrate placement activities may generate turbidity within approximately 150 feet of construction activities. Short-term and localized turbidity and resuspension of contaminants will occur during in-water, bottom-disturbing activities, but these conditions are expected to be localized near the activity, where marine mammals are not expected to occur. If present, the duration of exposure to potentially resuspended chemicals will be short, and it is unlikely that resuspension would result in water column contaminant concentrations that would pose a risk to marine mammals or their prey or would have long-term effects to habitat.

Flow volumes and currents in the lower Columbia River are affected by precipitation as well as upstream water management at dams, and natural currents routinely disturb sediments. High-volume flow events can result in resuspension of benthic sediments and cause temporarily elevated turbidity. Any temporary increase in turbidity resulting from the proposed Project is not anticipated to measurably exceed levels caused by these normal periodic increases. Additionally, the volume of flow through the Project area will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

1.2.6 Vessel Traffic

Local vessel traffic on the Columbia River will be increased by one tug with one derrick rig, a support barge, and a materials barge necessary for pile installation and materials staging at the Dock. Additional tugs may be needed for short durations for material delivery. During construction, increased vessel traffic will potentially increase the risk for species-vessel interactions. After Project completion, there is no expected long-term increase in vessel traffic from the Project, as the Project is replacing an existing Dock that is currently used. The potential short-term increases in vessel traffic and barge presence during construction are not expected to result in any vessel strikes or significant increases in noise above baseline and therefore are not considered as part of this application.

2 Dates, Duration, and Specified Geographic Region

2.1 Project Location

The Log Export Dock is located at the Weyerhaeuser marine terminal, within unincorporated Cowlitz County, Washington, near Longview (Figure 2-1). The Project site is located in Township 7 North, Range 2 West, Section 8, at river mile (RM) 66 of the Columbia River. The site is in the Water Resource Inventory Area 25 (Grays-Elochoman) in U.S. Geological Survey Hydrologic Unit Code 17080003 (Lower Columbia-Clatskanie Watershed).

2.2 Schedule and Sequencing

As mentioned previously, replacement of the existing Dock will be implemented in two phases. In-water work associated with Phase 1 (replacement of Berth A and one or two rows of Berth B) is currently scheduled to begin on September 1, 2025. Phase 1 is the subject of this IHA request.

The proposed construction schedule is outlined below. The in-water work window is based on guidance provided by NMFS (2017) in their recent Biological Opinion for the proposed Kalama Manufacturing and Marine Export Facility (located at RM 72, approximately 6 miles upstream of the Project location):

- Pile installation will be conducted over a 5-month period during a work window of September 1 to January 31. It is anticipated that pile installation will require up to 120 days of pile driving within this window. To complete pile installation within the pile installation work window, it is assumed that multiple crews will need to work simultaneously to remove and install piles. It is therefore possible that up to two hammers, including any combination of impact and/or vibratory hammers, could be in use simultaneously on any day during the pile installation work window.
- Pile removal, including direct pulling, vibratory extraction, and/or cutting existing piles at or below the mudline may be conducted year-round. It is anticipated that pile removal will require a maximum of 60 days (not consecutive) to complete.
- Over-water work and work conducted below the ordinary high water mark (OHWM), but outside the wetted perimeter of the river (in the dry), may be conducted year-round.

The requested in-water work window for pile installation (September 1 to January 31) will allow for pile removal to occur simultaneously. This could involve the simultaneous use of two vibratory hammers, or an impact and vibratory hammer as discussed above in Section 1.2.2. Riprap placement and restoration of the slope under the Dock will occur at any point during the year, following pile removal and installation and prior to deck construction.

Pile installation will be conducted during standard daylight working hours between civil dawn and civil twilight. Each pile will be installed alternately with vibratory and impact hammers. Each pile will require approximately 1 hour of vibratory hammering and up to 1,000 impact hammer strikes to install. Vibratory pile installation will likely be intermittent and involve multiple starts and stops, as opposed to 1 continuous hour of use. Additionally, it is likely that impact installation will require fewer than 1,000 impact hammer strikes; however, a conservative estimate has been provided to assist NMFS in their take evaluation for marine mammals. To reduce underwater noise produced by impact pile driving, an unconfined bubble curtain will be used during impact pile installation. Additional impact minimization measures for pile driving are described in Section 11 below.

It is conservatively assumed that up to eight piles will be installed each day. This equates to a total of 8 hours of vibratory driving and up to 8,000 impact hammer strikes per day. Within the pile installation in-water work window (September 1 to January 31), it is anticipated that pile driving will occur for up to 120 total days (not necessarily consecutive) in Phase 1.

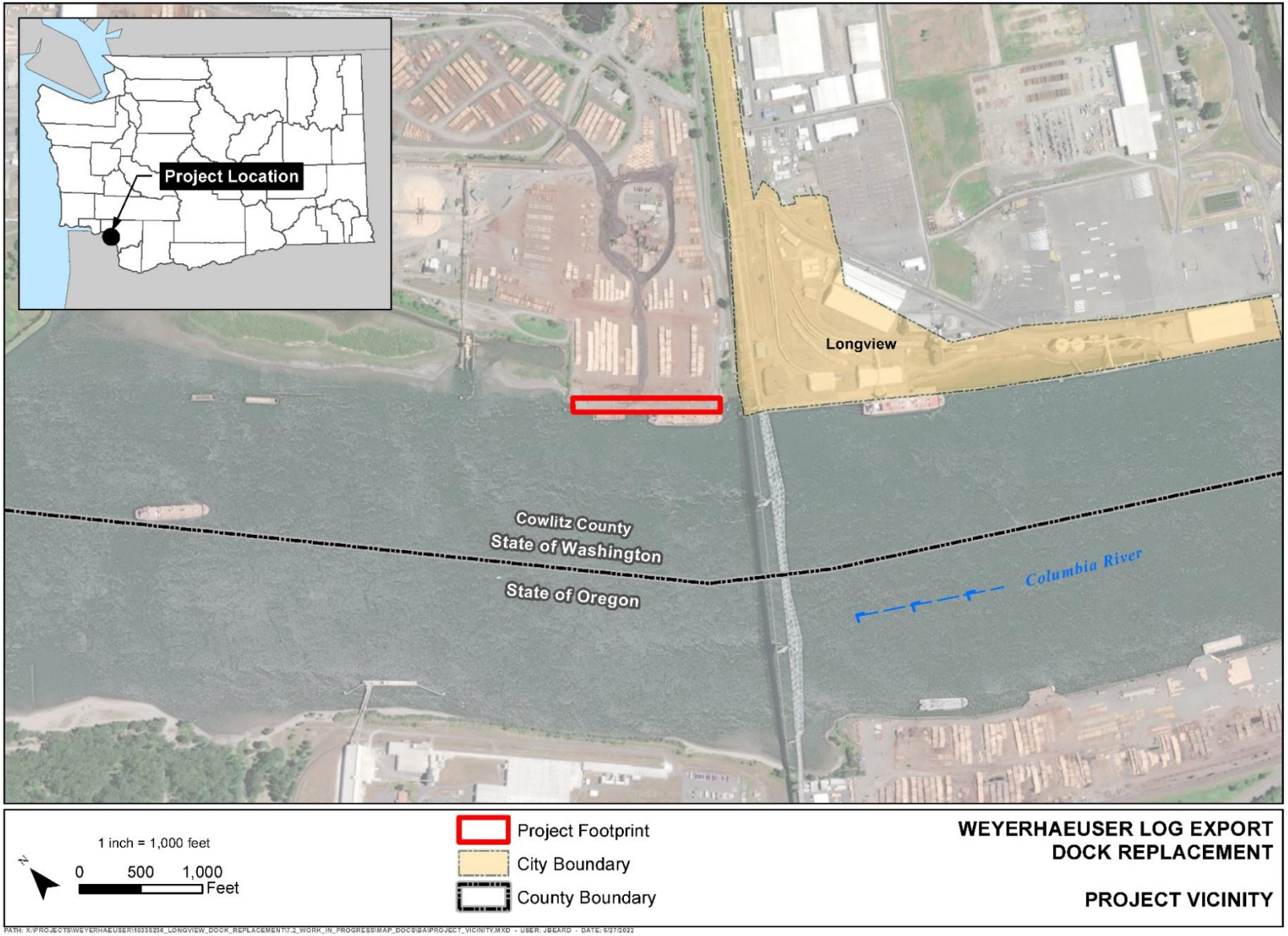

Figure 2-1. Project Location and Vicinity

3 Species and Numbers of Marine Mammals

The coastal waters of Washington and Oregon support many species of marine mammals, including pinnipeds and cetaceans, some of which are found within the mainstem and tributaries of the lower Columbia River. Three species of marine mammals have potential to occur within portions of the Columbia River that could be subject to elevated underwater noise levels: California sea lion, Steller sea lion, and harbor seal (Table 3-1). Each of the three marine mammal species that could occur in the area of ensonification resulting from this Project is addressed in this IHA request.

Table 3-1. Marine Mammal Species Addressed in this IHA Request

Species	Stock	ESA Listing Status	MMPA Designation	Timing and Occurrence	Stock Abundance[1]
Harbor Seal (*Phoca vitulina*)	OR/WA coastal stock	Not listed	Protected	Year-round common	24,732[1]
California Sea Lion (*Zalophus californianus*)	US stock	Not Listed	Protected	Year-round common	257,606[1]
Steller Sea Lion (*Eumatopius jubatus*)	Eastern DPS	Not Listed	Protected	Year-round occasional	43,201[2]

Note: DPS = Distinct Population Segment; ESA = Endangered Species Act; MMPA = Marine Mammal Protection Act.
[1.] Stock abundance was obtained from NOAA marine mammal stock assessment reports (Carretta et al. 2022 online at: https://doi.org/10.25923/246k-7589).
[2] Stock abundance obtained from Muto et al. 2022.

4 Affected Species Status and Distribution

All of the marine mammals addressed in this document are pinniped species, which use the portion of the Columbia River in the Project area as a seasonal corridor for foraging migrations upstream as far as Bonneville Dam. This section describes the status and distribution of the species and stocks of marine mammals likely to be affected by the pile installation and removal during Project construction.

The U.S. Army Corps of Engineers (USACE) has monitored pinniped presence and salmonid predation at Bonneville Dam (RM 146) since 2002, and the most recently published preliminary data from this monitoring come from compiled weekly status reports published in 2020 and 2021 (van der Leeuw and Tidwell 2022). This document is the primary source of data regarding pinniped presence, numbers, and run timing within the Project affected area. Additional primary sources of data include Washington Department of Fish and Wildlife's (WDFW's) Atlas of Seal and Sea Lion Haulout Sites in Washington (Jeffries et al. 2000). In this document, WDFW did not identify any significant sea lion haulout sites upstream of the Cowlitz River on the Columbia River. Several small haulouts are used by harbor seals and California sea lions at the mouth of the Cowlitz River and by Wallace Island (Jeffries et al. 2000) downstream of the Project site. For this reason, the numbers of these species reported at Bonneville Dam may be slightly lower than the number that may be present in the Project area and therefore estimates used in this analysis are conservative. The numbers of California sea lions and harbor seals at Bonneville Dam in recent years is very low (Tidwell et al. 2020; van der Leeuw and Tidwell 2022). Estimates used for this application are considered conservative based on

using the highest seasonal number of California sea lions at Bonneville Dam during spring and a conservative estimate of harbor seals based on estimates from a nearby project (NMFS 2017; 85 FR 76527; document provided to NMFS via email 12/19/23).

4.1 Harbor Seal

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

Harbor seals are non-migratory and reside year-round in the Columbia River, and generally remain in the same area throughout the year for breeding and feeding. Pupping seasons in coastal estuaries vary geographically; in the Columbia River, Willapa Bay, and Grays Harbor, pups are born from mid-April through June (Jeffries et al. 2003). Harbor seals in the Columbia River do exhibit some seasonal movement upriver, including into or through the Project area of ensonification, to follow winter and spring runs of Pacific eulachon (*Thaleichthys pacificus*) and outmigrating juvenile salmon (*Oncorhynchus* spp.), and they are observed regularly in portions of the Columbia River including the action area. Within the lower Columbia River, they tend to congregate to feed at the mouths of tributary rivers, including the Cowlitz and Kalama rivers (RM 68 and RM 73, respectively). WDFW's atlas of seal and sea lion haulout sites (Jeffries et al. 2000) identifies shoals near the confluence of the Cowlitz and Columbia rivers located approximately 2.4 miles upstream of the Project as a documented haulout for harbor seals. Harbor seals have been observed congregating in the area during winter months, near the mouth of the Kalama River in particular (NMFS 2017). These individuals are most likely congregating primarily to feed on the eulachon runs during the late winter months. There are no documented harbor seal haulout sites located within the area that would be exposed to elevated in-air or in-water noise and disturbance from Project activities (see Section 5.1).

4.2 California Sea Lion

California sea lions in the United States are not listed under the ESA and are categorized as Protected under the MMPA. The stock is not listed as "depleted" under the MMPA and is estimated to be approximately 40 percent above its maximum net productivity level (NOAA Fisheries 2022). The U.S. Stock was most recently estimated at 257,606 animals in 2014 (Lowry et al. 2017; Laake et al. 2018 as cited in Carretta et al. 2022). California sea lions on the West Coast are divided into three stocks based on the locations of breeding concentrations on islands located in southern California, western Baja California, and the Gulf of California.

The California sea lion is the most frequently sighted sea lion found in Washington waters and uses haulout sites along the outer coast, the Strait of Juan de Fuca, and in Puget Sound. Haulout sites are located on jetties, offshore rocks and islands, log booms, marina docks, and navigation buoys. California sea lions have been observed in increasing numbers farther and farther up the Columbia

River since the 1980s, first to the Astoria area, and then to the Cowlitz River and Bonneville Dam (WDFW 2020). An estimated 3,000 California sea lions have been observed in the lower Columbia River near Astoria (WDFW 2020). In recent years, California sea lions have been reported below Bonneville Dam feeding on returning adult salmon. Since about 2005, WDFW and the Oregon Department of Fish and Wildlife have worked with federal and tribal partners to harass and chase sea lions away from the area immediately below the dam. California sea lions continue to be permanently removed through captures or lethal means (WDFW 2020).

California sea lions have been observed at haulouts on shoals and log booms in Carroll Slough near the confluence of the Cowlitz and Columbia rivers during winter and spring months (Jeffries et al. 2000). This haulout is 2.2 miles upstream of the Dock and outside of the in-air and in-water Level B harassment zones defined for vibratory pile installation.

4.3 Steller Sea Lion

Steller sea lions that occur in the Lower Columbia River, including the Project vicinity, are members of the eastern Distinct Population Segment (DPS), ranging from Southeast Alaska to central California, including Washington. Individuals from the western DPS typically range from Southcentral Alaska to northeastern Asia and are highly unlikely to be present in the Project area. NMFS lists the western DPS as endangered, while the eastern DPS was removed from the list of threatened and endangered species of wildlife under the ESA in 2013 (78 FR 66139). For the purposes of this assessment, the likelihood that western DPS Steller sea lions may occur in the Project area is considered discountable, and no take authorization is requested for the western DPS.

In Washington, Steller sea lions occur mainly along the outer coast from the Columbia River to Cape Flattery (Jeffries et al. 2000). Smaller numbers use the Strait of Juan de Fuca, San Juan Islands, and Puget Sound south to about the Nisqually River mouth in Thurston and Pierce counties (Wiles 2015). The eastern DPS of Steller sea lions has historically bred on rookeries located in Southeast Alaska, British Columbia, Oregon, and California. However, within the last several years, a new rookery has become established on the outer Washington coast at the Carroll Island and Sea Lion Rock complex (Muto et al. 2019). The majority of pups (86 percent) are born in rookeries in Southeast Alaska and British Columbia (Wiles 2015). Steller sea lions occupy 22 haulouts in Washington, the largest of which are on the outer Olympic coast (Wiles 2015). None of these haulouts have been classified as rookeries, though pupping has increased in recent years, primarily at Carroll Island and Sea Lion Rock along the Olympic coast. The total count estimate of pups and non-pups for the U.S. portion of the eastern DPS of Steller sea lions (excluding Canada) is 43,201 (32,510 non-pups plus 10,691 pups) and is considered to be a minimum estimate (Muto et al. 2022).

Similar to California sea lions, Steller sea lions have also been observed at the base of Bonneville Dam in recent years, feeding on white sturgeon (*Acipenser transmontanus*) and salmonids (WDFW 2020). Recently, WDFW estimated that more adult salmonids were eaten by Steller sea lions below the dam than by California sea lions. Surveys conducted by WDFW and the Oregon Department of Fish and Wildlife documented up to 1,000 Steller sea lions in the lower Columbia River near Astoria (WDFW 2020). In December 2018, Senate Bill 3119 gave NOAA the authority to work with wildlife managers to expand the removal, including by capture and by lethal means, of California and Steller sea lions from and below Bonneville Dam, from the river at RM 112 near the Interstate 205 highway bridge to McNary Dam, and from adjacent tributaries (WDFW 2020). In June 2019, WDFW, along

with Washington State and tribal partners, submitted an expanded permit application to lethally remove California and Steller sea lions in the Columbia River and its tributaries (WDFW 2020).

No Steller sea lion haulouts are documented within the area that would be exposed to elevated in-air or in-water noise and disturbance from Project activities (see Section 5.1). Therefore, any individuals present during Phase 1 construction will be expected to be moving upstream or downstream through the underwater area of ensonification (to and from feeding areas at Bonneville Dam).

5 Type of Incidental Taking Authorization Requested

Under Section 101(a)(5)(D) of the MMPA, Weyerhaeuser requests an IHA for activities beginning as soon as practicable upon issuance of the regulation (expected to begin within the in-water work window starting September 1, 2025). Level A and Level B incidental take by acoustical harassment are requested for the three species of marine mammals that may occur in the area of ensonification during in-water pile removal and installation for the Project. Vibratory pile installation and removal and impact pile installation are the construction activities with potential to cause take.

Types of incidental taking include:

- Level B harassment (i.e., behavioral disturbance)
- Level A harassment (i.e., potential permanent [hearing] threshold shift or other types of non-serious injury).

The 2018 NOAA acoustical guidance (NOAA 2018) identifies the received levels, or acoustic thresholds, at which individual marine mammals are predicted to experience changes in their hearing sensitivity for acute, incidental exposure to all underwater anthropogenic sound sources. Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Finneran 2015). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall et al. 2007). Level A is the more severe form of harassment because it may result in injury (permanent [hearing] threshold shift [PTS]), whereas Level B harassment causes only behavioral disturbance with no potential for injury.

Thresholds have been established for marine mammal disturbance for both in-air and underwater noise, and injury thresholds have been established for underwater noise (Table 5-1). Regarding underwater noise, Level B harassment and Level A harassment onset acoustic thresholds for all sound sources are divided into two broad categories: impulsive and non-impulsive. Level A acoustic thresholds are presented as dual metric acoustic thresholds using cumulative sound exposure level (SELcum) and peak sound pressure (PK) metrics for impulsive sounds. As dual metrics, NOAA considers onset of PTS to have potentially occurred when either one of the two metrics is exceeded. NOAA’s alternative methods for development of PTS isopleths apply only to acoustic thresholds in the SELcum metric. Based on the details of the proposed Project, no component of the Project will include work that is expected to exceed the peak SPL PK thresholds for PTS or TTS, and no evaluations were conducted to identify take related to PK thresholds. Therefore, the type of incidental

take requested is based on exceedance of the acoustic thresholds in the SELcum metric for Level A and the disturbance thresholds for Level B harassment.

Table 5-1. Marine Mammal Injury and Disturbance Thresholds for Impulsive and Non-Impulsive Sounds for the Species That Potentially Occur in the Area of Ensonification

Hearing Group	In-Air Noise Thresholds	Underwater Noise Thresholds				
	Disturbance Threshold	Impulsive Sound Impact Pile Driving			Non-Impulsive Sound Vibratory Driving	
		Auditory Injury Threshold (PTS) – Level A		Behavioral Disturbance Threshold – Level B	Auditory Injury Threshold (PTS) – Level A	Behavioral Disturbance Threshold – Level B
	dB (RMS) unweighted	Peak SPL	dB SELcum	dB RMS	dB SELcum	dB RMS
Phocid Pinnipeds	90	218	185	160	201	120
Otariid Pinnipeds	100	232	203	160	219	120

Note: dB = decibels; PTS = permanent threshold shift; RMS = root mean square; SELcum = cumulative sound exposure level; SPL = sound pressure level

NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner that qualifies as Level B harassment when exposed to underwater noise above RMS received levels of 120 dB re 1 micropascal (µPa) for continuous sound sources including vibratory pile driving and removal, and 160 dB re 1 µPa for non-explosive, impulsive sound sources including impact pile driving (NOAA 2018).

5.1 Method of Incidental Taking

The method of incidental take requested is primarily Level B acoustical harassment. It would occur within the 120 dB RMS disturbance threshold for vibratory removal of existing piles (if vibratory removal is required vs. direct pull); the 120 dB RMS disturbance threshold for vibratory installation of 30-inch and 24-inch (temporary) steel pipe piles; and the 160 dB RMS disturbance threshold during impact pile installation of 30-inch pipe piles. These thresholds would be met or exceeded within the areas of ensonification from pile installation or removal described in Section 1 and summarized in Section 6.1.

Temporarily elevated in-air noise during vibratory and impact pile driving has the potential to result in Level B harassment of marine mammals that may be present during Phase 1 construction. As a result, any marine mammal that enters the area in which Level B terrestrial noise levels could be exceeded will be in an aquatic environment and will be recorded as a Level B take (or possible Level A take in the case of harbor seals) resulting from underwater noise. Therefore, no additional takes are anticipated as a result of temporarily elevated terrestrial noise levels. No Level A harassment threshold has been established for in-air noise; therefore, only underwater noise Level A thresholds are considered. Limited Level A take may also occur and is requested for harbor seals as described in Section 6.

6 Take Estimates for Marine Mammals

Under Section 101 (a)(5)(D) of the MMPA, the Project requests an IHA for takes by behavioral harassment (Level B harassment) during pile driving associated with Dock construction during the 2025–2026 in-water work period. The Project requests an IHA for incidental take of marine mammals described within this application for 1 year, commencing on September 1, 2025. Weyerhaeuser will request an annual renewal of the IHA for a second year until pile driving associated with the Project is completed if a second in-water work window is required. At this time, Weyerhaeuser is not requesting a multi-year Letter of Authorization (LOA) because the activities described are not expected to rise to the level of injury, which would require an LOA.

All marine mammals addressed in this document are pinniped species, which use the portion of the Columbia River within the Project-generated area of ensonification as a seasonal corridor for foraging. USACE has monitored pinniped presence and salmonid predation at Bonneville Dam (RM 146) since 2002, and the estimates of pinniped presence, numbers, and run timing in the Project vicinity are derived primarily from those data. The numbers of seals and sea lions estimated to be passing through the area of ensonification are based on numbers of individuals rather than a density estimate, as the ensonified zone covers the full width of the river. Therefore, any individuals moving through or foraging in the area are included in the estimate.

The numbers of harbor seals and sea lions observed at Bonneville Dam peaked from January 1 to May 31 in 2021 (van der Leeuw and Tidwell 2022). Only a few Steller sea lions were reported between August 1 and December 2020, and no California sea lions or harbor seals were observed during that period (van der Leeuw and Tidwell 2022). However, as described below, some harbor seals and potentially some California sea lions could be present downstream of Bonneville Dam in the Project area during September through December when pile driving activities would occur.

6.1 Estimated Harassment Threshold Zones

6.1.1 In-Air Noise

Pinnipeds can be affected by in-air noise when they are hauled out. Loud noises can cause hauled-out pinnipeds to panic back into the water, leading to disturbance and possible injury. For airborne noise exposure of hauled-out pinnipeds, NMFS uses criteria for Level B harassment of 90 dB re 20 µPa for harbor seals and 100 dB re 20 µPa for all other pinnipeds, including Steller sea lions and California sea lions. These criteria do not differentiate between continuous and impulsive noise types.

As described in Section 1.2 the geographic extent of construction-related in-air noise is calculated based on reference data provided by the Washington State Department of Transportation (WSDOT) Biological Assessment Preparation Manual (WSDOT 2020). Based on this guidance, the in-air noise generated by the project during pile installation and removal would was calculated to attenuate to:

Using this model, terrestrial noise during pile driving was calculated to attenuate to:

- Below the 90 dB RMS Level B threshold for harbor seals at a distance of approximately 500 feet (152 meters) during pile driving and

- Below the 100 dB RMS Level B threshold for non-harbor seal pinnipeds at a distance of up to 158 feet (48 meters) during pile driving.

All of these distances within which Level B terrestrial noise levels could be exceeded are within the distances that will be monitored for underwater noise. Because no pinniped haulout sites or habitat occur within the Project-generated area of ensonification, no pinnipeds are expected to haul out within the area exceeding the Level B disturbance in-air noise thresholds. As a result, any marine mammal that enters the area in which Level B terrestrial noise levels could be exceeded will be in an aquatic environment and will be recorded as a Level B take (or possible Level A take in the case of harbor seals) resulting from underwater noise.

6.1.2 Underwater Noise

Underwater noise from pile driving and removal were estimated for both impact and vibratory pile driving per accepted methods to determine the area of ensonification and isopleths for injury thresholds (Level A) and behavioral thresholds (Level B). This document identifies in-water noise thresholds for each marine mammal species based on the calculated behavioral effects levels and PTS isopleths identified using in-water sound transmission equations and spreadsheets provided by NOAA in the 2018 revised guidance (NOAA 2018). The Level B harassment isopleths were calculated using the practical spreading loss model. Underwater noise will fall below the behavioral effects threshold of 160 dB RMS for impact driving and 120 dB RMS for vibratory driving at the distances shown in Table 6-1. The possibility of simultaneous pile driving of up to two hammers, including any combination of impact and vibratory hammers, was also analyzed using interim guidance provided by NMFS (2024) and in coordination with NMFS biologists (Cara Hotchkin, NMFS, pers. comm 1/18/2024 and 2/21/2024). At this stage of project planning, it is difficult to predict when or where each of the crews may be working and, consequently, it is difficult to estimate which combinations of activities may occur simultaneously and for how long. Therefore, a “worst-case” scenario was assumed for each combination of simultaneous pile driving using the possibility of impact and/or vibratory installation of 30-inch steel piles on any day during the pile installation work window. However, the most likely scenario is that the removal of a 16-inch timber pile could occur at the same time as the installation of a 30-inch steel pile.

Level A

Level A thresholds for were identified for each functional hearing group for impact and vibratory installation and removal methods that will be implemented during Phase 1 as described in Section 1. The Level A isopleth distances were calculated using the NMFS acoustic threshold calculator (Appendix B), with inputs based on surrogate noise measurements from other sources and estimated conservative working durations or numbers of strikes, as described in Section 2. The maximum number of piles per day was used in the calculator to provide the maximum extent of the Level A harassment zones. This includes the maximum daily production rate including if up to two hammers are potentially being used. Level A isopleths were rounded up to develop conservative shutdown zones. Pile installation and removal will stop if animals approach or are present within the shutdown zone established for each hearing group.

Impact Pile Driving

The peak sound pressure thresholds established under NOAA's 2018 guidance for otariid pinnipeds (232 dB) will not be exceeded during any Project activities. The greatest single-strike peak sound pressure levels will be generated during the impact installation of the 30-inch steel piles, and these levels are estimated at 210 dB at 10 meters (Caltrans 2020). Although the NMFS acoustic threshold calculator (Appendix B) calculates a peak source level of 225 dB at the location of the pile being driven, which corresponds to a peak threshold distance of up to 3 meters for phocid pinnipeds, this distance is within the 10-meter minimum shutdown zone for all activities to avoid direct physical interaction with marine mammals (Appendix A).

The Level A harassment threshold for phocid pinnipeds (harbor seals) from impact pile driving could be exceeded at a distance of up to 852 meters. The Level A harassment threshold for otariid pinnipeds could be exceeded at a distance of up to 63 meters during impact driving of steel piles (Figure 6-1). These were estimated using the NMFS calculator and a conservative estimate of up to 8 piles per day and 1,000 strikes per pile (Appendix B). Eight is the maximum number of piles that will be installed per day, and on most days, only four or six piles will be installed. When impact installation of steel piles is required, the area within an 852-meter radius of the pile will be monitored and impact pile driving will be shut down immediately if any marine mammals approach or enter. Due to the size of the Level A shutdown zone for harbor seals, it is anticipated that some exposure to elevated sound levels potentially may occur as individuals enter this zone unobserved, and therefore, some Level A take for harbor seals is requested (see Section 6). The Level A zone for otariid pinnipeds (California sea lions and Steller sea lions) is 63 meters and monitoring of this smaller shutdown zone is expected to effectively eliminate the possibility of any individuals of those species being exposed to elevated sound levels that could result in Level A harassment.

Vibratory Installation and Removal

For vibratory pile installation of 30-inch steel piles, the Level A threshold for harbor seals is 23 meters. The Level A threshold for otariid pinnipeds (California sea lion and Steller sea lion) could be exceeded within 2 meters from the pile being driven (Figure 6-3; Appendix B). These small distances are not anticipated to be occupied by any individuals—particularly individual sea lions. Monitoring of the larger Level B harassment zones will indicate any approaching individuals, and the Level A shutdown zone will be monitored from the Dock and pile driving will be shut down immediately if any marine mammals are observed entering this zone.

Similarly, for vibratory removal of the 16-inch timber piles, 12-inch steel pipe piles, 12-inch steel H-piles, and 16-inch steel piles (including fender piles), as well as vibratory installation and removal of the 24-inch temporary steel piles, the Level A threshold distances are small (Table 6-1; Figure 6-2, Figure 6-3, Appendix B). Marine mammals are not anticipated to occur within these zones during the vibratory installation or removal of these piles, and monitoring of the much larger Level B harassment zones will indicate any approaching individuals before they enter the Level A shutdown Zone.

Simultaneous Pile Driving

For the simultaneous installation of 30-inch steel piles using up to two impact hammers operating concurrently, the Level A threshold was estimated using the NMFS calculator (Appendix B), a sound source level of 177 dB SEL, and adjusted inputs based on NMFS guidance for simultaneous impulsive sound sources (NMFS 2024). A conservative estimate of up to 8,000 total strikes (1,000

strikes per pile and a maximum of 8 piles installed per day) was used, although, as noted previously, impact pile driving is proposed only for the final setting (proofing) of 30-inch piles to support the new Dock. Based on NMFS guidance (2024), an input of one pile was used per day and the Weighting Factor Adjustment was 2.0 kHz (Appendix B). The Level A harassment threshold during impact pile driving could be exceeded at a distance of up to 852 meters for phocid pinnipeds and up to 63 meters for otariid pinnipeds, which is equivalent to that of a single 30-inch steel pile (Figure 6-1). Consistent with previously described protocols, the area within an 852-meter radius of either pile will be monitored during simultaneous impact pile driving and impact hammers will be shut down immediately if any marine mammals approach or enter.

For the simultaneous installation of up to two 30-inch steel piles using one impact hammer and one vibratory hammer, sound sources were treated as though they were non-overlapping and the largest Level A isopleth was used (Section 1.2.2; NMFS 2024). As noted above, the Level A harassment threshold for vibratory pile installation of 30-inch steel piles could be exceeded at a distance of up to 23 meters for phocid pinnipeds and up to 2 meters for otariid pinnipeds. In comparison, for impact pile installation of 30-inch steel piles, these distances increase to 852 meters for phocid pinnipeds and up to 63 meters for otariid pinnipeds. Therefore, the largest Level A isopleth in this scenario results from the impact installation of the 30-inch steel pile.

For the simultaneous vibratory installation of up to two 30-inch steel piles, and using a combined sound source level of 166 dB RMS (Section 1.2.2), the Level A harassment threshold could be exceeded at a distance of up to 36 meters for phocid pinnipeds and up to 3 meters for otariid pinnipeds (Figure 6-3). These distances were estimated using the NMFS calculator (Appendix B), the combined sound source level of 166 dB RMS, and adjusted inputs based on NMFS guidance for simultaneous sound sources (NMFS 2024). A conservative estimate of up to 8 hours (480 minutes) of simultaneous vibratory pile driving was used. Based on NMFS guidance (2024), an input of one pile was used for periods of concurrent activity and the Weighting Factor Adjustment was 2.5 kHz (Appendix B).

Level B – Behavioral Disturbance Isopleths

The Level B behavioral disturbance isopleths are estimated by the attenuation of underwater noise (transmission loss) using the practical spreading loss model. The formula for transmission loss (TL) is:

$$TL = X \log10 (R/D)$$

where R is the distance from the source, D is the distance of the known or measured noise level, and X is the TL coefficient. NMFS typically recommends a TL coefficient of 15 dB per tenfold increase in distance when site-specific empirical data are unavailable (i.e., 15 log10 in this case). This model, based on the default practical spreading loss assumption and NMFS' preferred TL coefficient, can be rearranged to estimate the distances to the Level B harassment thresholds as follows:

$$R = D * 10 (TL/15)$$

where TL is the difference between the sound source level and the Level B harassment threshold (120 dB or 160 dB). Distances to the Level B harassment isopleths vary by installation method and are described below. Landforms (including causeways, breakwaters, islands, and other land masses) are impenetrable by underwater sound and create land shadows where noise from construction is

diminished below harassment levels. In the Columbia River, noise from the Project will be blocked by Lord Island in the middle of the river channel as well as the shape and configuration of the river in the vicinity.

Impact Driving of 30-Inch Piles

Impact pile driving is proposed only for the final setting of 30-inch piles to support the new Dock. The 160 dB RMS behavioral disturbance threshold for all marine mammal species could be exceeded at a distance of up to 1,001 meters during impact driving of steel piles (Figure 6-1). This threshold distance was calculated using the spreading model that does not consider the number of strikes and duration of pile driving. Per the NOAA (2018) technical guidance, the NMFS calculator, which factors in the number of piles and strikes, was used to determine the Level A threshold areas (Appendix B). Piles will initially be vibratory-installed, and the much broader Level B harassment zone for vibratory pile driving (Figure 6-3 will be monitored at the same time. Harbor seals in this zone will be reported as Level B harassment and will serve as a warning that individuals may be approaching the Level A zone of up to 852 meters. For otariid pinnipeds (California sea lion and Steller sea lion), the Level A zone is much smaller at 63 meters (Table 6-1; Appendix B), and it is expected that monitoring in proximity of pile driving activities and of the Level B harassment zone should prevent any Level A take of these species. When impact installation of steel piles is required, the area within the Level A Harassment Zone will be monitored from the Dock and maintained as an injury protection zone, where impact pile driving will be shut down immediately if any marine mammals are observed entering this zone. This will ensure that no California sea lions or Steller sea lions will be exposed to underwater noise levels above the injury threshold established by NMFS (Level A harassment).

Vibratory Installation of Steel Piles (30-Inch Permanent, 24-Inch Temporary)

During vibratory installation of 30-inch steel piles, the 120 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of 7,356 meters from the Dock (Table 6-1.), although the extent of actual sound propagation will be limited to the area of 8.96 square kilometers identified in Figure 6-3 due to the shape and configuration of the river in the vicinity.

The distance to the Level B harassment threshold during vibratory driving of steel piles (120 dB RMS isopleth) will be monitored according to the protocol described in the monitoring plan. Marine mammal presence within this zone, if any, will be monitored, but vibratory pile driving activity will not be stopped if marine mammals are present. Any marine mammal documented within this zone during vibratory pile driving will constitute a Level B take and will be recorded and reported as such. Because vibratory pile driving and impact driving will both be occurring on the same days, the 120 dB rms isopleth will be monitored each day when pile driving is occurring. The Level B monitoring zone for vibratory pile driving will be monitored by four, land-based observers to estimate the number of individuals present within the Level B harassment zone, for purposes of reporting (see Appendix A).

As described in Section 1.2.2, a total of up to 26 24-inch temporary steel pipe piles may be installed for temporary construction use using a vibratory hammer. These piles will be installed as part of the daily pile driving activities within the 120 working days in the in-water work window during the same time as installation of the permanent 30-inch steel piles. Therefore, the Level B harassment zones for these overlaps with the other piles and is included in the maximum of eight piles installed per day

(Figure 6-3). Marine mammal monitoring will be conducted during pile driving, and any Level B take will be recorded during installation of the 24-inch temporary piles the same as for the permanent piles.

Possible Vibratory Removal of Timber Piles and Existing Steel Pipe Piles

Phase 1 will include the removal of 983 16-inch creosote timber piles, 53 steel piles (approximately 36 16-inch steel pipe piles, 10 12-inch H-piles, and 7 12-inch pipe piles), and 20 fender piles (14-inch or 16-inch steel pipe piles). Piles will be pulled out whenever possible, but some piles may require vibratory removal if they become stuck and are unable to be pulled. No noise impacts to marine mammals are anticipated from pulling piles, but vibratory removal of timber piles is estimated to produce 162 dB RMS (Caltrans 2020). A conservative estimate of additional take has been added to the take estimates for this Project to account for these activities. Based on the estimated maximum number of piles that would require vibratory removal, this could be up to 60 days in total, with some of these potentially occurring outside the work window. Direct pulling of these piles is planned, but a conservative estimate of an additional 30 days of potential vibratory removal was used to estimate take. This is a maximum estimate since many of the piles may be successfully pulled out and not require vibratory removal, and at least half would also be accomplished during the in-water work window within the 120 days of pile driving activities. Vibratory removal of timber piles that are unable to be pulled out may occur outside the in-water work window at any time during the year. During the possibly vibratory removal of the 16-inch timber piles, the 120 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of 6,310 meters from the Dock (Table 6-1.).

Steel piles (i.e., 12-inch steel pipe piles, 12-inch steel H-piles, and 16-inch steel piles, including fender piles) will also be removed and will likely require a vibratory hammer to pull them loose. The Level B harassment zones for these activities are estimated to be contained within the Level B harassment zone for the possible vibratory removal of the 16-inch timber piles (Table 6-1), as shown on Figure 6-2.

Simultaneous Pile Driving

For the possibility of simultaneous installation of 30-inch steel piles using up to two impact hammers operating concurrently, Level B thresholds were calculated using a combined sound source level of 193 dB RMS (Section 1.2.2). The 160 dB RMS behavioral disturbance threshold for all marine mammal species could be exceeded at a distance of up to 1,585 meters during impact driving of steel piles (Figure 6-1).

For the simultaneous installation of up to two 30-inch steel piles using one impact hammer and one vibratory hammer, the largest Level B harassment isopleth was used. As noted above, the 120 dB RMS Level B harassment threshold (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of 7,356 meters from the Dock during vibratory installation of 30-inch steel piles, although the extent of actual sound propagation will be limited to an area of 8.96 square kilometers due to the shape and configuration of the river in the vicinity (Table 6-1, Figure 6-3). This distance far exceeds the Level B harassment isopleth for impact installation of a 30-inch steel pile (i.e., 1,001 meters); therefore, the Level B harassment isopleth for vibratory installation was used.

For the simultaneous vibratory installation of up to two 30-inch steel piles, and using a combined sound source level of 166 dB RMS (Section 1.2.2), the Level B harassment threshold (120 dB) could be exceeded at a distance of up to 11,660 meters from the Dock, although the extent of actual sound

propagation will be limited to an area of 10.52 square kilometers due to the shape and configuration of the river in the vicinity (Table 6-1, Figure 6-3).

Summary of Anticipated Underwater Harassment Threshold Isopleths

The method of incidental take requested is primarily Level B acoustical harassment. It would occur within the 120 dB RMS disturbance threshold for vibratory removal of 16-inch timber piles and 24-inch steel piles (if these piles cannot be removed by direct pull); the 120 dB RMS disturbance threshold for vibratory pile driving of 30-inch and 24-inch (temporary) steel pipe piles; and the 160 dB RMS disturbance threshold during impact pile driving of 30-inch pipe piles. These thresholds would be met or exceeded within the areas of ensonification generated from pile installation or removal described in Section 1 and summarized below (Table 6-1).

Limited Level A take may also occur and is requested for harbor seal as described in Section 6.2.

Table 6-1. Summary of Level A and Level B Harassment Thresholds for Phase 1 of Log Export Dock Replacement

Hearing Group	Level A Harassment Zone Threshold (meters)	Level A Harassment Zone area (m^2)	Level B Harassment Zone Threshold (meters)	Level B Harassment Zone area (km^2)	Pile Activity
Phocid pinnipeds	20	693	6,310	8.25	Vibratory Removal 16-inch timber pile
	11	226	3,415	5.14	Vibratory Removal 12-inch steel pipe pile
	5	55	1,585	2.46	Vibratory Removal 12-inch steel H-pile
	17	509	5,412	7.47	Vibratory Removal 16-inch steel pile
	17	509	5,412	7.47	Vibratory Installation/Removal Temporary 24-inch steel pile
	23	906	7,356[a, b]	8.96	Vibratory Installation 30-inch steel pile
	36	2,153	11,660[b]	10.52	Simultaneous Vibratory Installation 30-inch steel pile
	852[c]	1.16 km^2	1,001	1.46	Impact Installation 30-inch steel pile
	852	1.16 km^2	1,585	2.46	Simultaneous Impact Installation 30-inch steel pile
Otariid pinnipeds	2	12	6,310	8.25	Vibratory Removal 16-inch timber pile
	1	3	3,415	5.14	Vibratory Removal 12-inch steel pipe pile
	1	3	1,585	2.46	Vibratory Removal 12-inch steel H-pile
	2	12	5,412	7.47	Vibratory Removal 16-inch steel pile

	2	12	5,412	7.47	Vibratory Installation/Removal Temporary 24-inch steel pile
	2	12	7,356[a, b]	8.96	Vibratory Installation 30-inch steel pile
	3	23	11,660[b]	10.52	Simultaneous Vibratory Installation 30-inch steel pile
	63[c]	6,352	1,001	1.46	Impact Installation 30-inch steel pile
	63	6,352	1,585	2.46	Simultaneous Impact Installation 30-inch steel pile

[a] The Level B harassment thresholds for the vibratory installation of a single 30-inch steel pile are equivalent to the potential simultaneous installation of up to two 30-inch steel piles using one impact hammer and one vibratory hammer operating concurrently. As noted previously, Level A and Level B harassment thresholds for simultaneous pile driving were analyzed based on interim guidance provided by NMFS (2024) and in coordination with NMFS biologists (Cara Hotchkin, NMFS, pers. comm 1/18/2024 and 2/21/2024).

[b] The Level B harassment thresholds reported above were calculated using the practical spreading loss model, although the extent of actual sound propagation will be limited to the areas identified in Figure 6-3 due to the shape and configuration of the Columbia River in the vicinity.

[c] The Level A harassment thresholds for the impact installation of a single 30-inch steel pile are equivalent to the potential simultaneous installation of up to two 30-inch steel piles using one impact hammer and one vibratory hammer operating concurrently. Similarly, based on the assumption that a maximum of 8 piles will be installed each day, this Level A harassment threshold is also equivalent to that of the simultaneous impact installation of up to two 30-inch steel piles as shown in the table above.

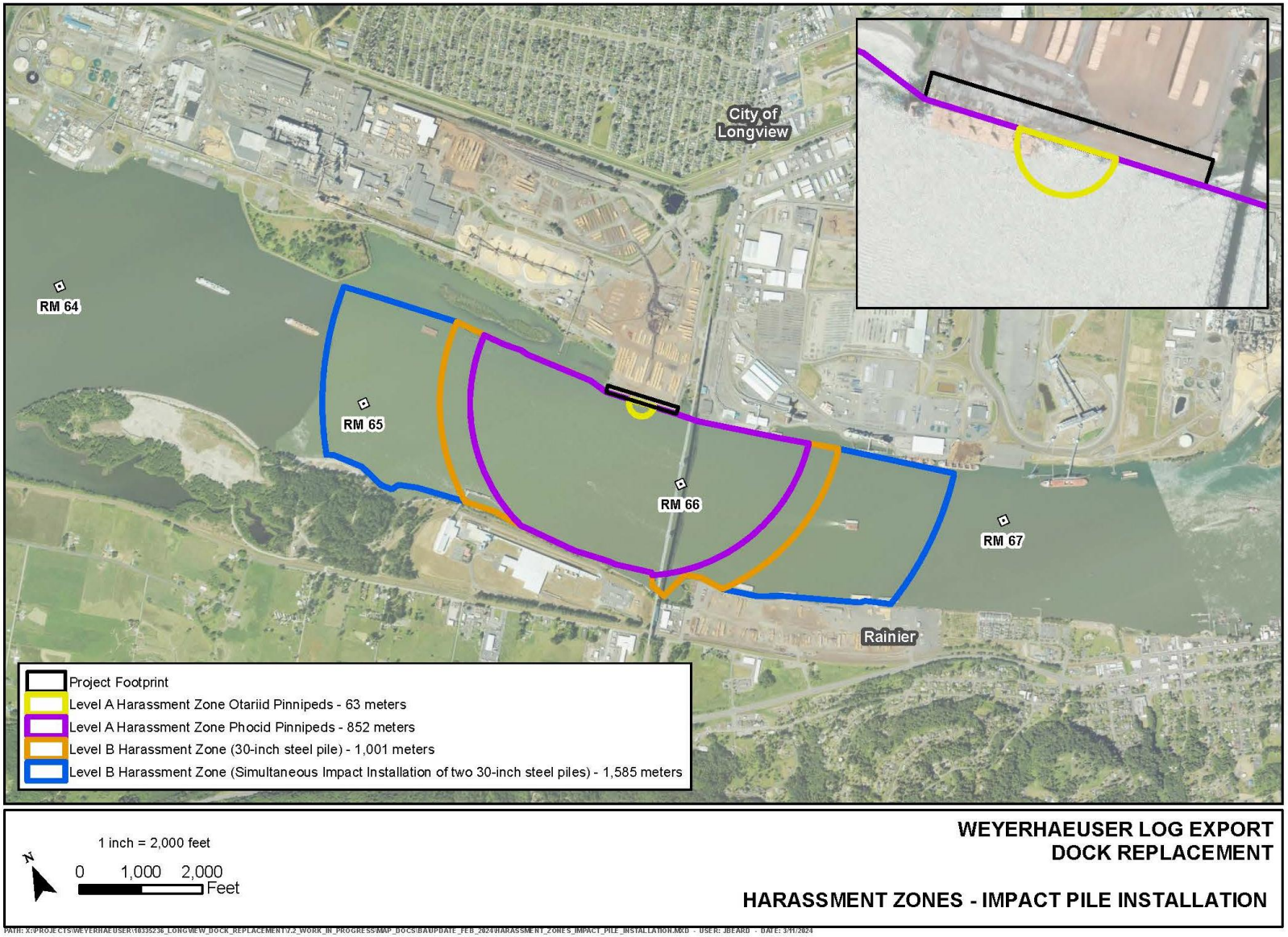

Figure 6-1. Impact Pile Installation Isopleths

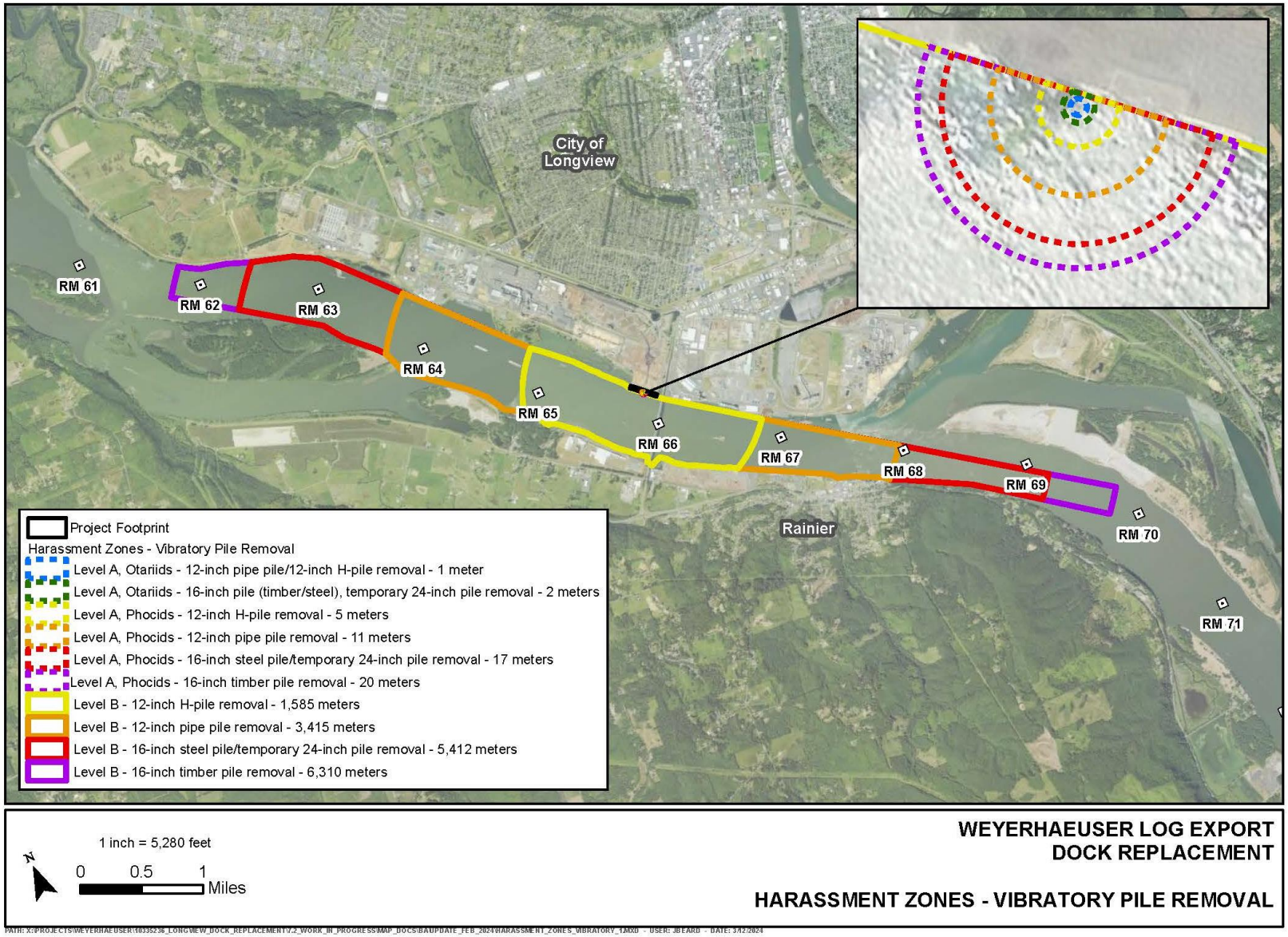

Figure 6-2. Vibratory Pile Removal Isopleths

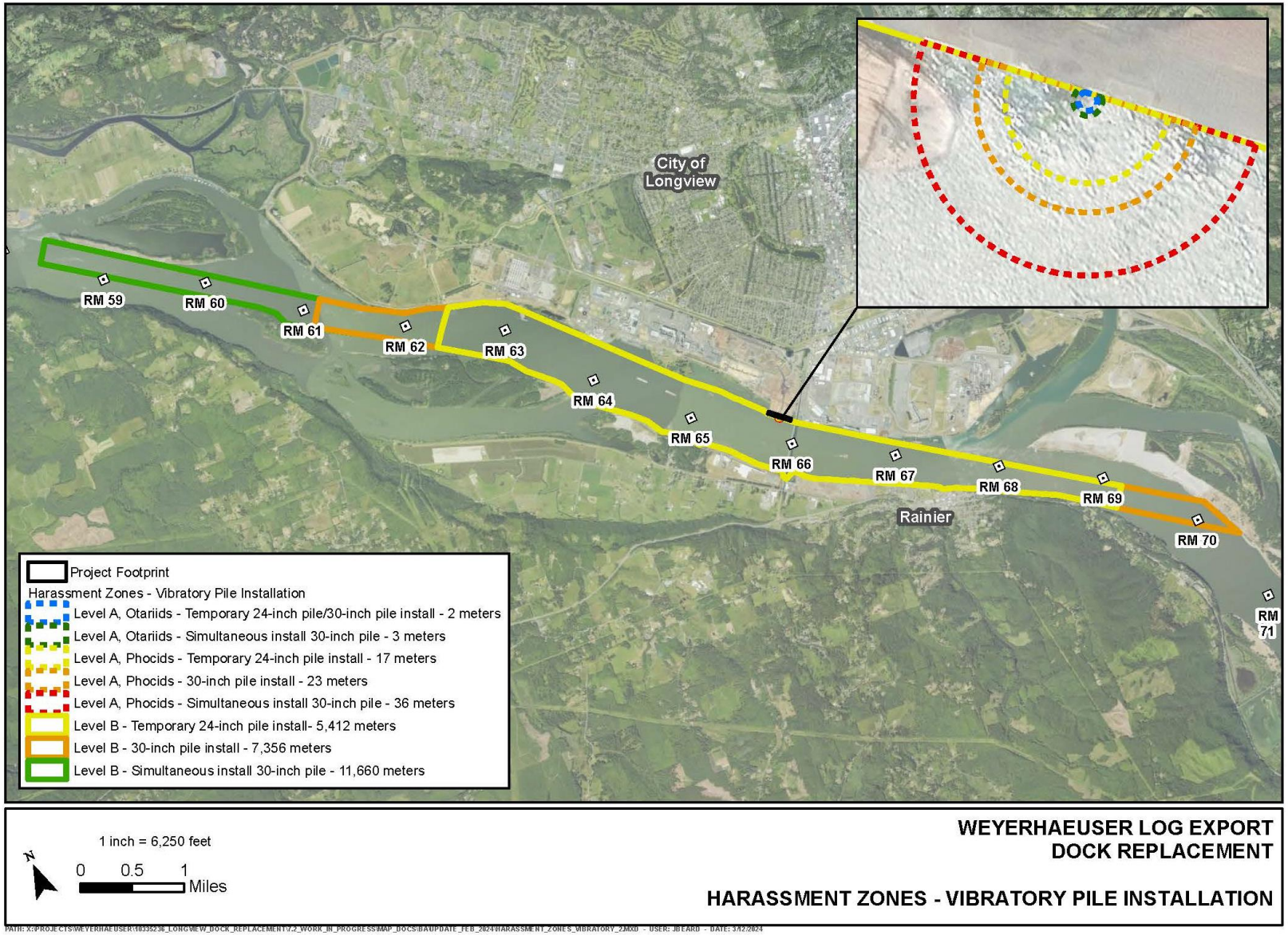

Figure 6-3. Vibratory Pile Installation Isopleths

6.2 Harbor Seal

While some harbor seal breeding and birthing does occur in the Columbia River estuary (Jeffries 1985), these activities are limited to the lower estuary, approximately 70 miles downstream of the Project, and no breeding or pupping is documented within the area of ensonification. For this reason, the only harbor seals expected to be present within this area during pile driving will be adult males and females.

Harbor seals are rarely observed at Bonneville Dam and have been recorded in low numbers over the past 10 years. However, they reside year-round in the Columbia River and are observed frequently in the vicinity of the Project. During winter, they tend to congregate to feed at the mouths of tributary rivers, including the Cowlitz and Kalama rivers. Few abundance data are available from Bonneville Dam, and specific observations from the area of ensonification are lacking. A recent IHA issued for the Port of Kalama Manufacturing and Marine Export Facility (85 FR 76527), which is located near the proposed Project, used a conservative estimate based on anecdotal information of harbor seals residing near the mouths of the Cowlitz and Kalama rivers and estimated that there could be up to 10 present on any given day of pile driving (NMFS 2017; 85 FR 76527).

Using this conservative estimate, during the anticipated 120 days of pile driving that could potentially occur during the 2025–2026 in-water work window as well as 30 days of vibratory removal of existing piles, it is possible that up to 1,500 Level B harassments of harbor seals could occur (Table 6-2) for the proposed Project (120 days x 10 harbor seals per day = 1,200 harbor seals plus 30 days x 10 harbor seals per day = 300; 1,200 + 300 = 1,500 harbor seals total). This a worst-case estimate, however, and the actual number of takes is expected to be fewer. It is likely that some individuals will be taken more than once. Individuals taken are expected to be a mix of solitary adult males and females. Juvenile harbor seals are not expected to be exposed, as there are no documented breeding rookeries within the area that could potentially be exposed to noise levels above the Level B harassment threshold.

In addition, due to the large size of the Level A harassment zone for impact pile driving for harbor seals (852 meters; Appendix B), Level A take is also requested. Marine mammal monitoring will be conducted during pile driving, but it is possible that a small number of individuals could enter the Level A harassment zone and stay for a sufficient duration to be taken before being detected by observers and before pile driving activities are shut down. It is therefore conservatively estimated that one harbor seal per day could potentially enter the Level A harassment zone undetected by marine mammal observers over the maximum of 120 days when impact pile driving would occur. This results in a Level A harassment (PTS) take estimate of 120 harbor seals (Table 6-2) for the proposed Project (120 days x 1 harbor seal per day = 120 harbor seals total).

6.3 California Sea Lion

California sea lions do not breed or bear their young anywhere in the Columbia River system, and their nearest documented breeding ground is on the islands off the coast of southern California (Caretta et al. 2013). California sea lions have been documented to use haulout sites at the mouth of the Cowlitz River (Jeffries et al. 2000), but the majority of individuals expected to be present in the Project area are adult males and females travelling to and from Bonneville Dam.

The numbers of California sea lions observed at Bonneville Dam have been in decline in recent years and ranged from 149 in 2016 to a total of 24 in 2021 (van der Leeuw and Tidwell 2022). In the fall and winter sampling period in 2019 to 2020, there were no California sea lions documented at Bonneville Dam. During the spring period from January 1 to May 6, 2020, daily counts averaged 0.9 animals ± 3.3 standard deviation (SD), with a high of 7 individuals (Tidwell et al. 2020). During spring 2021, California sea lions were present from late March through late May, but in relatively low numbers, with most days having five or fewer present (van der Leeuw and Tidwell 2022). The first California sea lion of the season was observed on March 15, and during April and May, the daily mean was 3.4 individuals with a peak of 10 on April 23 and again on April 28 (van der Leeuw and Tidwell 2022).

It is difficult to estimate the number of California sea lions that could potentially occur in the Level B harassment zone during the fall in-water work window from these data, because the numbers at Bonneville Dam reflect a strong seasonal presence in spring. California sea lions transiting or foraging in the Project area well downstream of the dam (RM 66) could be present year-round. Without actual counts or observation data from the Project area, spring counts at Bonneville Dam were used to estimate potential abundance during pile driving activities.

A conservative estimate of an average of 3 California sea lions moving through the Level B harassment zone per day was used for the up to 120 days of pile driving that could potentially occur within the 2025–2026 fall in-water work window. Reporting from 2021 indicated that there were generally few individuals at Bonneville Dam during the spring monitoring period, with most days having five or fewer (van der Leeuw and Tidwell 2022). From this, it is estimated that if vibratory removal of timber piles is required, there could be up to five individuals passing through the Level B harassment zone, and this number was used for take estimates for the up to 30 days of potential additive vibratory pile removal outside of the fall-winter work window. From these estimates, it is possible that up to 510 Level B takes of California sea lions could occur (Table 6-2) for the proposed Project (120 days x 3 California sea lions per day = 360 sea lions plus 30 days x 5 California sea lions per day = 150; 360 + 150 = 510 California sea lions total). This a conservative estimate, however, and the actual number of takes is expected to be fewer. It is likely that some individuals will be taken more than once. Individuals taken will be expected to be a mix of solitary adult males and females. Juveniles will not be expected to be exposed, as there are no documented breeding rookeries within the lower Columbia River, including the area that could potentially be exposed to noise levels above the Level B harassment threshold.

6.4 Steller Sea Lion

Steller sea lions have been observed in varying numbers at Bonneville Dam throughout much of the year (Tidwell et al. 2020; van der Leeuw and Tidwell 2022). All pile driving will occur between September 1 and January 31, which will avoid the April and May peak of the run. Steller sea lion presence at Bonneville Dam in January and February represents approximately one-third of the total run in a given year (Stansell et al. 2013). Steller sea lion counts at Bonneville Dam averaged 9.5 animals (± 10.3 SD) between January 1 and May 6, 2020 (Tidwell et al. 2020). During the 2019–2020 abundance counts, Steller sea lions were observed returning to the dam on July 17 and were sporadically observed in small numbers until the first week of September, after which there were 10 or more animals at the dam daily (Tidwell et al. 2020). Across the fall and winter period, the daily average abundance was 29.6 (± 13.3 SD) animals, and throughout April was 27 animals per day

(van der Leeuw and Tidwell 2022). These 30 individuals did not move up to the dam each day, but the majority of them remained in the vicinity of the dam for days or weeks.

While no specific data exist regarding the number of trips up and down river each individual sea lion makes, it is assumed that, on average, each makes one round trip during the spring migration. Therefore, to get a better estimate of the number of Steller sea lions that may move up through the Level B harassment zone past the Project site, we looked at changes in numbers prior to the peak to estimate the rate at which they were arriving. Reports from the previous 2 years also indicated daily increases of between 12 and 20 Steller sea lions during the fall survey period (Tidwell et al. 2020, Tidwell and van der Leeuw. 2021). Therefore, it is estimated that up to 20 Steller sea lions per day could potentially pass through or enter the Level B harassment zone on any of the 120 days of pile driving. Abundance tends to be highest in winter and spring, and therefore if vibratory removal of timber piles were to occur during that time period, there could be a higher number of individuals exposed to Level B harassment. For the up to 30 days of potential additive vibratory pile removal, it is estimated that up to 27 Steller sea lions per day could enter the Level B harassment area as they forage and migrate (120 days x 20 Steller sea lions per day = 2400 sea lions plus 30 days x 27 Steller sea lions per day = 810 sea lions; 2400 + 810 = 3,210 Steller seas lions total).

Using these numbers, it is estimated that up to 3,210 Level B takes of Steller sea lions could occur as a result of underwater noise from the Project (Table 6-2). However, the estimate of the daily number is conservative, and the actual number of takes is anticipated to be less. It is likely that some individuals will be taken more than once. Individuals taken are expected to be a mix of solitary adult males and females. Juvenile Steller sea lions are not anticipated to be exposed, as there are no documented breeding rookeries within or near the area that could potentially be exposed to noise levels above the Level B harassment threshold.

6.5 Summary of Requested Takes

The total number of takes for which Level B acoustical harassment authorization is requested is summarized in Table 6-2. Any incidental takes will very likely be multiple takes of individuals, rather than single takes of unique individuals. The stock take calculations below assume takes of individual animals, instead of repeated takes of a smaller number; therefore, the stock take percentage calculations are very conservative. The take request for each species is well below the 20 percent-of-stock threshold.

Table 6-2. Summary of Requested Takes

Species	Stock	Level A Take Request	Level B Take Request	% of Stock (take/ abundance*100)
Pacific harbor seal (*Phoca vitulina*)	OR/WA coastal stock	120	1,500	6.6%
California sea lion (*Zalophus californianus*)	U.S. stock	0	510	<1%
Steller sea lion (*Eumetopias jubatus*)	Eastern DPS	0	3,210	7.4%

Note: DPS = distinct population segment

7 Anticipated Impact of the Activity

The construction and operation of the Project have the potential to result in a range of effects to marine mammals including construction noise, water and air quality effects, and direct habitat impacts associated with the construction of the Project. Of these potential effects, underwater and in-air noise from impact and vibratory pile driving could result in Level B take of seals and sea lions and limited Level A take of harbor seals. This potential take in the form of disturbance and harassment is the subject of this IHA request.

As discussed in Section 6, underwater noise during pile installation may exceed the established injury and disturbance thresholds for the three species of marine mammals that potentially occur in the ensonified area generated by the Project. Because marine mammals may be present during pile driving, the modeled injury and disturbance threshold exceedance areas (Level A and Level B) will be monitored during pile installation according to the monitoring plan (Appendix A). The distances to the injury threshold for pinnipeds (185 and 203 dB SELcum for phocids and otariids, respectively) will be monitored during all pile driving, and the area within the respective injury threshold distances (up to 852 meters for phocids and 63 meters for otariids) will be maintained as an injury protection zone in which impact pile driving will be shut down immediately if any marine mammal enters. Weyerhaeuser does not anticipate take of California sea lions or Steller sea lions by Level A harassment due to the relatively small Level A threshold isopleths as well as required shutdown if an animal approaches the zone. Some Level A take is possible for harbor seals due to their lower hearing thresholds and consequently their larger Level A harassment zone (see Section 6).

The distances to the Level B disturbance thresholds for impact driving (the 160 dB RMS isopleth) and vibratory driving (120 dB rms isopleth) will also be monitored during pile driving according to the monitoring plan (Appendix A). Marine mammal presence within these zones, if any, will be monitored and documented, but pile driving will not be stopped if marine mammals are present. Any marine mammal documented within the 160 dB isopleth during impact driving, or the 120 dB isopleth during vibratory driving, could be exposed to underwater noise levels that will be defined as disturbance. Marine mammal monitoring for the vibratory removal of piles conducted outside of the pile installation work window will consist of trained protected species observers (PSOs) on site once every 7 days. PSOs will monitor the 10-meter shutdown zone to prevent physical interaction, in addition to the area within which the Level B harassment thresholds could be exceeded (i.e., the 120 dB RMS isopleth during vibratory removal) to monitor the number of Level B takes and ensure consistency with estimated Level B take included in this IHA request.

The Project is not anticipated to cause permanent harm or lethal take of any individual marine mammal. Disturbance from temporary exposure to levels of underwater noise above the disturbance threshold is expected to be limited to minor behavioral modifications such as dispersion from, or more rapid migration through, the action area. Long-term, permanent effects, such as long-term avoidance of the action area or direct injury or mortality, are not anticipated.

Overall, the potential Level A and Level B takes identified in Section 6 are not expected to have an impact on stock recruitment or survival and therefore would have a negligible impact on the stocks of the species evaluated. Because no potential biological removal (i.e., mortality) is anticipated as part of the Project, there is no anticipated effect to any stock’s ability to reach or maintain its optimum sustainable population.

The lower Columbia River represents a very small portion of the total habitat available to the pinniped species for which NMFS is proposing to authorize take. There are no known calving or rookery grounds in the Project area, with the estuary being over 40 miles downstream, and individuals present in the area of ensonification would be adults and sub-adults. The Project area represents a small portion of available foraging habitat, and the duration of noise-producing activities is limited to the in-water work window and fall season.

Any impacts on marine mammal prey that would occur during Project activities would have short-term effects on the foraging of individual marine mammals transiting between the mouth of the Columbia River and Bonneville Dam. These two locations provide better feeding opportunities than the river in between, which is why pinnipeds tend to congregate in these areas. Therefore, indirect effects on marine mammal prey and foraging opportunities during the pile driving activities are not expected to be substantial and are unlikely to cause significant effects on individual marine mammal foraging or the populations of the respective marine mammal stocks.

8 Anticipated Impacts on Subsistence Uses

The Project will take place in and adjacent to the Columbia River in Longview, Washington. No activities will take place in or near a traditional tribal hunting place. Therefore, the Project will have no impact on subsistence.

9 Anticipated Impacts on Habitat

The proposed Project will replace Berth A of the existing Dock and will use significantly fewer piles than the existing structure. Additionally, the Project will ultimately remove a large number of creosote-laden timber piles from the exiting Dock footprint. While habitat and species impacts have been minimized to the extent practicable, certain aspects of the Project have the potential to result in unavoidable impacts to aquatic and/or terrestrial habitat, and these in turn could affect marine mammals.

Impacts to marine mammal habitat as a result of the Project will be limited to temporary water quality impacts from localized increased turbidity during construction and direct habitat impacts resulting from the footprint of the installed piles. These are not expected to significantly affect marine mammal habitat within the Columbia River in the Project area. The minor, temporary habitat impacts are not expected to result in any disturbance of marine mammals that would rise to the level of harassment or take as defined under the MMPA.

As described in this document, the principal impacts to marine mammals will be from elevated underwater noise disturbance and harassment generated from pile driving for the Project. These same sound impacts also have the potential to affect the local abundance, behavior, or distribution of prey species. The most likely impact to fish from pile driving in the area of ensonification would be temporary behavioral avoidance of the area. The duration of fish avoidance of an 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 during the regular working daylight hours on days when pile driving occurs, and seals and

sea lions would be able to forage on prey species in other areas upstream or downstream where the fish would likely move to avoid the Project noise.

9.1 Benthic Habitat Impacts

The Project will not measurably alter river or shoreline habitat, and the Columbia River in the Project vicinity will continue to be used primarily as a migratory corridor, the same as under current conditions. The Project is in an area that has been highly modified by industrial activity and will occur at the location of the existing Dock.

The Project will result in short-term elevated levels of turbidity from pile installation (occurring within the pile installation work window of September 1 through January 31) and pile removal and slope restoration (including riprap replacement), which are proposed to occur at any point during the year. Although in-water construction activities could stir up sediments, increased turbidity will impact only areas in proximity to the Dock and, given the size of pilings to be removed/installed and the quantity of flow in the river, elevated turbidity is not expected to be measurable more than a few feet from each pile. Turbidity caused by the Project will quickly dissipate, as sandy material will quickly drop out of the water column and finer material will be diluted by riverine flow.

The Project will include the removal of 60,109 square feet of the existing deck and removal of 983 16-inch creosote timber piles, 53 steel piles (approximately 36 16-inch steel pipe piles, 10 12-inch H-piles, and 7 12-inch pipe piles), and 20 fender piles (14-inch or 16-inch steel pipe piles). Approximately 325 30-inch steel pipe piles will be installed as part of Dock replacement. Although the number of in-water piles will decrease compared to existing conditions, the overall in-water footprint of piles will increase by approximately 150 square feet due to the size of the proposed piles (30-inch steel pipe piles compared to the existing 16-inch timber piles). However, the Project will ultimately remove a large number of creosote-laden timber piles.

9.2 Water Quality

Turbidity occurs when suspended organic and inorganic particles in the water column scatter light waves and reduce the light available to underwater environments. Pile removal and installation may temporarily increase turbidity resulting from suspended sediments. Any increases will be short-term, localized, and minimal. All Project construction will be in compliance with Washington water quality standards under Washington Administrative Code 173 201A 200(1)(e)(i), which allow temporary exceedances of turbidity up to 300 feet (91 meters) downstream from areas during pile removal and installation.

Increases in turbidity will be well within State water quality standards for temporary construction exceedances. The risk of unintentional discharges of machinery fluids will be managed through adherence to best management practices (BMPs) as described in Section 11.

10 Anticipated Effects of Habitat Impacts on Marine Mammals

The Project will replace the upstream berth (Berth A) of the existing Dock in the same footprint as the existing structure and will not alter overwater shading or the shoreline from existing conditions. Impacts to marine mammal habitat as a result of the Project will be limited to temporary water quality impacts from localized increased turbidity during construction and direct habitat impacts resulting from the benthic footprint of the installed piles. These are not expected to significantly affect marine mammal habitat and are not expected to result in changes to their use of the Project area or any disturbance that would rise to the level of harassment or take as defined under the MMPA.

Pile removal and installation could cause temporary localized turbidity plumes. Natural tidal and hydraulic processes routinely disturb benthic habitats, and marine mammals that use this reach of the river are accustomed to these habitat conditions. Potential construction effects on habitat from reduction in water quality will be localized and temporary and are anticipated to have a negligible effect on marine mammals.

The Project area is used primarily as a transit corridor for seals and sea lions moving up and down the Columbia River to foraging and haulout areas. Haulout areas are not present in the vicinity of the Dock and will not be impacted by the Project.

Impacts on benthic habitat may negatively affect prey species for marine mammals, including salmonids. However, the relatively small quantity of proposed benthic habitat impact, and the mitigation measures proposed in Section 11, will minimize the potential effects to marine mammal prey species to the point that they are not expected to have a measurable effect on any marine mammal species. Further, seals and sea lions transit the area as they forage, moving upstream and downstream with salmon runs, and do not haul out or congregate in, or make direct use of benthic or shoreline habitats impacted by the Project.

11 Mitigation Measures to Protect Marine Mammals and Their Habitat

The Project has been designed to avoid and minimize impacts to aquatic resources to the greatest extent practicable. The sizes and configuration of the structures have been kept to the minimum necessary to support their needed functions. The Project will replace the existing Dock in an active shipping channel of the Columbia River adjacent to the federal navigation channel. A Marine Mammal Monitoring Plan (Appendix A) will be implemented to avoid and minimize the exposure of marine mammals to Level A harassment. If any other marine mammals including species not considered in this document also approach or enter the Level A harassment zone during monitoring, all pile driving will cease. In addition, a minimum shutdown zone of 10 meters will be implemented for all activities to avoid direct physical interaction with marine mammals. The Project has implemented the following BMPs to minimize the extent of any effects to marine mammals and the aquatic environment.

11.1 Pile Driving/Removal Best Management Practices

The Project will implement BMPs during pile installation to limit impacts to marine mammals. Pile driving BMPs include:

- To reduce underwater noise produced by impact pile driving, an unconfined bubble curtain will be used during impact pile installation.
- A vibratory hammer will be used to drive steel piles to the greatest extent possible to minimize underwater noise levels.
- Pile installation will be conducted during the pile installation work window of September 1 to January 31. Pile removal is proposed to occur at any time of year. It is estimated that 75% of the existing piles will be removed by direct pull, and 25% may require the use of a vibratory hammer. Marine mammal monitoring for the vibratory removal of piles conducted outside of the pile installation work window will consist of trained PSOs on site once every 7 days. PSOs will monitor the 10-meter shutdown zone to prevent physical interaction, in addition to the area within which the Level B harassment thresholds could be exceeded (i.e., the 120 dB RMS isopleth during vibratory removal) to monitor the number of Level B takes and ensure consistency with estimated Level B take included in this IHA request.
- Pile installation and removal will occur only during daylight hours, when visual monitoring of marine mammals can be conducted.
- Prior to impact pile driving, the Contractor will be required to use a soft start. Soft start for impact drivers requires that Contractors provide an initial set of three strikes at reduced energy, followed by a 30-second waiting period and then two subsequent reduced-energy strike sets. No soft start will be required for vibratory pile installation or removal.
- Soft start shall be implemented at the start of each day’s impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer.

11.2 Overwater Work Best Management Practices

The Project will employ typical construction BMPs for working over and near water. During construction, the Contractor is expected to mobilize cranes, tugs, and floating barges, including a derrick barge that will be moved into location with a tugboat. The crane will be used to conduct pile installation from barges, which are anticipated to remain on-site for the duration of construction. Impact minimization measures include the following:

- Netting or a similar system will be used to prevent demolition debris from falling into the Columbia River.
- Excess or waste materials will not be disposed of or abandoned waterward of the OHWM or allowed to enter surface waters. Waste material will be disposed of in an appropriate manner consistent with applicable local, State, and federal regulations.
- Construction materials will not be stored where wave action can cause materials to enter surface waters.

11.3 Spill Response and Prevention

Several measures have been incorporated into the Project to prevent a spill and minimize the potential effects in the unlikely event of a spill associated with tug and barge operation. These include:

- Fuel hoses, oil drums, oil or fuel transfer valves, fittings, and similar equipment will be checked regularly for leaks, and materials will be maintained and stored properly to prevent spills.
- Corrective actions will be taken in the event of any discharge of oil, fuel, or chemicals into the water. These actions will include beginning containment and cleanup efforts immediately upon discovery of the spill and completing them in an expeditious manner in accordance with all applicable local, State, and federal regulations. Spill response will take precedence over normal work. Cleanup will include proper disposal of any spilled material and used cleanup material.
- Oil-absorbent materials will be present on-site for use in the event of a spill or if any oil product is observed in the water.
- Vessel operators will have industry-standard spill containment equipment on board, including oil booms.
- Crane and pile hammer operators will evaluate using vegetable oil as lubricant, rather than hydrocarbon-based lubricants, to the greatest extent possible.
- Weyerhaeuser will require that the selected Contractor create a Spill Prevention, Control, and Countermeasures Plan (SPCCP). The SPCCP will be developed, implemented, and maintained to manage toxic materials associated with construction activities (e.g., equipment leakage, disposal of oily wastes, cleanup of spills, and storage of petroleum products/chemicals in contained areas away from streams and wetlands). The SPCCP will outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The SPCCP will also outline management elements such as personnel responsibilities, site security, site inspections, and training.
- Applicable spill response equipment and material designated in the SPCCP will be maintained at the job site.

12 Mitigation Measures to Protect Subsistence Uses

As described in Section 8, the Project will take place in and adjacent to the Columbia River in Longview, Washington. No activities will impact subsistence uses, as they do not take place in or near a traditional tribal hunting place.

13 Monitoring and Reporting

No ESA-listed marine mammals are expected to occur in the areas impacted by the Project or in this part of the lower Columbia River. However, to limit take of non-ESA-listed marine mammals as defined under the MMPA, the Project has developed a Marine Mammal Monitoring Plan (Appendix A). The plan will be implemented to minimize the exposure of marine mammals to Level A harassment and to document and quantify the number of Level B takes during pile driving activity associated with the Project. If Weyerhaeuser discovers a stranded, injured, or dead marine mammal, regardless of the cause, Weyerhaeuser will immediately report the incident to the NMFS West Coast Region Stranding Hotline (866-767-6114). Details regarding the reporting protocol for this scenario can be found in Appendix A (Marine Mammal Monitoring Plan).

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Appendix A: Marine Mammal Monitoring Plan

Appendix B: NMFS User Spreadsheets for Project Pile Removal and Installation

Appendix A. Marine Mammal Monitoring Plan

1.0 Introduction

This marine mammal monitoring plan is designed to avoid Level A harassment (harassment resulting in injury or direct mortality) to California sea lion and Stellar sea lion within the Level A harassment zones as identified in the IHA application, and to minimize exposure of harbor seals to Level A harassment. The plan is also designed to monitor and record the extent of Level B harassment (behavioral disruption) for all three pinniped species.

As described in the IHA application, the proposed construction schedule is as follows:

- Pile installation and removal will be conducted over a five-month period during a work window of September 1 to January 31. It is anticipated that pile installation will require up to 120 days of pile driving within this window. To complete pile installation within the pile installation work window, it is assumed that multiple crews will need to work simultaneously to remove and install piles. It is therefore possible that up to two hammers, including any combination of impact and/or vibratory hammers, could be in use simultaneously on any day during the pile installation work window.
- Additional pile removal as needed, including direct pulling, vibratory extraction and/or cutting existing piles at or below the mudline may be conducted year-round. It is anticipated that pile removal will require a maximum of 60 days (not consecutive) to complete.
- Over-water work and work conducted below the ordinary high water mark (OHWM), but outside the wetted perimeter of the river (in the dry) may be conducted year-round.

The requested work window for pile installation (September 1 to January 31) leaves adequate buffer for unexpected delays and allows for pile removal to occur simultaneously. Pile removal activities, riprap placement, and restoration of the slope under the Dock are not expected to result in significant adverse impacts to aquatic species or resources, and these activities are therefore proposed to occur at any point during the year.

Pile installation will be conducted during standard daylight working hours. Each pile will be installed alternately with vibratory and impact hammers. Each pile will require approximately 1 hour of vibratory hammering and up to 1,000 impact hammer strikes to install. Vibratory pile installation will likely be intermittent and involve multiple starts and stops, as opposed to one continuous hour of use. To reduce underwater noise produced by impact pile driving, an unconfined bubble curtain will be used during impact pile installation. It is conservatively assumed that up to a maximum of eight piles will be installed each day. This gives a maximum total of 8 hours of vibratory driving and up to 8,000 impact hammer strikes per day. Within the pile installation window (September 1 to January 31), it is anticipated that pile driving will occur for up to 120 total days (not necessarily consecutive).

Per this monitoring plan, impact pile driving activities will not be initiated, or, if initiated, will cease temporarily, if any marine mammals are present within the Level A harassment threshold (i.e., the 185 dB and 203 dB isopleths, also referred to as the “injury protection zone”) represented in Figure A-1. These zones differ based on phocid and otariid hearing groups. For impact driving of 30-inch steel piles, the Level A exclusion zone is up to 63 meters for otariid pinnipeds (sea lions) and up to 852 meters for phocid pinnipeds (harbor seals). It is anticipated that an occasional harbor seal may

be observed within this 852-meter zone during the course of the project. Based on the assumption that a maximum of 8 piles will be installed each day, this Level A harassment threshold is also equivalent to that of the simultaneous impact installation of up to two 30-inch steel piles.

Additionally, the area within the Level B harassment zones (i.e., the 160 dB isopleth during impact driving and the 120 dB isopleth during vibratory installation), shown in Figure A-1, will be monitored for documenting and reporting any Level B takes of marine mammals. Any marine mammal present within this zone would be monitored, but impact pile driving would not be stopped and would constitute a Level B take and would be recorded and reported as such. Note that Figure A-1 shows only Level A exclusion zones for phocid pinnipeds, as the Level A exclusion zones for otariid pinnipeds are subsumed within this area.

As noted previously, pile installation will be conducted during the pile installation work window of September 1 to January 31. Pile removal is proposed to occur at any time of year. It is estimated that 75% of the existing piles will be removed by direct pull, and 25% may require the use of a vibratory hammer. Marine mammal monitoring for the vibratory removal of piles conducted outside of the pile installation work window will consist of trained protected species observers (PSOs) on site once every 7 days. PSOs will monitor the 10-meter shutdown zone to prevent physical interaction, in addition to the area within which the Level B harassment thresholds could be exceeded (i.e., the 120 dB RMS isopleth during vibratory removal) to monitor the number of Level B takes and ensure consistency with estimated Level B take included in this IHA request.

Monitoring during pile driving activities will be conducted by at least 4 observers. One observer will be stationed on the existing dock or similar location to monitor the Level A harassment zone, and 3 to 4 observers will be stationed throughout the Level B harassment zone where line of sight views would cover the zone. Figure A-1 shows the Level A and Level B harassment zones, as well as potential locations for marine mammal observers. Table A-1 shows Level A and Level B harassment zones and shutdown zones based on Project activities.

Table A-1. Level A and B Harassment and Shutdown Zones based on Project Activities

				Level A Zones and Minimum Shutdown Zones (m)				Level B Zones
				PW		OW		
				Harbor Seal		California Sea Lion Steller Sea Lion		All Species
				Shutdown Zone	Level A Zone	Shutdown Zone	Level A Zone	
Pile Installation and Removal								
Pile Type and Size	**Activity Type**	**Installation Method**	**Piles Per Day (Total Estimated Duration in Minutes)**					
16-inch timber pile	Removal	Vibratory[1]	8 (480)	20	20	10	2	6,310
12-inch steel pipe pile	Removal	Vibratory[1]	8 (480)	11	11	10	1	3,415
12-inch steel H-pile	Removal	Vibratory[1]	8 (480)	10	5	10	1	1,585
16-inch steel pipe pile	Removal	Vibratory[1]	8 (480)	17	17	10	2	5,412
24-inch steel pipe pile	Temporary pile install/removal	Vibratory[1]	8 (480)	17	17	10	2	5,412
30-inch steel pipe pile	Preliminary install	Vibratory	8 (480)	23	23	10	2	7,356
30-inch steel pipe pile	Simultaneous vibratory installation	Vibratory	8 (480)	36	36	10	3	11,660
30-inch steel pipe pile	Final install	Impact	8,000 strikes	852	852	63	63	1,001
30-inch steel pipe pile	Simultaneous impact installation	Impact	8,000 strikes (total)	852	852	63	63	1,585

Notes: m = meters; OW = otariid in water; PW = phocid in water.

[1] Based on substrate conditions at the site, it is anticipated that most (i.e., approximately 75%) of the existing timber piles will be removed by direct pull. Steel piles will likely be removed by vibratory hammer. It is anticipated to take a total of 60 days with up to 30 days possibly occurring outside the work window.

2.0 Monitoring Protocol

Marine mammal monitoring during project construction will consist of the following procedures:

1. Trained PSOs meeting the minimum qualifications identified in Section 2.1 will be always present on site during pile installation activities conducted for the project (on the Dock and along the shore of the Columbia River upstream and downstream of the Dock). Additional observations could be established on boats or on the opposite bank of the river in Oregon.
2. Marine mammal monitoring will be conducted during the pile installation work window (September 1 to January 31). Additionally, marine mammal monitoring for the vibratory removal of piles conducted outside of the pile installation work window will consist of trained PSOs on site once every 7 days. PSOs will monitor the 10-meter shutdown zone to prevent physical interaction, in addition to the area within which the Level B harassment thresholds could be exceeded (i.e., the 120 dB RMS isopleth during vibratory removal) to monitor the number of Level B takes and ensure consistency with estimated Level B take included in this IHA request.
3. A minimum shutdown zone of 10 meters will be implemented for all activities to avoid direct physical interaction with marine mammals.
4. During impact pile driving activities, the Level A injury protection zone within 852 meters of the pile being driven will be monitored by a single, land-based observer. This individual will be stationed in the general vicinity of the pile being driven and will have clear line of sight views of the entire area within which temporary effects can be expected.
5. Impact pile driving would be shut down immediately if any marine mammals enter the injury protection zone, thus avoiding the possibility of any marine mammal being exposed to Level A harassment.
6. If a marine mammal is observed approaching the injury protection zone, PSOs will call for all in-water pile installation to be shut down until the marine mammal (s) has left the zone. PSOs must maintain verbal contact with construction personnel to immediately call for a halt of pile installation operations to avoid exposures. A clear authorization and communication system will be in place to ensure that PSOs and construction crew members understand their respective roles and responsibilities.
7. The area within which the Level B harassment thresholds could be exceeded (i.e., the 160 dB RMS isopleth for impact driving and the 120 dB RMS isopleth during vibratory driving) will also be monitored for the presence of marine mammals during pile installation activities. Marine mammal presence within these zones will be monitored, but pile driving activity will not be stopped if marine mammals are found to be present. Any marine mammal documented within the 160 dB isopleth during impact driving, or the 120 dB isopleth during vibratory driving, will constitute a Level B take, and will be recorded and used to document the number of take incidents.
8. Monitoring of the Level A and Level B harassment zones will be conducted each day when pile driving activities are occurring and the number of marine mammals potentially exposed to underwater noise above the Level B harassment threshold will be recorded. Monitoring of the Level B harassment zone during vibratory pile driving will be conducted by at least 4 observers stationed at accessible locations upstream and downstream of the Dock and

would observe the vibratory temporary effect area from the shore of the Columbia River or by boat (Figure A-1).

9. Each observer will be equipped with large aperture binoculars (25X or better) or hand-held binoculars (7X or better) with built-in rangefinder or reticles to conduct monitoring activities.
10. If waters exceed a sea-state which restricts the observers' ability to make observations within the injury protection zone (i.e., the 190 dB isopleth), including excessive wind or fog, impact pile installation will cease until conditions allow for the resumption of monitoring. Vibratory pile installation would be permitted to continue under these conditions.
11. PSOs will begin observations 30 minutes prior to the start of impact pile installation each day and will continue to observe for 30 minutes after completion each day of impact pile installation. PSOs will have no other construction-related tasks or responsibilities while monitoring for marine mammals. PSOs will understand their roles and responsibilities before beginning observations. Each PSO will be trained and provided with reference materials to ensure standardized and accurate observations and data collection.
12. Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones are clear of marine mammals. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals.
13. Activity must be halted if upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or within the harassment zone.
14. If pile driving is delayed or halted due to the presence of a marine mammal, the activity cannot resume until the mammal has been visually confirmed to have moved beyond the shutdown zone or 15 minutes has passed without re-detection of the animal.

2.1 Minimum Qualifications for Marine Mammal Observers

Monitoring will be conducted by trained PSOs who meet or exceed the qualifications identified by NMFS. These will include the following requirements:

1. PSOs will be independent observers (i.e., not construction personnel).
2. One PSO will be designated as the lead PSO or monitoring coordinator. The lead PSO must have prior experience working as an observer.
3. Other observers may substitute education (including relevant academic experience) or training for experience.
4. PSOs must have:
    a. The ability to conduct field observations and collect data according to assigned protocols.
    b. Experience or training in the field identification of marine mammals, including the identification of behaviors.
    c. Sufficient training, orientation, or experience with construction operations to provide for personal safety during observations.

d. The ability to communicate orally, by radio, or in person with project personnel to provide real-time information on marine mammals observed in the area.

2.2 Soft Start Procedure

A ‘‘soft start’’ technique will be used at the beginning of impact pile installation, to allow any marine mammal that may be in the immediate area to leave before impact pile driving reaches full energy. Soft start for impact drivers requires that contractors provide an initial set of three strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets.

If a marine mammal is sighted within the shutdown zone prior to impact pile installation or during the soft start, the hammer operator (or other authorized individual) will delay impact pile driving until the animal moves outside the shutdown zone; work can then resume. Soft start will be implemented at the start of each day’s pile driving and at any time following cessation of pile driving for a period of thirty minutes or longer.

2.3 Reporting

During marine mammal monitoring activities, a marine mammal observation sheet will be used to record the species, date, and time of any marine mammal sightings. Marine mammal behavior and any communication between the observer and the contractor during pile driving will also be recorded.

A draft marine mammal monitoring report for the project will be submitted to NMFS within 90 calendar days of the completion of monitoring. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. This report will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets.

In general, reporting will include:

- Date and time when observations began and ended each day
- General weather and water conditions and visibility during observations
- Number of marine mammals observed and other notable wildlife observations
- Description of any observable marine mammal behavior patterns, including direction of travel and distance from pile driving activity
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point
- Times when work was stopped and resumed due to the presence of marine mammals

2.4 Notification of Injured or Dead Marine Mammals

In the unanticipated event that the Project activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as a serious injury or mortality, Weyerhaeuser would immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator. The report will include the following information:

- Time, date, and location (latitude/longitude) of the incident.
- Detailed description of the incident.
- Description of vessel involved (if applicable), including the name, type of vessel, and vessel speed before and during the incident.
- Status of all sound source use in the 24 hours preceding the incident.
- Environmental conditions (wind speed and direction, wave height, cloud cover, and visibility).
- Description of marine mammal observations in the 24 hours preceding the incident.
- Species identification, description, and fate of animal(s) involved.
- Photographs or video footage of animals or equipment (if available).

In-water pile installation and removal would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with Weyerhaeuser to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Weyerhaeuser may not resume in-water pile installation and removal until notified by NMFS' MMPA program via letter, email, or telephone.

If Weyerhaeuser discovers a stranded, injured, or dead marine mammal, regardless of the cause, Weyerhaeuser will immediately report the incident to the NMFS West Coast Region Stranding Hotline (866-767-6114). The report will include applicable information listed above. If the cause of stranding, injury, or death is unknown, activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with Weyerhaeuser to determine whether modifications to the activities are appropriate.

3.0 Literature Cited

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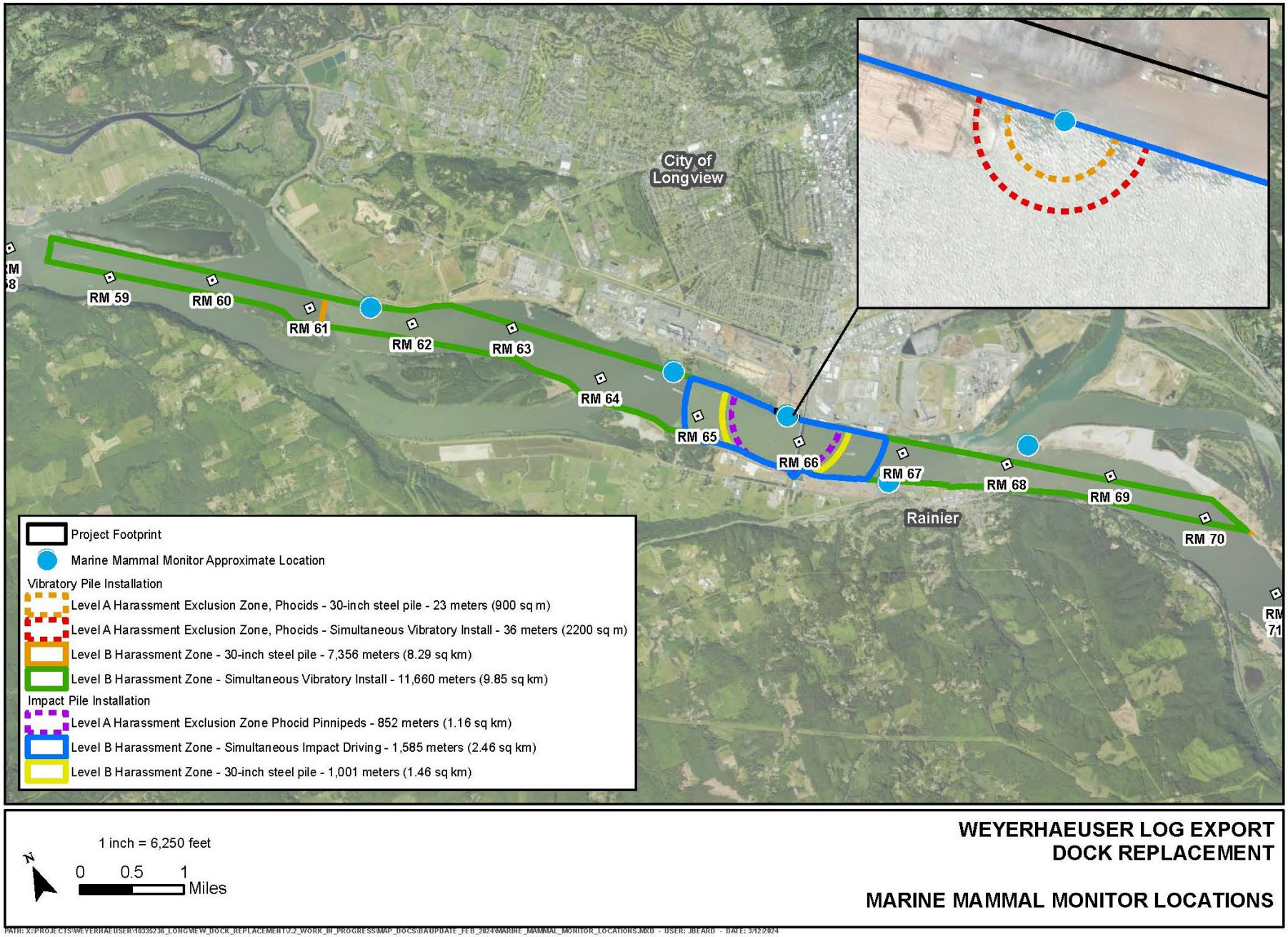

Figure A-1. Marine Mammal Monitor Locations

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

Vibratory Removal of 16-inch timber piles

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz)*	2.5	Relying on default due to lack of project-specific information

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

* Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	162
Number of piles within 24-h period	8
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**31.9**	**2.8**	**47.1**	**19.4**	**1.4**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

Vibratory Removal of 12-inch steel pipe piles

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2.5	Relying on default due to lack of project-specific information

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	158
Number of piles within 24-h period	8
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**17.2**	**1.5**	**25.5**	**10.5**	**0.7**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

Vibratory Removal of 12-inch steel H-piles

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2.5	Relying on default due to lack of project-specific information

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	153
Number of piles within 24-h period	8
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**8.0**	**0.7**	**11.8**	**4.9**	**0.3**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

Vibratory removal of 16-inch steel piles and temporary install/removal of 24-inch steel piles using vibratory methods.

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	Relying on default due to lack of project specific information

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	161
Number of piles within 24-h period	8
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS isopleth to threshold (meters)	**27.3**	**2.4**	**40.4**	**16.6**	**1.2**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

Vibratory installation of 30-inch steel piles

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	Relying on default due to lack of project specific information

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	163
Number of piles within 24-h period	8
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS isopleth to threshold (meters)	**37.1**	**3.3**	**54.9**	**22.6**	**1.6**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

Simultaneous Vibratory Installation of up to two 30-inch steel piles

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)*	2.5	Based on NMFS' Interim Simultaneous Sound Source Guidance for Coastal Pile Installation (February 2024), Table 3 Scenario 1

* Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	166
Number of piles within 24-h period	1
Duration to drive a single pile (minutes)	480
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**58.9**	**5.2**	**87.0**	**35.8**	**2.5**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

Impact Installation of 30-inch steel piles

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2	Relying on default due to lack of project-specific information

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)

Unweighted SEL_{cum} (at measured distance) = SEL_{ss} + 10 Log (# strikes)	**216.0**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,single\ strike}$) specified at "x" meters (Cell B32)	177
Number of strikes per pile	1000
Number of piles per day	8
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,single\ strike}$) measurement (meters)	10

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)	210
Distance of $L_{p,0\text{-}pk}$ measurement (meters)*	10
$L_{p,0\text{-}pk}$ Source level	225.0

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**1,590.2**	**56.6**	**1,894.2**	**851.0**	**62.0**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**2.5**	**NA**	**34.1**	**2.9**	**NA**

*"NA": PK source level is < to the threshold for that marine mammal hearing group.

E.1-2: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B53)	
Number of piles per day	
Strike (pulse) Duration^ (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Transmission loss coefficient	
Distance of sound pressure level (L_{rms}) measurement (meters)	

^Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G47)	
Distance of $L_{p,0\text{-}pk}$ measurement (meters)*	
$L_{p,0\text{-}pk}$ Source level	#NUM!

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

*"NA": PK source level is < to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Weyerhaeuser Log Export Dock Replacement
PROJECT/SOURCE INFORMATION	See references in IHA application

Please include any assumptions

PROJECT CONTACT	See cover letter of IHA application

Simultaneous Impact Installation of up to two 30-inch steel piles

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2	Based on NMFS' Interim Simultaneous Sound Source Recommendations for Coastal Pile Installation (February 20, 2024)

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)

Unweighted SEL_{cum} (at measured distance) = SEL_{ss} + 10 Log (# strikes)	**216.0**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,single\ strike}$) specified at "x" meters (Cell B32)	177
Number of strikes per pile	8000
Number of piles per day	1
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,single\ strike}$) measurement (meters)	10

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)	210
Distance of $L_{p,0\text{-}pk}$ measurement (meters)*	10
$L_{p,0\text{-}pk}$ Source level	225.0

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**1,590.2**	**56.6**	**1,894.2**	**851.0**	**62.0**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**2.5**	**NA**	**34.1**	**2.9**	**NA**

*"NA": PK source level is < to the threshold for that marine mammal hearing group.

E.1-2: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B53)	
Number of piles per day	
Strike (pulse) Duration[A] (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Transmission loss coefficient	
Distance of sound pressure level (L_{rms}) measurement (meters)	

[A]Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G47)	
Distance of $L_{p,0\text{-}pk}$ measurement (meters)*	
$L_{p,0\text{-}pk}$ Source level	#NUM!

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

*"NA": PK source level is < to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$