

**Request for an Incidental Harassment Authorization
under the Marine Mammal Protection Act**

**Seattle Multimodal Project at Colman Dock
Year 4 Construction 2020-21**

**Washington State Department of Transportation
Ferries Division**

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Submitted To:

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Cover: California Sea Lion hauled out on Colman construction platform (WSDOT 2018).

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Appendix E Marine Mammal Monitoring Plan (Attached)

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Abbreviations and Acronyms

BMP	best management practices
CA-OR-WA	California-Oregon-Washington
CFR	Code of Federal Regulations
dB	decibels
DPS	Distinct Population Segment
DPS	dynamic positioning system
Ecology	Washington State Department of Ecology
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FR	Federal Register
FTA	Federal Transit Administration
HPA	Hydraulic Project Approval
Hz	hertz
IHA	Incidental Harassment Authorization
IWC	International Whaling Commission
kHz	kilohertz
kJ	kilojoules(s)
km	kilometer(s)
m	meters
MATLAB	matrix laboratory
MLLW	Mean Low-Low Water
MHHW	Mean High-High Water
MM	mitigation measure
MMPA	Marine Mammal Protection Act of 1972
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanographic Atmospheric Administration



NOAA/NMFS	National Oceanic Atmospheric Administration/National Marine Fisheries Service
NTU	nephelometric turbidity units
OHW	ordinary high water
OWC	overwater coverage
PSAMP	Puget Sound Ambient Monitoring Program
PSD	power spectral densities
PTS	permanent threshold shift
RCW	Revised Code of Washington
RL	Received Level
RMS	root mean square
SAR	Stock Assessment Report
SEL	Sound Exposure Level
SL	Source Level
SPCC	Spill Prevention, Control, and Countermeasures Plan
SPL	Sound Pressure Level
SSV	Sound Source Verification
TL	Transmission Loss
TTS	Temporary Threshold Shift
μPa	micro-Pascals
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
WSF	Washington State Department of Transportation Ferries Division
ZOE	Zone of Exclusion
ZOI	Zone of Influence

1.0 Description of the Activity

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 Introduction

The Washington State Department of Transportation (WSDOT) Ferries Division (WSF) operates and maintains 19 ferry terminals and one maintenance facility, all of which are located in the Salish Sea (Georgia Basin/Puget Sound) (Figure 1-1). Since its creation in 1951, WSF has



Figure 1-1 Washington State Ferry System Route Map

become the largest ferry system in the United States, operating 23 vessels on 10 routes with over 500 sailings each day.

To improve, maintain, and preserve the terminals, WSF conducts construction, repair and maintenance activities as part of its regular operations. One of these projects is the Seattle Multimodal Project at Colman Dock, and is the subject of this Incidental Harassment Authorization (IHA) request. This five-year project began in the fall of 2017, under the first of five consecutive IHAs. This application addresses the fourth year of construction (August 2020 to mid-February 2021). If the fourth year of construction goes well, it is possible that a fifth year of in-water work, and a fifth IHA will not be necessary.

The proposed project will occur in marine waters that support marine mammal species. The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals, which is defined as to “harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill,” except under certain situations. Section 101 (a) (5)(D) allows for the issuance of an IHA, provided an activity results in negligible impacts on marine mammals.

The project’s timing and duration and specific types of activities may result in the incidental taking by acoustical harassment (Level A/B take) of marine mammals protected under the MMPA. WSDOT/WSF is requesting an IHA for 11 marine mammal species (Pacific harbor seal, Northern Elephant seal, California sea lion, Steller sea lion, killer whale, gray whale, Humpback whale, Minke whale, harbor porpoise, Dall’s porpoise, and

common bottlenose dolphin) that may occur in the project vicinity.



1.2 Project Setting and Land Use

The Seattle Ferry Terminal at Colman Dock, serving State Route 519, is located on the downtown Seattle waterfront, in King County, Washington. The terminal services vessels from the Bainbridge Island and Bremerton routes, and is the most heavily used terminal in the WSF system. The Seattle terminal is located in Section 6, Township 24 North, Range 4 East, and is adjacent to Elliott Bay, a tributary to Puget Sound (Figure 1-2). Land use in the area is highly urban, and includes business, industrial, the Port of Seattle container loading facility, residential, the Pioneer Square Historic District and local parks.

1.3 Project Description

The purpose of the Seattle Multimodal Project at Colman Dock is to preserve the transportation function of an aging, deteriorating and seismically deficient facility to continue providing safe and reliable service. The project will also address existing safety concerns related to conflicts between vehicles and pedestrian traffic and operational inefficiencies.

Key project elements include:

- Replacing and re-configuring the timber trestle portion of the dock;
- Replacing the main terminal building;
- Reconfiguring the dock layout to provide safer and more efficient operations;
- Replacing the vehicle transfer span and the overhead loading structures of Slip 3;
- Replacing vessel landing aids;
- Maintaining a connection to the Marion Street pedestrian overpass;
- Moving the current passenger only ferry (POF) slip temporarily to the north to make way for south trestle construction, and then constructing a new POF slip in the south trestle area.
- Mitigating for additional 5,400 square feet of overwater coverage;
- Capping contaminated sediments.

The project will reconfigure the dock while maintaining approximately the same vehicle holding capacity as current conditions. The construction will take approximately five years, and began in August 2017. The terminal will continue to operate during the construction.

The project will remove the northern timber trestle and replace a portion of it with a new concrete trestle (Figure 1-3). The area from Marion Street to the north edge of the property will not be rebuilt and after demolition will become a new area of open water. A section of fill contained behind a bulkhead underneath the northeast section of the dock will be removed. WSF will construct a new steel and concrete trestle from Columbia Street northward to Marion Street.



Figure 1-2 Location of Seattle Ferry Terminal

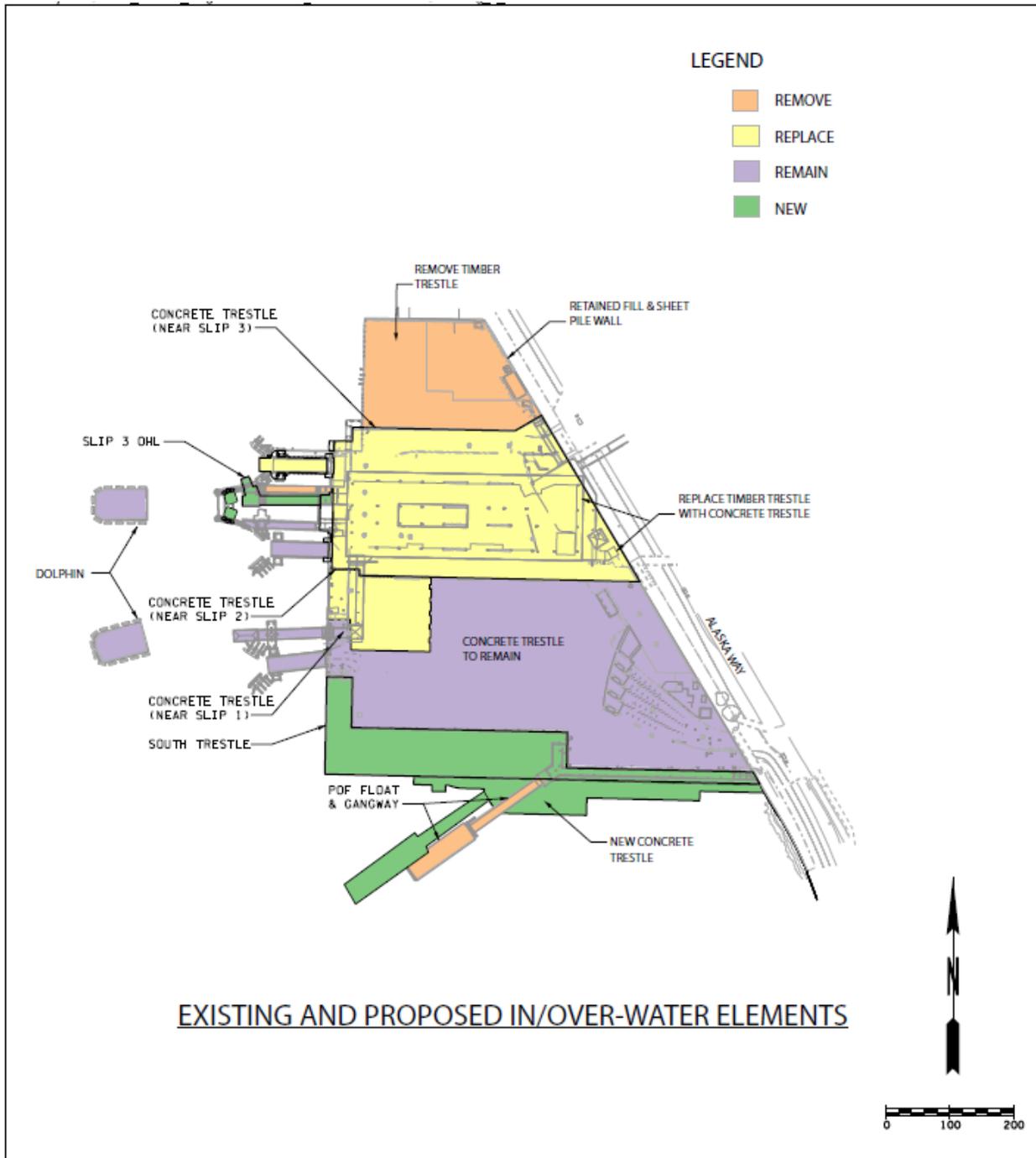


Figure 1-3 Existing/Proposed Construction Elements

The project will maintain the current King County Passenger Only Ferry (POF) functions on site, and address safety concerns related to pedestrian/vehicle conflicts at Yesler Street. A new covered pier, sized to accommodate POF passenger waiting and connected by a new overhead pedestrian bridge to the terminal building and the Marion Street Overpass, will be constructed along the south side of Colman Dock.

The reconfiguration will increase total permanent overwater coverage (OWC) by about 5,400 square feet (SF) (about 1.7% more than existing overwater coverage at the site), due to the new walkway from the POF facility to Alaskan Way and new stairways and elevators from the POF to the upper level of the terminal. Removal of at least 5,400 SF from Pier 48, a condemned timber structure, will serve as mitigation for the permanent OWC increase.

Construction of the reconfigured dock will narrow (reduce) the OWC along the shoreline (at the landward edge) by 180 linear feet at the north end of the site, while 30 linear feet of new trestle will be constructed along the shoreline at the south end of the site. The net reduction of OWC in the nearshore zone is 150 linear feet.

The project includes demolition of the existing terminal building and construction of a new terminal building. The new terminal building will be located along the west edge of the dock, spanning all three slips to handle passenger traffic more efficiently, and will connect to the Marion Street Overpass by an elevated deck.

The project includes reconstruction of the vehicle transfer span and the passenger overhead loading (OHL) structures of Slip 3, including new hydraulic systems. The new OHL will be wider than the existing OHL, to accommodate the increased walk-on passenger volumes.

Sediment beneath the terminal has been contaminated by the creosote-treated piles and other chemicals discharged to the environment over the years. A cap was installed to cover contaminated sediment on the south half of the site prior to trestle expansion in 1990. WSF will place a new sediment cap to the north and south of the current cap during construction of the project to contain existing contamination. Stormwater management will be improved by the addition of Filterra treatment units in the southern portion of the terminal, which will remove oil and suspended solids. Project sheets are provided in Appendix F.

1.4 Regulatory Background

The effects of the project were analyzed pursuant to the National Environmental Policy Act and the federal co-lead agencies, the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA), issued a finding of no significant impact (FONSI) on November 5, 2015.

During the NEPA process, the project underwent formal Endangered Species Act (ESA) consultation with National Oceanographic and Atmospheric Administration (NOAA) Fisheries and the U.S. Fish and Wildlife Service (USFWS). NOAA Fisheries issued a Biological Opinion on March 20, 2014 and USFWS issued a Biological Opinion on February 18, 2014. A re-initiation of the project was completed in 2017. USFWS issued a Biological Opinion (01EWF00-2013-F0262R001 X-Ref: O1EWF00-2013-F-0262) on June 14, 2017 (USFW



2017), and NMFS issued a Biological Opinion (WCR-2016-5803) on June 26, 2017 (NMFS 2017a). A re-initiation for Humpback whale was completed on October 1, 2018 (Biological Opinion WCR-2016-5803)(NMFS 2018a).

An Incidental Harassment Authorization (IHA) for Year 1 (2017-18) of the Seattle Multimodal Project was issued on June 8, 2017 (NMFS 2017b). A revised Year 1 IHA was issued on 11/28/17 (NMFS 2017f). The Year 2 IHA (2018-19) was issued on 7/20/18 (NMFS 2018b). An IHA application for Year 3 (2019-2020) was submitted on February 7, 2019. The Year 3 IHA was issued on July 18, 2019. This application was submitted on April 21, 2020.

1.5 In-water Construction Details

This five-year project began in the fall of 2017, under the first of five consecutive IHAs. This application addresses the fourth year of construction (August 2020 to mid-February 2021). If the fourth year of construction goes well, it is possible that a fifth year of in-water work and a fifth IHA will not be necessary.

In-water construction completed during Year 1 (2017-18) is provided below:

Table 1-1 2017-2018 In-water Construction Completed

Method	Pile type	Pile size (inch)	Season 1 Planned	Season 1 Completed	Comment
Vibratory removal	Timber	14	215	142	Fewer present than estimated for Pier 48 mitigation.
Vibratory removal	Steel	24	2	0	Postponed until future season.
Vibratory driving	Steel	24	101	160	Temporary piles. More needed than planned (24” piles removed are same piles).
Vibratory removal	Steel	24	101	160	Temporary piles (same piles removed).
Vibratory driving	Steel	30	17	8	Fewer needed.
Vibratory driving	Steel	36	205	275	More needed than planned (36” piles below noted as impacted are same piles).
Impact driving	Steel	30	14	8	Fewer needed.
Impact driving	Steel	36	201	275	More needed than planned.
Total Permanent Piles*			236	291	

In-water construction completed during Year 2 (2018-19) (numbers in parentheses = total quantity):

Table 1-2 2018-2019 In-water Construction Completed

Permanent Structures	Permanent Installed	Permanent Removed
North Trestle	(119) 36-inch steel	(22) 12-inch steel
Slip 3 Bridge Seat	(8) 30-inch steel	(925) 14-inch timber*
Slip 3 Overhead Loading	(6) 36-inch steel	(19) 14-inch steel H*
Slip 3 Wingwall	(1) 108-inch steel	(35) 24-inch steel
Slip 2/3 Inner Dolphin		(1) 30-inch steel
Temporary Structures	Temporary Installed	Temporary Removed
Slip 3 Overhead Loading	(8) 24-inch steel (147) 24-inch steel	(8) 24-inch steel (147) 24-inch steel

*Deferred to Year 3

In-water construction completed for Year 3 (2019-20):

Table 1-3 2019-2020 In-water Construction Completed

Permanent Structures	Permanent Installed	Permanent Removed
Slip 2 Bridge Seat	(8) 36-inch steel	(1,046) 14-inch timber*
Center Trestle	(93) 36-inch steel	(19) 14-inch steel H*
Slip 2 Wingwall	(2) 24-inch steel	(2) 18-inch concrete
Extension		(108) 12-inch steel
Slip 2/3 Inner Dolphin		(15) 18-inch steel (3) 36-inch steel
Temporary Structures	Temporary Installed	Temporary Removed
Templates	(148) 24-inch steel	(148) 24-inch steel

*Deferred from Year 2 (timber - 925 + 121 = 1,046)

Table 1-4 2020-2021 In-water Construction Planned

Permanent Structures	Permanent Installed	Permanent Removed
North Trestle	(73) 36-inch steel	(355) 14-inch timber (30) 12-inch steel
Temporary Structures	Temporary Installed	Temporary Removed
Templates	(30) 24-inch steel	(30) 24-inch steel

Year 4 in-water construction methods include:

- Permanent 36-inch steel piles will be installed with a vibratory hammer, and then proofed with an impact hammer for the last 5-10 feet.
- Permanent Removed - piles will be removed with a vibratory hammer.
- Temporary template piles will be installed and removed with a vibratory hammer (no proofing).

1.6 Pile Driving and Removal Techniques

Project vibratory hammer driving and removal, and impact hammer driving may affect marine mammals.

1.6.1 Vibratory Hammer Driving and Removal

Vibratory hammers are used to drive piles where substrate conditions allow, and are also used to remove piles. When pile driving, the pile is placed into position using a choker and crane, and then vibrated between 1,200 and 2,400 vibrations per minute (Figure 1-4). The vibrations liquefy the sediment surrounding the pile allowing it to penetrate to the required seating depth, or to be removed. The type of vibratory hammer that is being used for the project is an APE 400 King Kong (or equivalent) with a drive force of 361 tons.



Figure 1-4 Vibratory Hammer Driving a Steel Pile

1.6.2 Impact Hammer Installation

Impact hammers are used to install piles, especially when substrate conditions are difficult (such as glacial till) or when proofing (gathering load bearing data). Impact hammers have guides (called a lead) that hold the hammer in alignment with the pile while a heavy piston moves up and down, striking the top of the pile, and driving it into the substrate from the downward force of the hammer on the top of the pile.

To drive the pile, the pile is first moved into position and set in the proper location using a choker cable or vibratory hammer. Once the pile is set in place, pile installation with an impact hammer can take less than 15 minutes under good conditions, to over an hour under poor conditions (such as glacial till and bedrock, or exceptionally loose material in which the pile repeatedly moves out of position). Figure 1-5 shows a pile being driven with an impact hammer.



Figure 1-5 Impact Hammer Driving a Steel Pile

1.7 Sound Levels and Noise Analysis

Under the NMFS Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Guidance) (NMFS 2016a), the calculation of Level A thresholds (permanent and temporary threshold shift) and Level B thresholds (harassment) are analyzed to understand the potential effects of in-water pile driving and removal noise on marine mammals for this project.

1.7.1 Source Levels

The source levels for impact pile driving of the 36-in steel piles are based on the Colman Year One Acoustic Monitoring Report (WSDOT 2018). The highest source level was recorded for Pile S19-SF: 174 SEL/188 RMS/206 Peak at 10 m.

The source level for vibratory pile driving of the 36-in steel piles is based on vibratory test pile driving of 36-in steel piles at Port Townsend (WSDOT 2010a). Recordings of vibratory pile driving were made at a distance of 10 m from the pile. The results show that the unweighted SPL_{rms} for vibratory pile driving of 36-in steel pile was 177 dB re 1 μPa .

The source level for vibratory pile driving and removal of the 24-in steel piles is based on vibratory pile driving of the 30-in steel pile at Port Townsend (WSDOT 2010a). The unweighted SPL_{rms} source level at 10 m from the pile is 174 dB re 1 μ Pa.

The source level for vibratory removal of 14-in timber pile is based on measurements conducted at the Port Townsend Ferry Terminal during vibratory removal of a 12-inch timber pile by WSDOT (WSDOT 2011). The recorded source level is 152 $_{rms}$ dB re 1 μ Pa at 16 m from the pile, with an adjusted source level of 155 dB $_{rms}$ re 1 μ Pa at 10 m.

The source level for vibratory removal of 12-in steel piles is based on vibratory pile driving of 12-in steel pipe pile measured by CALTRANS (2015). The unweighted source level is 155 dB $_{rms}$ re 1 μ Pa at 10 m.

A summary of source levels is presented in Table 1-2.

Table 1-5 Summary of Source Levels

Method	Pile type / size (inch)	SEL, dB re 1 μPa²-s @ 10 m	SPL_{rms}, dB re 1 μPa @ 10 m	SPL_{pk}, dB re 1 μPa @ 10m
Impact pile driving (proof)	Steel, 36-in	174	188	206
Vibratory driving/removal	Steel, 36-in	-	177	-
Vibratory driving/removal	Steel, 24-in	-	174	-
Vibratory removal	Timber, 14-in	-	155	-
Vibratory removal	Steel, 12-in	-	155	-

1.7.2 Distances to Harassment Zones

The 160-dB Level B harassment ensonified area for impact pile driving of the 36-in steel piles for the near-field source level of 188 dB $_{rms}$ re 1 μ Pa at 10 m, applying practical spreading loss of $15 \cdot \log(R)$ for transmission loss calculation is 736 m.

The Level B harassment ensonified area for vibratory pile driving and removal of the 24-in steel piles, and the vibratory driving of 36-inch piles is based on Sound Source Verification measurements conducted during Year One of the Seattle Multimodal Project (WSDOT 2016a). The result showed that pile driving noise of two 36-in steel piles being concurrently driven was no longer detectable at a range of 5.4 miles (8.69 km). Therefore, the distance of 8,690 m is selected as the Level B harassment distance for vibratory pile driving and removal of the 24-in, and vibratory driving of 36-in steel piles.



The Level B harassment ensonified areas for vibratory removal of the 14-in timber and 12-in steel piles are based on the above source level of 155 dB_{rms} re 1 μPa at 10 m, applying practical spreading loss of 15*log(R) for transmission loss calculation. The derived distance to the 120-dB Level B zone is 2,154 m.

For Level A harassment, calculations are based on pile driving duration of each pile and the number of piles installed or removed per day, using the NMFS optional spreadsheet (**Appendix X**).

Distances of ensonified area for different pile driving/removal activities for different marine mammal hearing groups are presented in Table 1-5.

Table 1-6 Distances to Level A & B Zones/Level B Zones Areas

Pile type, size & pile driving method	Level A Injury zone (m) / Area (km ²)					Level B ZOI (m)/ Area (km ²)
	LF cetacean	MF cetacean	HF cetacean	Phocid	Otariid	
Impact drive (proof) 36" steel pile, 8 piles/day, 200 strikes/pile	343.2/ 0.370	12.2/ 0.000	408.7/ 0.524	183.6/ 0.106	13.4/ 0.000	736/ 1.701
Vibratory drive 36" steel pile, 8 piles/day, 20 min/pile	153.1/ 0.074	13.6/ 0.001	226.4/ 0.161	93.1/ 0.027	6.5/ 0.000	8,690/ 40.529
Vibratory drive/removal, 24" steel piles, 8 piles/day, 20 min/pile	96.6/ 0.029	8.6/ 0.000	142.8/ 0.064	58.7/ 0.011	4.1/ 0.000	8,690/ 40.529
Vibratory removal 14" timber pile, 20 piles/day, 15 min/pile	8.0/ 0.000	0.7/ 0.000	11.8/ 0.000	4.8/ 0.000	0.3/ 0.000	2,154/ 5.466
Vibratory removal 12" steel pile, 11 piles/day, 20 min/pile	6.1/ 0.000	0.5/ 0.000	9.0/ 0.000	3.7/ 0.000	0.3/ 0.000	2,154/ 5.466

1.7.3 Shutdown Zones

Shutdown zones have been established in order to prevent injury and limit Level A take. For all marine mammals except harbor seal and Southern Resident killer whale, the shut-down zone is the Level A zone, but not less than 10 m. For harbor seal, a maximum of 60-m shutdown zone will be implemented if the Level A zone is bigger than 60 m, and a minimum 10-m shutdown zone will be implemented. For Southern Resident killer whale, the shutdown zone shall be the Level B ZOI boundary.

Table 1-7 Shutdown Zones

Pile type, size & pile driving method	Shutdown zone (m)					SRKW Shutdown (m)
	LF cetacean	MF cetacean	HF cetacean	Phocid	Otariid	
Impact drive 36" steel pile, 8 piles/day	350	15	410	60	15	750
Vibratory drive 36" steel pile, 8 piles/day	160	15	230	60	10	8,700
Vibratory drive/removal, 24" steel piles, 8 piles/day	100	10	150	60	10	8,700
Vibratory remove 14" timber pile, 20 piles/day; or vibratory removal 12" steel pile, 10 piles/day	10	10	15	10	10	2,200

The analysis results in three Zones of Influence:

- ZOI-1 – Vibratory driving (36/24") and removal (24") of steel piles
- ZOI-2 – Vibratory removal of 14" timber/12" steel piles
- ZOI-3 – Impact driving of 36" steel piles

ZOI's and shutdown zones are shown in Figures 1-6/1-7 and 1-8.

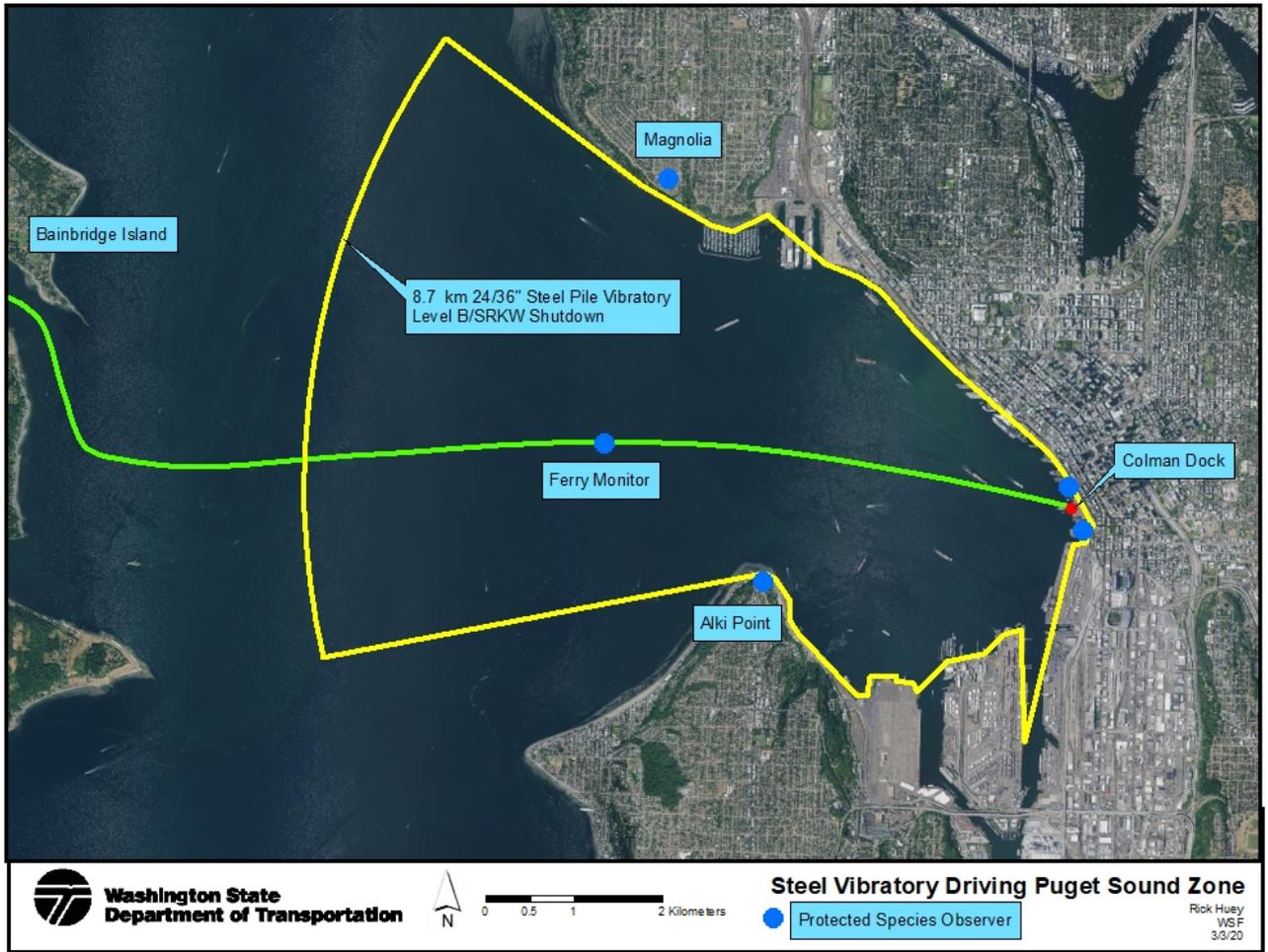


Figure 1-6 ZOI-1 24/36" Steel Vibratory

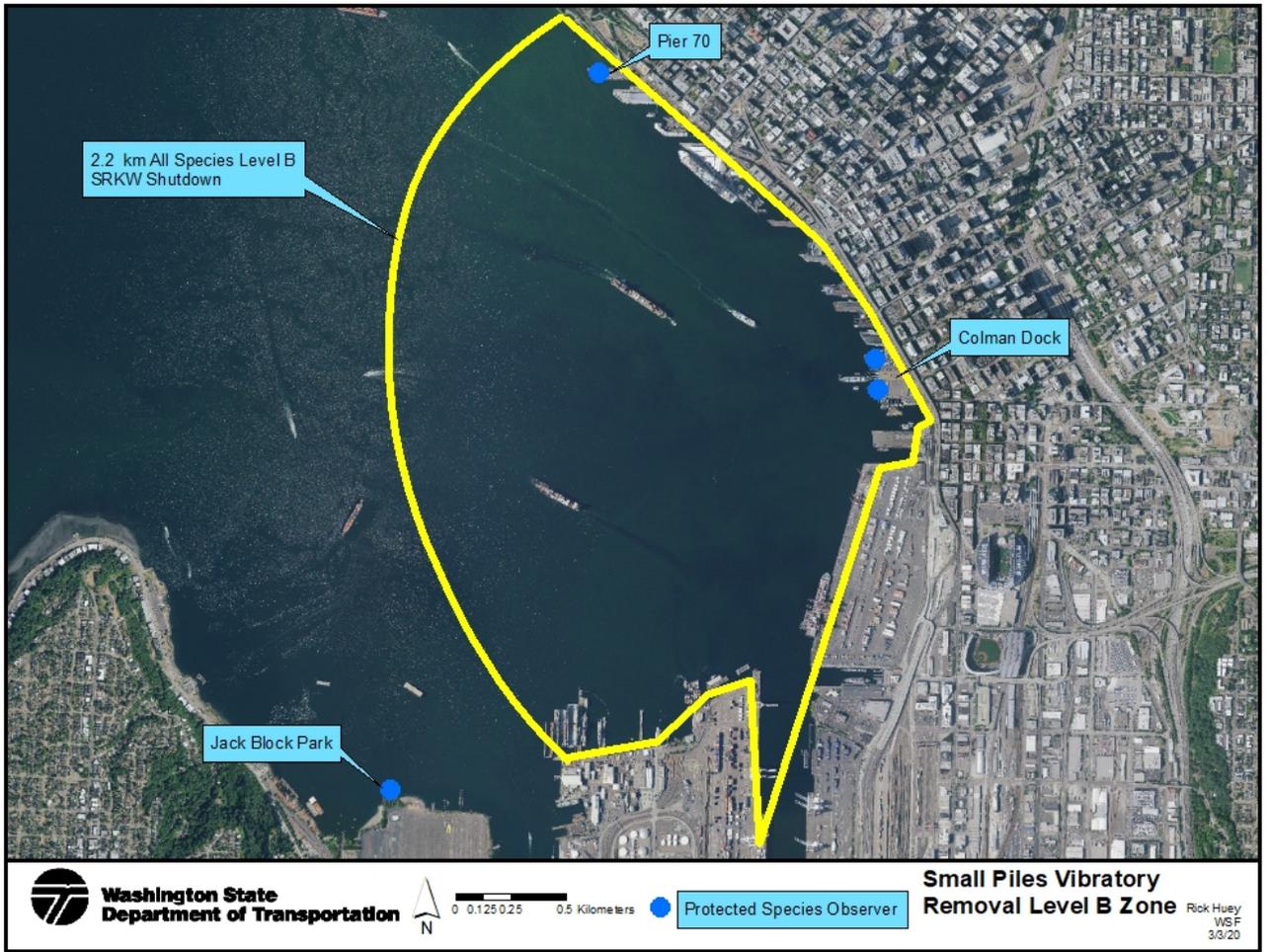


Figure 1-7 ZOI-2 14" Timber/12" Steel Vibratory

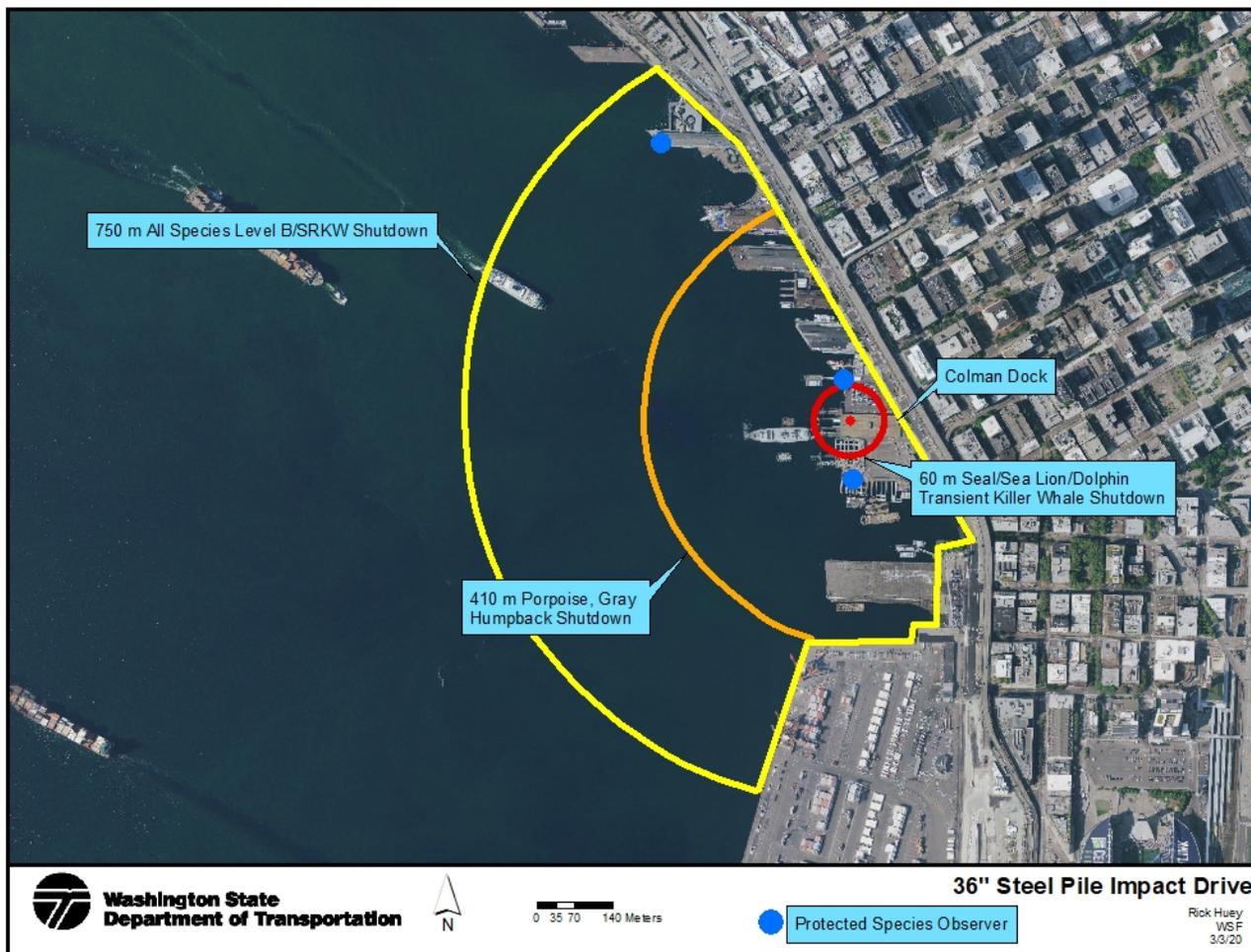


Figure 1-8 ZOI-3 36” Steel Impact

1.7.4 Airborne Reference Sound Source Levels

While in-air sounds are not applicable to cetaceans, they are to pinnipeds, especially harbor seals when hauled out. Loud noises can cause hauled out seals to panic back into the water, leading to disturbance and possible injury to stampeded pups.

No unweighted in-air data is available for vibratory removal of 14-inch timber, vibratory driving/removal of 24-inch steel, or vibratory driving of 36-inch steel piles. Based on in-air measurements at the WSF Coupeville Ferry Terminal, vibratory driving of a 30-inch steel pile generated a maximum of 97 dB_{rms} (unweighted) @ 15 m/50 ft. (WSDOT 2010b). It is assumed

that in-air noise generated during vibratory driving or removal of all other project piles will generate the same source level (96.9 dB_{rms}).

Based on in-air measurements during the Seattle Test Pile Project, impact pile driving of a 36-inch steel pile generated 111 dB dB_{rms} (unweighted) @ 15m/50 ft. (WSDOT 2016). It is assumed that in-air noise generated during impact driving of 30-inch diameter steel piles will generate the same source level (111 dB_{rms}).

1.7.5 Vibratory and Impact Pile Driving Airborne Noise

NMFS has established an in-air noise disturbance threshold of 90 dB_{rms} (unweighted) for harbor seals, and 100 dB_{rms} (unweighted) for all other pinnipeds (sea lions).

Assuming the use of three hammers, 5 dB will be added to each in-air source level (Table 1-6). In-air thresholds will be reached at the following distances (Figure 1-9):

- Noise generated during vibratory installation and/or removal of hollow steel piles (103 dB_{rms} (97 dB+ 5 dB) @ 15 m/50 ft. (WSDOT 2016)) will reach the harbor seal threshold at approximately 61 m/200 ft., and the other pinnipeds threshold at approximately 20 m/65 ft.
- Noise generated during 36-inch diameter steel pile impact driving (116 dB_{rms} (111 dB+ 5 dB) @ 15 m/50 ft.) will reach the harbor seal threshold at approximately 305 m/1,000 ft., and the other pinnipeds threshold at approximately 98 m/320 ft.

The nearest documented harbor seal haulout to the Seattle Ferry Terminal is 10.6 km/6.6 miles west on Blakely Rocks (Figure 3-2), though harbor seals also make use of docks, buoys and beaches in the area. The nearest documented California sea lion haulout sites are 3 km/2 miles southwest of the Seattle Ferry Terminal (Figure 3-2), although sea lions also make use of docks and buoys in the area.

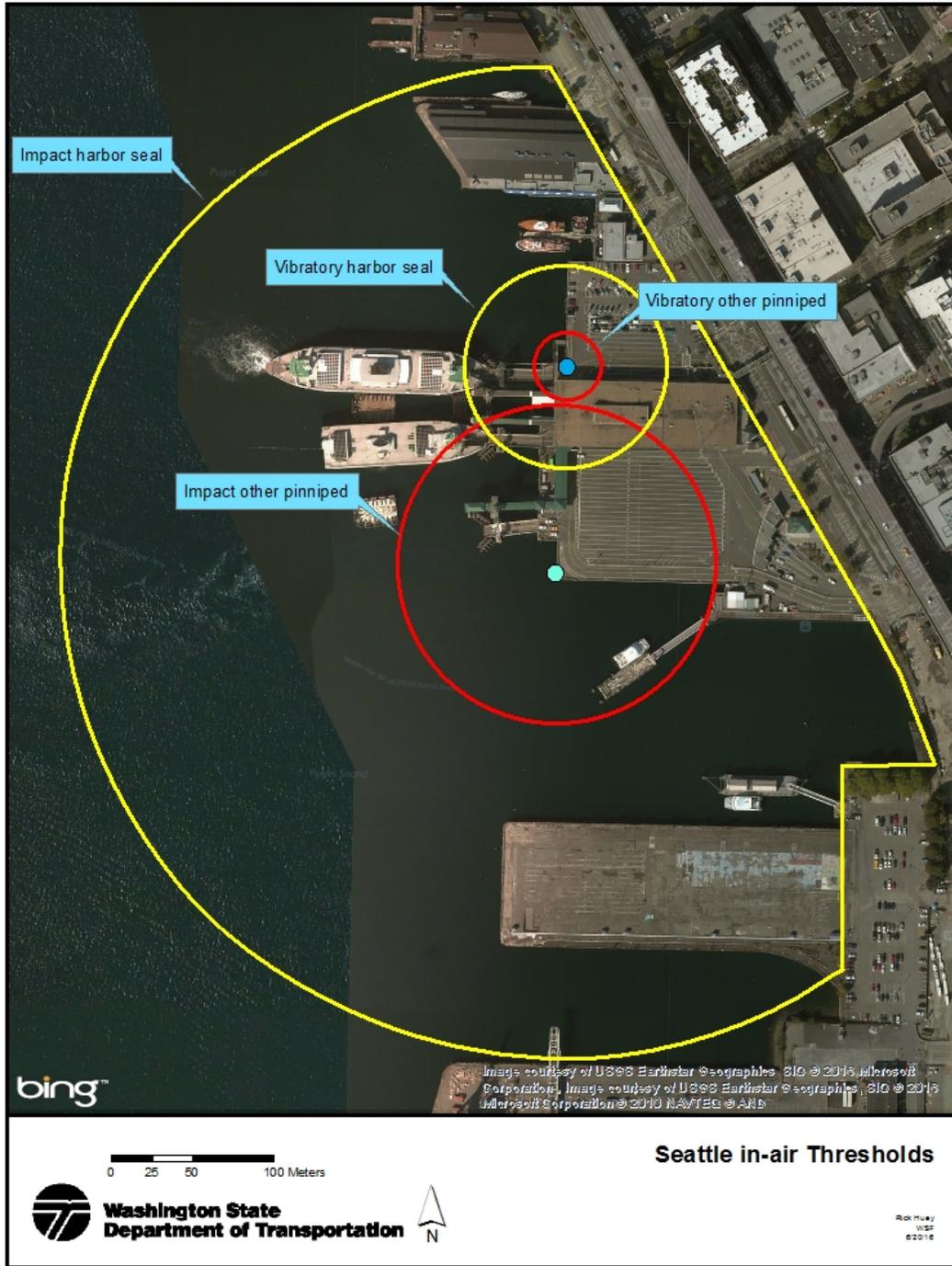


Figure 1-9 In-air construction noise threshold areas for pinnipeds

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2.0 Dates, Duration, and Region of Activity

The date(s) and duration of such activity and the specific geographical region where it will occur.

2.1 Dates

Due to NMFS and the U.S. Fish and Wildlife Service (USFWS) in-water work timing restrictions to protect ESA-listed salmonids, planned WSF in-water construction is limited each year to July 16 through February 15. For this IHA, in-water construction is planned to take place between August 1, 2020 and February 15, 2021.

2.2 Durations

The total worst-case durations for pile driving and removal is 45 days (Table 2-1).

Table 2-1 Pile Driving and Removal Durations

Method	Pile type	Pile size (inch)	Pile number	Piles /day	Minutes /pile	Duration (Days)
Impact drive (proof)	Steel	36	73*	8	10	9
Vibratory drive	Steel	36	73*	8	20	9
Vibratory drive	Steel (temporary)	24	30**	8	20	4
Subtotal						22
Vibratory remove	Steel (temporary)	24	30**	8	20	4
Vibratory remove	Timber	14	355	20	15	18
Vibratory remove	Steel	12	30	10	20	3
Subtotal						25
Total						47

*same pile

**same pile

2.3 Region of Activity

The proposed activities will occur at the Seattle Ferry Terminal at Colman Dock, located in the City of Seattle, Washington (see Figures 1-1 and 1-2).



Request for an Incidental Harassment Authorization

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3.0 Species and Numbers of Marine Mammals in Area

This section is a combination of items 3 and 4 from NOAA's list of information required for an incidental take authorization. It provides:

The species and numbers of marine mammals likely to be found within the activity area.

A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

It also describes the ESA and MMPA status for each species. Possible ESA status designations include:

- Threatened: "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."
- Endangered: "any species which is in danger of extinction throughout all or a significant portion of its range."
- Proposed: *candidate species* that were found to warrant listing as either threatened or endangered and are officially proposed as such in a *Federal Register* notice.
- Delisted: No longer listed under the ESA.
- Unlisted: Not currently listed under the ESA.

Possible MMPA status designations include:

- Strategic: a marine mammal stock for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA.
- Depleted: the Secretary, after consultation with the Marine Mammal Commission and the Committee of Scientific Advisors on Marine Mammals established under MMPA title II, determines that a species or population stock is below its optimum sustainable population; a State, to which authority for the conservation and management of a species or population stock is transferred under section 109, determines that such species or stock is below its optimum sustainable population; or a species or population stock is listed as a threatened or endangered species under the ESA.
- Non-depleted: a species or population stock is at or above its optimum sustainable population (NMFS 2013a).

3.1 Species Present

Eleven species of marine mammals can be found in the Seattle Ferry Terminal area (Table 3-1).

Table 3-1 Marine Mammal Species Potentially Present in Region of Activity

Species	ESA Status	MMPA Status	Timing of Occurrence	Frequency of Occurrence
Harbor Seal	Not listed	Non-depleted	Year-round	Common
Northern Elephant Seal	Unlisted	Non-depleted	Year-round	Occasional
California Sea Lion	Not listed	Non-depleted	August-April	Common
Steller Sea Lion	Delisted	Strategic/Depleted	August-April	Occasional
Killer Whale Southern Resident	Endangered	Depleted	September - May	Occasional
Killer Whale Transient	Not listed	Depleted	Year-round	Common
Gray Whale	Delisted	Unclassified	January-May	Occasional
Humpback whale (Central America DPS)	Endangered	Depleted	Year-round	Rare
Humpback whale (Mexico DPS)	Threatened	Depleted	Year-round	Occasional
Humpback whale (Hawaii DPS)	Not listed	Depleted	Year-round	Occasional
Minke Whale	Not listed	Non-depleted	September-January	Occasional
Harbor Porpoise	Not listed	Non-depleted	May-June peak	Common
Dall's Porpoise	Not listed	Non-depleted	October-February	Occasional
Common Bottlenose Dolphin	Not listed	Non-depleted	Year-round	Occasional

3.1 Pinnipeds

There are four species of pinnipeds that present in the Seattle Ferry Terminal area: harbor seal (*Phoca vitulina richardsi*), Northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*) and Steller sea lion (*Eumetopias jubatus*).

3.1.1 Harbor Seal

There are three stocks in Washington’s inland waters, the Hood Canal, Northern Inland Waters, and Southern Puget Sound stocks. Seals belonging to the Northern Inland Waters Stock are present at the project site. Pupping seasons vary by geographic region. For the northern Puget Sound region, pups are born from late June through August (WDFW 2012). After October 1, all pups in the inland waters of Washington are weaned. Of the pinniped species that commonly occur within the region of activity, harbor seals are the most common and the only pinniped that breeds and remains in the inland marine waters of Washington year-round (Calambokidis and Baird 1994).

3.1.1.1 Numbers

In 1999, Jeffries et al. (2003) recorded a mean count of 9,550 harbor seals in Washington’s inland marine waters, and estimated the total population to be approximately 14,612 animals (including the Strait of Juan de Fuca). According to the 2014 Stock Assessment Report, the most recent estimate for the Washington Northern Inland Waters Stock is 11,036 (NMFS 2014). No minimum population estimate is available. However, there are an estimated 32,000 harbor seals in Washington today, and their population appears to have stabilized (Jeffries 2013), so the estimate of 11,036 may be low.

3.1.1.2 Status

The Washington Inland Waters stock of harbor seals is “non-depleted” under the MMPA and “unlisted” under the ESA.

3.1.1.3 Distribution

Harbor seals are the most numerous marine mammal species in Puget Sound. Harbor seals are non-migratory; their local movements are associated with such factors as tides, weather, season, food availability and reproduction (Scheffer and Slipp 1944; Fisher 1952; Bigg 1969, 1981). They are not known to make extensive pelagic migrations, although some long-distance movements of tagged animals in Alaska (108 miles) and along the U.S. west coast (up to 342 miles) have been recorded (Pitcher and McAllister 1981; Brown and Mate 1983; Herder 1983).

Harbor seals haul out on rocks, reefs and beaches, and feed in marine, estuarine and occasionally fresh waters. Harbor seals display strong fidelity for haul out sites (Pitcher and Calkins 1979; Pitcher and McAllister 1981). The nearest documented harbor seal haul out site to the Seattle Ferry Terminal is approximately 4 miles northeast on log rafts present in the East Waterway of Port Gardner Harbor (Figure 3-1). The level of use of this haul out during the fall and winter is

unknown, but is expected to be much less as air temperatures become colder than water temperatures resulting in seals in general hauling out less (H. Huber pers. comm. 2010).

3.1.1.4 Project-specific Observations/Takes/Navy Density Estimate

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of harbor seals in the Seattle area as a range between 1.22 to 2.21 animals per square kilometer.

3.1.2 Northern Elephant Seal

The California breeding stock of northern elephant seal (*Mirounga angustirostris*) may be present near the project site.

3.1.2.1 Numbers

The California stock of northern elephant seal minimum population size is estimated very conservatively as 81,368 (NMFS 2015a). In Puget Sound and the Strait of San Juan de Fuca, 10 to 15 northern elephant seal pups are born each year on Whidbey, Protection, and Smith Islands, Dungeness Spit and Race Rocks. The population in the Salish Sea appears to be rising (Orca Network 2015a). Using a multiplier of 4.4 (NMFS 2015a) with the maximum pup count of 15, the Salish Sea population could be as large as 66 individuals.

3.1.2.2 Status

The California breeding stock of northern elephant seal is not ESA listed, and not considered a “depleted” or “strategic” stock under the MMPA (NMFS 2015a).

3.1.2.3 Distribution

Northern elephant seals breed and give birth in California (U.S.) and Baja California (Mexico), primarily on offshore islands, from December to March. Males feed near the eastern Aleutian Islands and in the Gulf of Alaska, and females feed further south. Adults return to land between March and August to molt, with males returning later than females. Adults return to their feeding areas again between their spring/summer molting and their winter breeding seasons (NMFS 2015a). The closest documented northern elephant seal haul out is Protection Island (30 miles northwest of the ferry terminal).

Elephant seals also use area beaches as haul outs, such as a female elephant seal that has been coming to a south Whidbey beach to rest while molting each spring for several years, and recently gave birth to a pup. Male elephant seals have also been observed in Puget Sound, as far south as Vashon Island (Miller 2015 personal comm. 4/6/15).

3.1.2.4 Project-specific Observations/Takes/Navy Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, one 1 northern elephant seal has been observed.

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of northern elephant seals in the Seattle area as 0.00001 animals per square kilometer.

3.1.3 California Sea Lion

Washington California sea lions are part of the U.S. stock, which begins at the U.S./Mexico border and extends northward into Canada.

3.1.3.1 Numbers

The minimum population size of the U.S. stock was estimated at 296,750 in 2011. More recent pup counts made in 2011 totaled 61,943, the highest recorded to that date. Estimates of total population size based on these counts are currently being developed (NMFS 2015b). Some 3,000 to 5,000 animals are estimated to move into northwest waters (both Washington and British Columbia) during the fall (September) and remain until the late spring (May) when most return to breeding rookeries in California and Mexico (Jeffries et al. 2000; J. Calambokidis pers. comm. 2008). Peak counts of over 1,000 animals have been made in Puget Sound (Jeffries et al. 2000).

The nearest documented California sea lion haul out sites to the Seattle ferry terminal are 3.5 miles northeast on the Everett Harbor buoys (Figure 3-3). The number of California sea lions using the buoys is less than 20 (Jeffries, et al. 2000).

3.1.3.2 Status

California sea lions are not listed as endangered or threatened under the ESA or as depleted under the MMPA. They are not considered a strategic stock under the MMPA, because total human-caused mortality, although unknown, is likely to be well less than the PBR (9,200) (NMFS 2015b).

3.1.3.3 Distribution

California sea lions breed on islands off Baja Mexico and southern California with primarily males migrating north to feed in the northern waters (Everitt et al. 1980). Females remain in the waters near their breeding rookeries off California and Mexico. All age classes of males are seasonally present in Washington waters (Jeffries, et al. 2000).

California sea lions were unknown in Puget Sound until approximately 1979 (Steiger and Calambokidis 1986). Everitt et al. (1980) reported the initial occurrence of large numbers at Port Gardner, Everett (northern Puget Sound) in the spring of 1979. The number of California sea lions using the Everett haul out numbered around 1,000. This haul out remains the largest in the state for sea lions in general and for California sea lions specifically (P. Gearin pers. comm. 2008). Similar sightings and increases in numbers were documented throughout the region after the initial sighting in 1979 (Steiger and Calambokidis 1986), including urbanized areas such as Elliott Bay near Seattle and heavily used areas of central Puget Sound (P. Gearin et al. 1986). In Washington, California sea lions use haul out sites within all inland water regions (Jeffries, et al. 2000). The movement of California sea lions into Puget Sound could be an expansion in range of a growing population (Steiger and Calambokidis 1986).

California sea lions do not avoid areas with heavy or frequent human activity, but rather may approach certain areas to investigate. This species typically does not flush from a buoy or haul out if approached.

3.1.3.4 Project-specific Observations/Takes/Navy Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, 1,716 California sea lions have been observed, with a one-day high of 29 individuals on January 18, 2018.

Between August and mid-June, the Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of California sea lions in the Seattle area ranging between 0.0676 and 0.1266 animals per square kilometer.

3.1.4 Steller Sea Lion

The Eastern U.S. stock of Steller sea lion may be present near the project site.

3.1.4.1 Numbers

The most recent minimum population estimate for the eastern U.S. stock of Steller sea lions was 41,638 individuals in 2015. The Washington (non-pup) estimate was 1,407 (NMFS 2016b).

Within the last several years, a new rookery became established on the outer Washington coast with a confirmed count of 45 pups in 2013, and greater than 100 pups in 2015 (NMFS 2016b).

Steller sea lion numbers in Washington State decline during the summer months, which correspond to the breeding season at Oregon and British Columbia rookeries (approximately late May to early June) and peak during the fall and winter months (Jeffries et al. 2000). A few Steller sea lions can be observed year-round in Puget Sound although most of the breeding age animals return to rookeries in the spring and summer (P. Gearin pers. comm. 2008).

3.1.4.2 Status

The eastern stock of Steller sea lions is classified as “non-strategic” under the MMPA and was “delisted” under the ESA on November 4, 2013 (78 FR 66140).

3.1.4.3 Distribution

Adult Steller sea lions congregate at rookeries in California, Oregon, Washington, and British Columbia for pupping and breeding from late May to early June (Gisiner 1985; NMFS 2016b). Rookeries are usually located on beaches of relatively remote islands, often in areas exposed to wind and waves, where access by humans and other mammalian predators is difficult (WDFW 1993).

For Washington inland waters, Steller sea lion abundances vary seasonally with a minimum estimate of 1,000 to 2,000 individuals present or passing through the Strait of Juan de Fuca in fall and winter months (S. Jeffries pers. comm. 2008). The number of haul out sites has increased in recent years.

3.1.4.4 Project-specific Observations/Takes/Navy Density Estimate

From October through May, the Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of Steller sea lions in the Seattle area ranging between 0.0251 and 0.0368 animals per square kilometer.



Figure 3-1 Pinniped haul outs in the Seattle project vicinity

3.2 Cetaceans

Seven cetacean species may be present in the Seattle terminal area; killer whale (Southern Resident and Transient), gray whale, humpback whale, Minke whale, harbor porpoise, Dall’s porpoise and common bottlenose dolphin.

3.2.1 Killer Whale

The Eastern North Pacific Southern Resident (SRKW) and West Coast Transient (Transient) stocks of killer whale may be found near the project site. Killer whales are mid-frequency hearing range cetaceans (Southall et al. 2007).

3.2.1.1 Numbers

Southern Resident Stock

The Southern Residents live in three family groups known as the J, K and L pods, and currently consists of 73 individuals (CWR 2019).

West Coast Transient Stock

Transient killer whales generally occur in smaller (less than 10 individuals), less structured pods (NMFS 2013b). According to the Center for Whale Research (CWR 2015), they tend to travel in small groups of one to five individuals, staying close to shorelines, often near seal rookeries when pups are being weaned. The West Coast Transient stock, which includes individuals from California to southeastern Alaska, has a minimum population estimate of 243 (NMFS 2013b).

3.2.1.2 Status

Southern Resident Stock

The SRKW stock was declared “depleted/strategic” under the MMPA in May 2003 (68 FR 31980). On November 18, 2005, the SR stock was listed as “endangered” under the ESA (70 FR 69903). On November 29, 2006, NMFS published a final rule designating critical habitat for the SR killer whale DPS. Both Puget Sound and the San Juan Islands are designated as core areas of critical habitat under the ESA, excluding areas less than 20 feet deep relative to extreme high water (71 FR 69054). A final recovery plan for Southern Residents was published in January of 2008 (NMFS 2008). On February 23, 2015, NMFS announced a 12-month finding on a petition to revise the Critical Habitat Designation for the Southern Resident killer whale distinct population segment is warranted (NMFS 2015c). On September 9, 2019, NMFS proposed a revision of critical habitat (50 FR 226). The revision is currently in process (not finalized).

West Coast Transient Stock

The West Coast Transient stock is “non-depleted” under the MMPA, and “unlisted” under the ESA (NMFS 2013b).

Washington State Status

In Washington State, all killer whales (*Orcinus orca*) that may be present in Washington waters (Southern Resident, West Coast Transient, and Offshore) were listed as a state candidate species in 2000. In April 2004, the State upgraded their status to a “state endangered species” (WDFW 2004).

3.2.1.3 Distribution

The SRKW and West Coast Transient stocks are both found within Washington inland waters. Individuals of both stocks have long-ranging movements and regularly leave the inland waters (Calambokidis and Baird 1994).

Southern Resident Stock Distribution

Southern Residents are documented in coastal waters ranging from central California to the Queen Charlotte Islands, British Columbia (NMFS 2008). They occur in all inland marine waters. SR killer whales generally spend more time in deeper water and only occasionally enter water less than 15 feet deep (Baird 2000). Distribution is strongly associated with areas of greatest salmon abundance, with heaviest foraging activity occurring over deep open water and in areas characterized by high-relief underwater topography, such as subsurface canyons, seamounts, ridges, and steep slopes (Wiles 2004).

Records from 1976 through 2013 document Southern Residents in the inland waters of Washington during the months of March through June and October through December, with the primary area of occurrence in inland waters north of Admiralty Inlet, located in north Puget Sound (Orca Network 2015b).

Spring/Summer Distribution. Beginning in May or June and through the summer months, all three pods (J, K and L) of Southern Residents are most often located in the protected inshore waters of Haro Strait (west of San Juan Island), in the Strait of Juan de Fuca, and Georgia Strait near the Fraser River.

Fall/Winter Distribution. In fall, all three pods occur in areas where migrating salmon are concentrated such as the mouth of the Fraser River. They may also enter areas in Puget Sound where migrating chum and Chinook salmon are concentrated (Osborne 1999). In the winter months, the K and L pods spend progressively less time in inland marine waters and depart for coastal waters in January or February. The J pod is most likely to appear year-round near the San Juan Islands, and in the fall/winter, in the lower Puget Sound and in Georgia Strait at the mouth of the Fraser River.

West Coast Transient Stock Distribution

The West Coast Transient stock occurs in California, Oregon, Washington, British Columbia, and southeastern Alaskan waters. Within the inland waters, they may frequent areas near seal rookeries when pups are weaned (Baird and Dill 1995).

West Coast Transients are documented intermittently year-round in Washington inland waters. Transient sightings have become more common since the mid-2000's. Unlike the SRKW pods, Transients may be present in the area for hours as they hunt pinnipeds.

3.2.1.4 Southern Resident Project-specific Observations/Takes/Navy Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, 300 SRKW have been observed, with a one-day high of 14 individuals on October 15, 2019.

From October through May, the Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of SRKW in the Seattle area ranging between 0.000506 and 0.002091 animals per square kilometer.

3.2.1.5 Transient Project-specific Observations/Takes/Navy Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, and 47 transient killer whales observed, with a one day high of two groups (total 20 individuals) on January 9, 2020.

From October through May, the Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of transient killer whale in the Seattle area ranging between 0.001582 and 0.002373 animals per square kilometer.

3.2.2 Gray Whale

The Eastern North Pacific gray whale may be found near the project site. Gray whales are low-frequency range cetaceans (Southall et al. 2007).

3.2.2.1 Numbers

The most recent population estimate for the Eastern North Pacific stock is 20,990 individuals (NMFS 2015d). Animals that spend the summer and autumn feeding in coastal waters of the Pacific coast of North America from California to southeast Alaska have been designated as the “Pacific Coast Feeding Group” or PCFG (IWC 2012). This definition was further refined for purposes of abundance estimation, limiting the geographic range to the area from northern California to northern British Columbia, limiting the temporal range to the period from June 1 to November 30, and counting only those whales seen in more than one year within this geographic and temporal range (IWC 2012). The 2012 abundance estimate for the defined range of the PCFG is 209 (Calambokidis *et al.* 2014).

3.2.2.2 Status

The Eastern North Pacific stock of gray whales is “non-depleted” under the MMPA, and was “delisted” under the ESA in 1994 after a 5-year review by NOAA Fisheries.

3.2.2.3 Distribution

Gray whales had a considerably higher number of sighting days within the ZOI quadrants than all other species. This is likely driven by the ‘resident’ population of gray whales that returns to the Possession Sound and Port Susan area each year, primarily in spring and summer (Calambokidis *et al.*, 2014).

The number of sighting days drops considerably when limited to the months of interest (August through February), but gray whales are still the most common large cetacean in the project area followed by transient orcas and humpbacks. From 2011-2015, sightings days for gray whale in the project ZOIs were 8 in the month of January and 24 in the month of February (TWM 2016). Sightings days likely include re-sightings of the same individual(s).

3.2.2.4 Project-specific Takes/Navy Density Estimate

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of gray whales in the Seattle area as a range of 0.000015 to 0.0051 animals per square kilometer.

3.2.3 Humpback Whale

The California-Oregon-Washington (CA-OR-WA) stock of humpback whale may be found near the project site. Humpback whales are low-frequency hearing range cetaceans (Southall *et al.* 2007).

3.2.3.1 Numbers

The stock assessment report population estimate is 2,900 individuals. The minimum population estimate is 2,784 (NMFS 2019).

3.2.3.2 Status

The California-Oregon-Washington stock of humpback whales is “depleted/strategic” under the MMPA, and “endangered” under the Endangered Species Conservation Act of 1969. This

protection was transferred to the ESA in 1973. A recovery plan was adopted in 1991(NMFS 1991).

In 2016, NMFS revised the ESA listing for the humpback whale to identify 14 Distinct Population Segments (DPS), and listed one as threatened, four as endangered, and nine others as not warranted for listing. The unlisted Hawaii DPS, the threatened Mexico DPS and the endangered Central American DPS may be present in Puget Sound.

3.2.3.3 Distribution

Historically, humpback whales were common in inland waters of Puget Sound and the San Juan Islands (Calambokidis et al. 2004). In the early 1900s, there was a productive commercial hunt for humpbacks in Georgia Strait that was probably responsible for their long disappearance from local waters (Osborne et al. 1988). Commercial hunts ended in the 1960's. Since the mid-1990s, sightings in Puget Sound have increased. Humpback whales are seen in Puget Sound, but more frequent sightings occur in the Strait of Juan de Fuca and near the San Juan Islands. Most sightings are in spring and summer.

Along the U.S. west coast, one stock is currently recognized, which includes animals that appear to be part of two separate feeding groups, a California and Oregon feeding group and a northern Washington and southern British Columbia feeding group. Very few photographic matches between these feeding groups have been documented. Humpbacks from both groups have been photographically matched to breeding areas off Central America, mainland Mexico, and Baja California, but whales from the northern Washington and southern British Columbia feeding group also winter near the Hawaiian Islands and the Revillagigedo Islands off Mexico. Seven 'biologically important areas' for humpback whale feeding are identified off the U.S. west coast, including five in California, one in Oregon, and one in Washington (NMFS 2019).

3.2.3.4 Project-specific Observations/Takes/Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, three humpback whales have been observed.

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of humpback whales in the Seattle area as a range between 0 and 0.00014 animals per square kilometer.

3.2.4 Minke Whale

The California-Oregon-Washington (CA-OR-WA) stock of minke whale may be found near the project site. Minke whales are low-frequency hearing range cetaceans (Southall et. al. 2007).

The CA-WA-OR stock is considered a resident stock (NMFS 2016d), and includes minke whales within the inland Washington waters of Puget Sound and the San Juan Islands (Dorsey et al. 1990).

3.2.4.1 Numbers

The CA/OR/WA stock assessment report population estimate is 369 individuals. (NMFS 201).

3.2.4.2 Status

Minke whales are not listed under the ESA and are classified as non-depleted under the MMPA.

3.2.4.3 Distribution

Minke whales are reported in Washington inland waters year-round, although few are reported in the winter (Calambokidis and Baird 1994). Minke whales are relatively common in the San Juan Islands and Strait of Juan de Fuca (especially around several of the banks in both the central and eastern Strait), but are relatively rare in Puget Sound.

3.2.4.4 Project-specific Observations/Takes/Navy Density Estimate

From August 2107 to January 2020, there have been 134 days of monitoring and 1 Minke whale observed.

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of Minke whales in the Seattle area as a range between 0.000801 and 0.002 animals per square kilometer.

3.2.5 Harbor Porpoise

The Washington Inland Waters Stock of harbor porpoise may be found near the project site. The Washington Inland Waters Stock occurs in waters east of Cape Flattery (Strait of Juan de Fuca, San Juan Island Region, and Puget Sound). Harbor porpoise are high-frequency hearing range cetaceans (Southall et. al. 2007).

3.2.5.1 Numbers

The Washington Inland Waters Stock mean abundance estimate based on 2002 and 2003 aerial surveys conducted in the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia is 10,682 harbor porpoises (NMFS 2017a). No minimum population estimate is available.

No harbor porpoise were observed within Puget Sound proper during comprehensive harbor porpoise surveys conducted in the 1990s (Osmek et al. 1994). Declines were attributed to gill-net fishing, increased vessel activity, contaminants, and competition with Dall's porpoise.

However, populations have rebounded with increased sightings in central Puget Sound (Carretta et al. 2007) and southern Puget Sound (WDFW 2008). Recent systematic boat surveys of the main basin indicate that at least several hundred and possibly as many as low thousands of harbor porpoise are now present. While the reasons for this recolonization are unclear, it is possible that changing conditions outside of Puget Sound, as evidenced by a tripling of the population in the adjacent waters of the Strait of Juan de Fuca and San Juan Islands since the early 1990s, and the recent higher number of harbor porpoise mortalities in coastal waters of Oregon and Washington, may have played a role in encouraging harbor porpoise to explore and shift into areas like Puget Sound (Evenson, et al. 2016).

3.2.5.2 Status

The Washington Inland Waters Stock of harbor porpoise is “non-depleted” under MMPA, and “unlisted” under the ESA.

3.2.5.3 Distribution

Harbor porpoises are common in the Strait of Juan de Fuca and south into Admiralty Inlet, especially during the winter, and are becoming more common south of Admiralty Inlet.

Little information exists on harbor porpoise movements and stock structure near the Seattle area, although it is suspected that in some areas harbor porpoises migrate (based on seasonal shifts in distribution). For instance, Hall (2004) found harbor porpoises off Canada’s southern Vancouver Island to peak during late summer, while the WDFW Puget Sound Ambient Monitoring Program (PSAMP) data show peaks in Washington waters to occur during the winter.

Hall (2004) found that the frequency of sighting of harbor porpoises decreased with increasing depth beyond 150 m with the highest numbers observed at water depths ranging from 61 to 100 m. Although harbor porpoises have been spotted in deep water, they tend to remain in shallower shelf waters (<150 m) where they are most often observed in small groups of one to eight animals (Baird 2003).

3.2.5.4 Project-specific Takes/Navy and WDFW Density Estimates

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of harbor porpoises in the Seattle area as a range between 0.061701 and 0.156 animals per square kilometer.

According to Evenson, et al. (2016), the maximum harbor porpoise density in the Whidbey Basin (which includes the project ZOIs) is 0.79 animals per square kilometer.

3.2.6 Dall’s Porpoise

The California, Oregon, and Washington Stock of Dall’s porpoise may be found near the project site. Dall’s porpoise are high-frequency hearing range cetaceans (Southall et. al. 2007).

3.2.6.1 Numbers

The most recent estimate of Dall’s porpoise stock abundance is 42,000, based on 2005 and 2008 summer/autumn vessel-based line transect surveys of California, Oregon, and Washington waters (NMFS 2017b). Within the inland waters of Washington and British Columbia, this species is most abundant in the Strait of Juan de Fuca east to the San Juan Islands. The most recent Washington’s inland waters estimate is 900 animals (Calambokidis et al. 1997), though sightings have become rarer since then. Prior to the 1940s, Dall’s porpoises were not reported in Puget Sound.

3.2.6.2 Status

The California, Oregon, and Washington Stock of Dall’s porpoise is “non-depleted” under the MMPA, and “unlisted” under the ESA.

3.2.6.3 Distribution

Dall's porpoises are migratory and appear to have predictable seasonal movements driven by changes in oceanographic conditions (Green et al. 1992, 1993), and are most abundant in Puget Sound during the winter (Nysewander et al. 2005; WDFW 2008). Despite their migrations, Dall's porpoises occur in all areas of inland Washington at all times of year, but with different distributions throughout Puget Sound from winter to summer. The WDFW PSAMP data show peaks in Washington waters to occur during the winter. The average winter group size is three animals (WDFW 2008).

3.2.6.4 Project-specific Observations/Takes/Navy Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, three Dall's porpoise have been observed.

The Navy Marine Species Density Database (U.S. Navy 2019) estimates the density of Dall's porpoises in the Seattle area as a range between 0.018858 and 0.047976 animals per square kilometer.

3.2.7 Common Bottlenose Dolphin

The California-Oregon-Washington Offshore stock of common bottlenose dolphin may be found near the project site. Common bottlenose dolphins are mid-frequency hearing range cetaceans (Southall et. al. 2007).

3.2.7.1 Numbers

The most recent shipboard surveys conducted within 300 nautical miles of the coasts of California, Oregon, and Washington were in 2008 and 2014. The minimum population estimate for bottlenose dolphin is 1,255 (NMFS 2017c).

3.2.7.2 Status

The California, Oregon, and Washington Offshore Stock of common bottlenose dolphin is "non-depleted" under the MMPA, and "unlisted" under the ESA.

3.2.7.3 Distribution

On surveys conducted off California, offshore bottlenose dolphins have been found at distances greater than a few kilometers from the mainland and throughout the Southern California Bight. They have also been documented in offshore waters as far north as about 41° N, and they may range into Oregon and Washington waters during warm-water periods (NMFS 2017c).

3.2.7.4 Project Specific Observations/Takes/Navy Density Estimate

From August 2017 to January 2020, over 262 days of monitoring, 6 bottlenose dolphins have been observed.

The Navy Marine Species Density Database (U.S. Navy 2019) concludes that common bottlenose dolphins are not expected to be present in the Seattle area.

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4.0 Status and Distribution of Affected Species or Stocks

A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

This section has been combined with Section 3.0.

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5.0 Type of Incidental Take Authorization Requested

The type of incidental taking authorization that is being requested (i.e., takes by harassment only, takes by harassment, injury and/or death), and the method of incidental taking.

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

As described previously in the Effects section, Level B Harassment is expected to occur and is proposed to be authorized in the numbers identified below. As described below, a small number of takes by Level A Harassment are being proposed to be authorized. The death of a marine mammal is also a type of incidental take. However, no mortality is anticipated or proposed to be authorized to result from this activity.

5.1 Incidental Take Authorization Request

Under Section 101 (a)(5)(D) of the MMPA, WSF requests an IHA from August 1, 2019 through February 15, 2020 for Level B and A take of 12 species of marine mammals described in this application during the terminal construction project at the Seattle Ferry Terminal.

The scheduled pile-driving and pile-removal activities discussed in this application will occur between August 1, 2019 and February 15, 2020.

5.2 Method of Incidental Taking

The method of incidental take is Level A and Level B acoustical take during active pile driving or removal activity.

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6.0 Number of Marine Mammals that May Be Affected

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in [Section 5], and the number of times such takings by each type of taking are likely to occur.

This section summarizes potential incidental take of marine mammals during Year Three (2019/20) of the Seattle project. Section 6.2 describes the methods used to calculate the estimated zones and Section 6.3 describes the potential incidental take for each marine mammal species. Section 6.2.6 provides the number of marine mammals by species for which take authorization is requested.

Due to in-water noise from impact pile driving, and vibratory pile driving and removal this project will incidentally take by Level A and/or B acoustical harassment small numbers (no more than 33% of stock) of harbor seal, Northern elephant seal, California sea lion, Steller sea lion, Transient killer whale, gray whale, Minke whale, harbor porpoise, Dall’s porpoise, and common bottlenose dolphin.

With the exception of harbor seals and California sea lions, it is anticipated that all of the marine mammals that enter a Level B acoustical harassment ZOI will be exposed to pile driving noise only briefly as they are transiting the area. Only harbor seals and California sea lions are expected to forage and haul out in the Seattle project area with any frequency and could be exposed multiple times during the project.

6.1 Estimated Duration of Pile Driving

The total worst-case duration for pile installation and removal is 47 days (Table 6-1).

Table 6-1 Durations

Method	Pile type	Pile size (inch)	Pile number	Piles /day	Minutes /pile	Duration (Days)
Impact drive (proof)	Steel	36	73*	8	10	9
Vibratory drive	Steel	36	73*	8	20	9
Vibratory drive	Steel (temporary)	24	30**	8	20	4
Subtotal						22
Vibratory remove	Steel (temporary)	24	30**	8	20	4
Vibratory remove	Timber	14	355	20	15	18
Vibratory remove	Steel	12	30	10	20	3
Subtotal						25
Total						47

6.2 Estimated Zones of Influence/Zones of Exclusion

Distances to ZOIs and ZOE's are provided in Tables 6-2 and 6-3. Monitoring ZOE's/Shutdown Zones have been conservatively simplified in order to make PSO monitoring easier to implement during construction. SRKW shutdown is established at the Level B harassment SSV.

Table 6-2 Zone of Influence summary

ZOI	Pile Type	Method	Threshold/SSV	Distance to Threshold	ZOI Area (km ²)	Days Present
ZOI-1	36/24" steel	Vibratory drive/removal	SSV	8.7 km	41	17
ZOI-2	14" timber/12" steel	Vibratory removal	SSV	2.2 km	6	21
ZOI-3	36" steel	Impact drive	SSV	.75 km	2	9

Table 6-3 Zones of Exclusion/Shutdown

Pile type, size & pile driving method	Shutdown zone (m)					SRKW Shutdown (m)
	LF cetacean	MF cetacean	HF cetacean	Phocid	Otariid	
Impact drive 36" steel pile, 8 piles/day	350	15	410	60	15	750
Vibratory drive 36" steel pile, 8 piles/day	160	15	230	60	10	8,700
Vibratory drive/removal, 24" steel piles, 8 piles/day	100	10	150	60	10	8,700
Vibratory remove 14" timber pile, 20 piles/day; or vibratory removal 12" steel pile, 10 piles/day	10	10	15	10	10	2,200



6.3 Airborne Zones of Influence

NMFS has established an in-air noise disturbance threshold of 90 dB_{rms} (unweighted) for harbor seals, and 100 dB_{rms} (unweighted) for all other pinnipeds (sea lions).

Assuming the use of three hammers, 5 dB will be added to each in-air source level (Table 1-6). In-air thresholds will be reached at the following distances (Figure 1-9):

- Noise generated during vibratory installation and/or removal of hollow steel piles (103 dB_{rms} (97 dB+ 5 dB) @ 15 m/50 ft. (WSDOT 2016)) will reach the harbor seal threshold at approximately 61 m/200 ft., and the other pinnipeds threshold at approximately 20 m/65 ft.
- Noise generated during 36-inch diameter steel pile impact driving (116 dB_{rms} (111 dB+ 5 dB) @ 15 m/50 ft.) will reach the harbor seal threshold at approximately 305 m/1,000 ft., and the other pinnipeds threshold at approximately 98 m/320 ft.

The nearest documented harbor seal haulout to the Seattle Ferry Terminal is 10.6 km/6.6 miles west on Blakely Rocks (Figure 3-2), though harbor seals also make use of docks, buoys and beaches in the area. The nearest documented California sea lion haulout sites are 3 km/2 miles southwest of the Seattle Ferry Terminal (Figure 3-2), although sea lions also make use of docks and buoys in the area.

Temporary in-air disturbance will be limited to harbor seals swimming on the surface through the immediate terminal area, or hauled-out on the City of Seattle Habitat Beach (constructed to the south of the ferry terminal), or on floating platforms within 61 m/200 ft. during vibratory pile driving and removal, and within 98 m/320 ft. during impact pile driving.

6.4 Estimated Level B Takes

Incidental take is estimated by the likelihood of a marine mammal being present within a ZOI during active pile driving or removal.

For most species, take will be calculated using density data. Where a low to high range of densities is given for a species in Section 3, the more conservative high density will be used.

For California sea lion, Northern Elephant seal, Humpback whale, Transient killer whale and common bottlenose dolphin, take based on density is too low. Referenced observations in Section 3 more accurately reflect presence for these species, and so take is based on individuals or groups observed. No take for Southern Resident killer whale is requested.

Density Based Take

The calculation for density-based take is:

- Density X km² X days ZOI is present = Level B take.

For the project ZOI's:

- ZOI-1: Density X 41 km² X 17 days
- ZOI-2: Density X 6 km² X 21 days
- ZOI-3: Density X 2 km² X 9 days

Take based on density calculations are shown in Table 6-5.

Species	High Density (km ²)	ZOI-1 (41 km ² /17 days) Level B Takes	ZOI-2 (6 km ² /21 days) Level B Takes	ZOI-3 (2 km ² /9 days) Level B Takes	Total Level B Take
Harbor Seal	2.21 ¹	1,540	279	40	1,859
Northern Elephant Seal	0.0001 ¹	0	0	0	0 ⁴
California Sea Lion	0.1266 ¹	88	16	2	106 ⁴
Steller Sea Lion	0.0368 ¹	26	5	1	32
Killer Whale Southern Resident	0.002373 ¹	2	0	0	0 ³
Killer Whale Transient	0.002373 ¹	2	0	0	2 ⁴
Gray Whale	0.0051 ¹	4	1	0	5
Humpback whale	0.0001 ¹	0	0	0	0 ⁴
Minke Whale	0.002 ¹	1	0	0	1 ⁴
Harbor Porpoise	0.792 ²	552	100	14	666
Dall's Porpoise	0.047976 ¹	33	6	1	40
Common Bottlenose Dolphin	0	0	0	0	0 ⁴

¹Navy 2019

²Evenson 2016

³No Southern Resident Killer Whale take is requested

⁴Take will be based on observations



Observation-based Level B Take

Based on project specific observations, the following species are present more often than density data suggests. The take estimates are:

- California sea lion – 763 individuals have been observed during project monitoring, with a high of 29 individuals in one day. Conservatively assuming that 29 individuals may be present in the ZOIs during 47 days of pile driving or removal, it is assumed that 1,363 animals may be exposed to pile driving noise.
- Northern Elephant Seal - One individual has been observed during project monitoring. Given how rare Northern Elephant seal are in the area, it is unlikely they would be present on a daily basis. Instead it is assumed that one individual may be present in the ZOIs once a month during the in-water work window (7 months), or 7 animals.
- Humpback whale -Three individuals have been observed during project monitoring. Given that Humpback whales are occasionally present in the area, it is unlikely they would be present on a daily basis. Instead it is assumed that three individuals may be present in the ZOIs once a month during the in-water work window (7 months), or 21 animals.
- Transient killer whale - Two groups of 10 individuals have been observed. It is assumed that one group size of 10 animals may be present in the ZOIs once a month during the in-water work window (7 months), or 70 animals.
- Minke whale - One individual has been observed during project monitoring. Given how rare Minke whale are in the area, it is unlikely they would be present on a daily basis. Instead it is assumed that one individual may be present in the ZOIs once a month during the in-water work window (7 months), or 7 animals.
- Common Bottlenose Dolphin – Six individuals have been observed during project monitoring. Given how rare Common Bottlenose dolphin are in the area, it is unlikely they would be present on a daily basis. Instead it is assumed that 6 individuals may be present in the ZOIs once a month during the in-water work window (7 months), or 42 animals.

No take for Southern Resident killer whale is requested in this application.

Harbor Seal Level A Take

Level A take is necessary for harbor seals that may enter the 24” vibratory drive/removal zone, the 36” vibratory drive zone, and the 36” impact zone, between the 60 m shutdown and the 184 m Level A limit.

To date, 243 harbor seals have been observed in the 60-184 m Level A zone, with a high of 2 individuals in one day. This zone will be present 26 days. Assuming that 2 individual may be present once a day for 26 days results in 52 potential Level A takes.

6.4.1 Summary of Estimated Takes

A summary of estimated marine mammal takes is listed in Table 6-1.

Table 6-4 Estimated Take Levels

Species	Estimated Level A take	Estimated Level B take	Estimated total take
Pacific Harbor seal	52	1,859	1,911
Northern Elephant seal	0	7	7
California sea lion	0	1,363	1,363
Steller sea lion	0	32	32
Killer whale, Southern Resident	0	0	0
Killer whale, Transient	0	70	70
Gray whale	0	5	5
Humpback whale	0	21	21
Minke whale	0	7	7
Harbor porpoise	0	666	666
Dall's porpoise	0	40	40
Common Bottlenose dolphin	0	42	42



Request for an Incidental Harassment Authorization

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7.0 Anticipated Impact on Species or Stocks

The anticipated impact of the activity upon the species or stock of marine mammals.

WSF is requesting authorization for A and Level B acoustical harassment take of marine harbor seals, and Level B take of the remaining species as listed in Table 7-1. These numbers in relation to the overall stock size of each species are also summarized in Table 7-1.

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 of individuals; therefore, the stock take percentage calculations are very conservative.

If incidental takes occur, it is expected to only result in short-term changes in behavior and potential temporary hearing threshold shift. These takes would be unlikely to have any impact on stock recruitment or survival and therefore, would have a negligible impact on the stocks of these species.

Table 7-1 Level B Acoustical Harassment Take Request Percent of Total Stock

Species	Stock Size	Take Request	Take Request % of Stock	33% of Stock
Pacific Harbor Seal	11,036	1,911	17	3,642
Northern Elephant Seal	81,368	7	0.001	26,851
California Sea Lion	296,750	1,363	0.5	97,928
Steller Sea Lion	41,638	32	0.08	13,741
Killer Whale, Southern Resident	73	0	0	24
Killer Whale, Transient	243	70	29	80
Gray Whale	20,990	5	0.02	6,927
Humpback Whale	2,900	21	0.7	957
Minke Whale	369	7	2.0	122
Harbor Porpoise	10,682	666	6.0	3,525
Dall's Porpoise	42,000	40	0.01	13,860
Common Bottlenose Dolphin	1,255	42	3.0	414



**Request for an
Incidental Harassment Authorization**

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8.0 Anticipated Impact on Subsistence

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

8.1 Subsistence Harvests by Northwest Treaty Indian Tribes

Historically, Pacific Northwest Native American tribes were known to hunt several species of marine mammals including harbor seals, Steller sea lions, northern fur seals, gray whales and humpback whales. More recently, several Pacific Northwest Native American tribes have promulgated tribal regulations allowing tribal members to exercise treaty rights for subsistence harvest of harbor seals and California sea lions (Carretta et al. 2007a).

The Makah Indian Tribe (Makah) has specifically passed hunting regulations for gray whales. However, the directed take of marine mammals (not just gray whales) for ceremonial and/or subsistence purposes was enjoined by the Ninth Circuit Court of Appeals in rulings against the Makah in 2002, 2003 and 2004 (Norberg pers. comm. 2007b; NMFS 2005). Currently, there are no authorized ceremonial and/or subsistence hunts for marine mammals in Puget Sound or the San Juan Islands (Norberg pers. comm. 2007b) with the possible exception of some coastal tribes who may allow a small number of directed take for subsistence purposes.

8.1.1 Harbor Seals

Tribal subsistence takes of this stock may occur, but no data on recent takes are available (NMFS 2014a). No impacts on the availability of the species or stocks to the Pacific Northwest treaty tribes are expected as a result of the proposed project.

8.1.2 California Sea Lions

Tribal subsistence takes of this stock may occur, but no data on recent takes are available (NMFS 2015d). No impacts on the availability of the species or stock to the Pacific Northwest treaty tribes are expected as a result of the proposed project.

8.1.3 Gray Whales

The Makah ceased whaling in the 1920s after commercial whaling decimated the Eastern North Pacific gray whale population (NMFS 2005). On June 16, 1994, gray whales were removed from the endangered species list after a determination that the population had “recovered to near its estimated original population size, and is neither in danger of extinction throughout all or a significant portion of its range, nor likely to again become endangered within the foreseeable future throughout all or a significant portion of its range” (59 FR 31094).



On May 5, 1995, the Makah formally notified the U.S. Government of its interest in resuming treaty ceremonial and subsistence harvest of Eastern North Pacific gray whales, asking the Department of Commerce to represent them in seeking approval from the International Whaling Commission (IWC) for an annual quota (NMFS 2005). On October 18, 1997, the IWC approved an aboriginal subsistence quota of 620 Eastern North Pacific gray whales (with an annual cap of 140) for the Russian Chechotah people and the Makah (Angliss and Outlaw 2007; NMFS 2007b). The Makah successfully hunted one Eastern North Pacific gray whale on May 17, 1999 (NMFS 2005).

Whaling by the Makah was halted on December 20, 2002, when the Ninth Circuit Court of Appeals ruled that an environmental impact statement rather than an environmental assessment should have been prepared under the National Environmental Protection Act and that the Makah must comply with the process prescribed in the MMPA for authorizing take of marine mammals otherwise prohibited by a moratorium. This was further upheld by rulings in 2003 and 2004 (NMFS 2005).

In February 2005, NMFS received a request from the Makah for a waiver of the MMPA take moratorium to resume limited hunting of Eastern North Pacific gray whales. At a 2007 meeting of the IWC (59th Annual Meeting in Anchorage, Alaska), an aboriginal subsistence quota for gray whales was again approved for natives in Russia and 20 whales (four per year for 5 years) for the Makah. However, under the Ninth Circuit Court ruling the Makah must first obtain a waiver of the MMPA take moratorium before harvesting under their IWC quota (Norberg pers. comm. 2007b). A draft environmental impact statement (DEIS) to examine the alternatives for a decision to approve or deny the waiver was released for public comment in May 2008, but later terminated in May 2012 to begin developing a new DEIS because of substantial new scientific information. In March 2015, the new DEIS was released for public comment, which closed on July 31, 2015 (NMFS 2017e). No further information is available at this time.

However, any future hunts by the Makah would occur along the outer coast of Washington, not in the Puget Sound area. Therefore, the proposed activities would not interfere with any future hunt.

9.0 Anticipated Impact on Habitat

The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat.

9.1 Introduction

Construction activities will have temporary impacts on marine mammal habitat by increased in-water and in-air sound pressure levels from pile driving and removal. Other potential temporary impacts are water quality (increases in turbidity levels) and prey species distribution. Best management practices (BMPs) and minimization practices used by WSF to minimize potential environmental effects from project activities are outlined in Section 11 - Mitigation Measures.

9.2 In-air Noise Disturbance to Haul Outs

The third season of the project is scheduled to begin August 1, 2019, and all harbor seal pups are weaned in this region of Puget Sound by October 1. Disturbance of pinnipeds hauled out near the project, and surfacing when swimming within the threshold distances is possible.

During vibratory pile driving and removal, temporary in-air disturbance will be limited to harbor seals swimming on the surface through the immediate terminal area, or hauled-out on beaches or boat ramps within 61 m/200 ft., and within 20 m/65 ft. for all other pinnipeds.

During impact pile driving, temporary in-air disturbance will be limited to harbor seals swimming on the surface through the immediate terminal area, or hauled-out on beaches or boat ramps within 305 m/1000 ft., and within 98 m/320 ft. for all other pinnipeds.

In-air noise from non-pile driving construction activities is not expected to cause in-air disturbance to pinnipeds, because the Seattle Ferry Terminal is currently subject to similar existing levels of in-air noise from ferry, boat, road and other noise sources.

9.3 Underwater Noise Disturbance

Distances to the Level A/B acoustical harassment thresholds are described in Section 1.6.4, Attenuation to NMFS Thresholds.

There are several short-term and long-term effects from noise exposure that may occur to marine mammals, including impaired foraging efficiency and its potential effects on movements of prey, harmful physiological conditions, energetic expenditures and temporary or permanent hearing threshold shifts due to chronic stress from noise (Southall et al. 2007). The majority of the research on underwater noise impacts on whales is associated with vessel and navy sonar disturbances and does not often address impacts from pile driving.



The threshold levels at which anthropogenic noise becomes harmful to killer whales are poorly understood (NMFS 2008b). Because whale occurrence is occasional near the project site, in-water noise impacts are localized and of short duration, any impact on individual cetaceans will be limited.

Pile removal and driving will expose marine mammals to potential Level A/B harassment. The Zones of Exclusion (ZOE) will be monitored, and work ceased if any cetacean or pinniped approaches. Because there are no documented haul outs within the immediate project area, in-air pinniped disturbance will be limited to individuals transiting the construction area, or hauled out on nearby docks.

9.4 Water and Sediment Quality

Short-term turbidity is a water quality effect of most in-water work, including pile driving and removal. WSF must comply with state water quality standards during these operations by limiting the extent of turbidity in the immediate project area.

Roni and Weitkamp (1996) monitored water quality parameters during a pier replacement project in Manchester, Washington. The study measured water quality before, during and after pile removal and driving. The study found that construction activity at the site had “little or no effect on dissolved oxygen, water temperature and salinity”, and turbidity (measured in nephelometric turbidity units [NTU]) at all depths nearest the construction activity was typically less than 1 NTU higher than stations farther from the project area throughout construction.

Similar results were recorded during pile removal operations at two WSF ferry facilities. At the Friday Harbor Ferry Terminal, localized turbidity levels within the regulatory compliance radius of 150 feet (from three timber pile removal events) were generally less than 0.5 NTU higher than background levels and never exceeded 1 NTU. At the Eagle Harbor Maintenance Facility, within 150 feet, local turbidity levels (from removal of timber and steel piles) did not exceed 0.2 NTU above background levels (WSF 2014). In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile (Everitt et al. 1980).

Cetaceans are not expected to be close enough to the Seattle Ferry Terminal to experience turbidity, and any pinnipeds will be transiting the terminal area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals.

9.5 Passage Obstructions

Pile driving and removal at the Seattle Ferry Terminal will not obstruct movements of marine mammals. Pile work at Seattle will occur within 500 ft. of the shoreline leaving 11 km/7 miles of Puget Sound for marine mammals to pass. Construction barges will be used during the project. The barges will be anchored and/spudded. No dynamic positioning system (DPS) will be used. In a previous concurrence letter for the Vashon Island Dolphin Replacement Project (NMFS 2008b), NMFS stated the following:

Vessels associated with any project are primarily tug/barges, which are slow moving, follow a predictable course, do not target whales, and should be easily detected by whales when in transit. Vessel strikes are extremely unlikely and any potential encounters with Southern Residents [killer whales] are expected to be sporadic and transitory in nature.

Similarly, vessel strikes are unlikely for the proposed project.

9.6 Conclusions Regarding Impacts on Habitat

The most likely effects on marine mammal habitat from the proposed project are temporary, short duration noise and water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts and construction activity is expected to be minimal. All cetacean species using habitat near the terminal will be transiting the terminal area.

Any adverse effects on prey species during project construction will be short term. Given the large numbers of fish and other prey species in Puget Sound, the short-term nature of effects on fish species and the mitigation measures to protect fish during construction (use of a vibratory hammer when possible, use of a bubble curtain during steel pile impact pile driving, BMPs, conducting work within the approved in-water work window), the Seattle project is not expected to have measurable effects on the distribution or abundance of potential marine mammal prey species.

Passage is not expected to be obstructed as a result of the proposed project. Any temporary obstruction due to barge placement will be localized and limited in duration, and a traveling barge is too slow to strike marine mammals.

10.0 Anticipated Impact of Loss or Modification of Habitat

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The proposed project will not result in a significant permanent loss or modification of habitat for marine mammals or their food sources. The most likely effects on marine mammal habitat for the proposed project are temporary, short duration in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during the project is expected to be minimal. These temporary impacts have been discussed in detail in Section 9.0, Anticipated Impact on Habitat.

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11.0 Mitigation Measures

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

WSF activities are subject to federal, state and local permit regulations. WSF has developed and routinely uses the best guidance available (e.g., BMPs and mitigation measures) to avoid and minimize (to the greatest extent possible) impacts on the environment, ESA species, designated critical habitats and species protected under the MMPA.

The mitigation measures will be employed during all pile driving and removal, and other construction activities during the project. The language in each mitigation measure is included in the Contract Plans and Specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the Contractor and WSF. Failure to follow the prescribed mitigation measures is a contract violation.

General mitigation measures used for all construction practices are listed first, followed by specific mitigation measures for pile related activities.

11.1 All Construction Activities

WSF performs all construction in accordance with the current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. Special Provisions contained in preservation and repair contracts are developed accordingly to address project specific site conditions, and by permitted work methods, and materials, and are used in coordination with the Standard Specifications. Mitigation measures include:

All construction equipment will comply with applicable equipment noise standards of the U.S. Environmental Protection Agency.

AWSF inspector will be on site during construction. The role of the inspector is to ensure contract compliance. The inspector and the contractor will have a copy of the Contract Plans and Specifications on site and will be aware of all requirements. The inspector will have knowledge of the environmental provisions and compliance of the project.

WSF will obtain Hydraulic Project Approval (HPA) from WDFW as appropriate and the contractor will follow the conditions of the HPA. HPA requirements will assumed as part of the contract document.

The contractor shall be responsible for the preparation of a Spill Prevention, Control and Countermeasures (SPCC) plan to be used for the duration of the project:

The SPCC plan is submitted to the Project Engineer prior to the commencement of any construction activities. The contractor maintains a copy of the SPCC plan, along with any updates, at the work site.

The SPCC plan shall identify construction planning elements and recognize potential spill sources at the site. The SPCC plan shall outline BMPs, responsive actions in the event of a spill or release and identify notification and reporting procedures. The SPCC plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections and training.

- The SPCC will outline what measures shall be taken by the contractor to prevent the release or spread of hazardous materials, either found on site and encountered during construction but not identified in contract documents, or any hazardous materials that the contractor stores, uses, or generates on the construction site during construction activities. These items include, but are not limited to gasoline, oils and chemicals. Hazardous materials are defined in Revised Code of Washington (RCW) 70.105.010 under “hazardous substance.”
- The contractor shall maintain, at the job site, the applicable spill response equipment and material designated in the SPCC plan.
- The contractor shall regularly check fuel hoses, oil drums, oil or fuel transfers valves, fittings, etc. for leaks, and shall maintain and store materials properly to prevent spills.
- No petroleum products, chemicals or other toxic or deleterious materials shall be allowed to enter surface waters.
- WSF will comply with water quality restrictions imposed by the Washington State Department of Ecology (Ecology) (Chapter 173-201A WAC), which specify a mixing zone beyond which water quality standards cannot be exceeded. Compliance with Ecology’s standards is intended to ensure that fish and aquatic life are being protected to the extent feasible and practicable.
- Wash water resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged into state waters unless authorized through a state discharge permit.
- Equipment that enters the surface water shall be maintained to prevent any visible sheen from petroleum products appearing on the water.
- There shall be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
- No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
- The contractor shall regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. for leaks, and shall maintain and store materials properly to prevent spills.

11.2 Timing Windows

Timing restrictions are used to avoid in-water work when ESA-listed salmonids are most likely to be present. The combined work window for in-water work for the Seattle Ferry Terminal is July 16 through February 15. Actual construction activities are planned to take place from August 1, 2019 and February 15, 2020.

11.3 Pile Driving BMPs

BMPs to be employed during pile installation include:

- The vibratory hammer method will be used to the extent possible to drive steel piles to minimize noise levels.
- A bubble curtain or other noise attenuation device will be employed during impact installation or proofing of steel piles unless the piles are driven in the dry.
- Creosote-treated timber piling shall be replaced with non-creosote-treated piling.
- The contractor will be required to retrieve any floating debris generated during construction. Any debris in the containment boom will be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris will be disposed of at an upland disposal site.
- Steel, plastic/steel, concrete, or ACZA-treated wood piling will be used. No creosote-treated timber piling will be used.

11.4 Pile Removal BMPs

The following pile removal mitigation measures are proposed by WSF to reduce impacts on marine mammals to the lowest extent practicable. For WSF's Construction Minimization Measures, see WSF Biological Assessment Reference Section 2.3. Additional BMPs that will be incorporated into the project include:

- The vibratory hammer method will be used to remove timber piles to minimize noise levels.
- Hydraulic water jets will not be used to remove piles.
- Marine mammal monitoring during vibratory pile removal will be implemented (see Section 11.5, Marine Mammal Monitoring).
- The crane operator will be instructed to remove piles slowly to minimize turbidity in the water as well as sediment disturbance.
- The operator will “wake up” the pile to break the bond with surrounding sediment by vibrating the pile slightly prior to removal. Waking up the pile avoids pulling out large blocks of sediment, which could cause the pile to break apart during the removal process, and usually results in little to no sediment attached to the pile during withdrawal.
- Extraction equipment will be kept out of the water, above the water line, to prevent creosote release into the water that could occur if the pile is pinched by extraction equipment below the water line.
- Piling will not be broken off intentionally by twisting, bending, or other deformation, to minimize any potential release of creosote into the water column.
- Treated wood will be contained during and after removal to preclude sediments and contaminated materials from entering the aquatic environment.

- The work surface on the barge deck or pier will include a containment basin for pile and any sediment removed during pulling. The basin will be constructed of durable plastic sheeting with sidewalls supported by hay bales or a support structure to contain all sediment. The containment basin shall be removed and disposed of in accordance with applicable federal and state regulations.
- The work surface shall be cleaned by properly disposing of sediment or other residues along with cut-off piling.
- Upon removal from the substrate, the pile shall be moved immediately from the water into the containment basin. The pile shall not be shaken, hosed-off, stripped or scraped off, left hanging to drip or any other action intended to clean or remove adhering material from the pile.
- Holes left when removing piling will be filled with clean sand or gravel. Sand or gravel used as fill material will be obtained from a commercial source that is free of contaminants.
- During removal of creosote-treated piles, containment booms and absorbent booms (or other oil-absorbent fabric) will be placed around the perimeter of the work area to capture wood debris, oil, and other materials that could inadvertently be released into marine waters. All accumulated debris will be collected daily and disposed of at an approved upland site.
- Removed creosote-treated piles will be disposed of in a manner that precludes their further use. Piles will be cut into manageable lengths (four feet or less) for transport and disposal in an approved upland location that meets the liner and leachate standards contained in the Washington Administrative Code (WAC), Chapter 173-304, Minimum Functional Standards. No reuse of treated wood will occur.
- Water quality will be monitored during pile removal. Work barges and dredged material disposal barges will not be allowed to ground out or rest on the substrate, or be over or within 25 feet of vegetated shallows (except where such vegetation is limited to state-designated noxious weeds).
- Barges will not be anchored over vegetated shallows for more than 24 hours.
- Demolition and construction materials shall not be stored where high tides, wave action, or upland runoff can cause materials to enter surface waters.

11.5 Shutdown Zones

WSF will establish Level A shutdown zones for all marine mammals (Table 11-1).

Table 11-1 Exclusion Zones

Pile type, size & pile driving method	Shutdown zone (m)					SRKW Shutdown (m)
	LF cetacean	MF cetacean	HF cetacean	Phocid	Otariid	
Impact drive 36" steel pile, 8 piles/day	350	15	410	60	15	750
Vibratory drive 36" steel pile, 8 piles/day	160	15	230	60	10	8,700
Vibratory drive/removal, 24" steel piles, 8 piles/day	100	10	150	60	10	8,700
Vibratory remove 14" timber pile, 20 piles/day; or vibratory removal 12" steel pile, 10 piles/day	10	10	15	10	10	2,200

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12.0 Arctic Subsistence Uses, Plan of Cooperation

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. A plan must include the following:

(i) A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

(ii) A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;

(iii) A description of what measures the applicant has taken an/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and

(iv) What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting activity, to resolve conflicts and to notify the communities of any changes in the operation.

This section is not applicable. The proposed activities will take place in Washington State, specifically in Puget Sound. No activities will take place in or near a traditional Arctic subsistence hunting area.

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13.0 Monitoring and Reporting Plan

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

13.1 Coordination

WSF will conduct briefings with the construction supervisors and the crew, and marine mammal observer(s) prior to the start of pier removal to discuss marine mammal monitoring protocol and requirement to halt work.

Prior to starting any pile driving or removal activity, the Orca Network and/or Center for Whale Research will be contacted to find out the location of the nearest marine mammal sightings. Daily sightings information can be found on the Orca Network Twitter site (<https://twitter.com/orcanetwork>), which will be checked several times a day.

The Orca Sightings Network consists of a list of over 600 (and growing) residents, scientists, and government agency personnel in the U.S. and Canada. Sightings are called or emailed into the Orca Network and immediately distributed to other sighting networks including: the Northwest Fisheries Science Center of NOAA Fisheries, the Center for Whale Research, Cascadia Research, the Whale Museum Hotline and the British Columbia Sightings Network.

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

With this level of coordination in the region of activity, WSF will be able to get real-time information on the presence or absence of whales before starting any pile removal or driving.

13.2 Visual Monitoring

WSF has developed a monitoring plan (Appendix D) that will collect sighting data for each marine mammal species observed during pile removal activities. Monitoring for marine mammal presence will take place 30 minutes before, during and 30 minutes after pile removal.

Marine mammal behavior, overall numbers of individuals observed, frequency of observation and the time corresponding to the daily tidal cycle will also be included. Qualified marine mammal observers will be present on site during pile removal. Level A Take zones will be added to this plan when available from the final permit.

13.3 Reporting Plan

WSF will provide NMFS with a draft monitoring report within 90 days of the conclusion of monitoring. This report will detail the monitoring protocol, summarize the data recorded during monitoring and estimate the number of marine mammals that may have been harassed.

If comments are received from the Regional Administrator on the draft report, a final report will be submitted to NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

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14.0 Coordinating Research to Reduce and Evaluate Incidental Take

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

In-water noise generated by pile removal and driving at the project site is the primary issue of concern relative to local marine mammals. WSF has conducted research on sound propagation from vibratory and impact hammers, and plans on continuing that research to provide data and new technologies for future ferry terminal projects. Impact and vibratory noise will be monitored during the project, in order to collect further data.

As described in Section 13, WSF will coordinate with local marine mammal sighting networks (Orca Network and/or the Center for Whale Research) to gather information on the location of whales prior to initiating pile removal. Marine mammal monitoring will be conducted using ArcGIS Survey123 to collect information on presence of marine mammals within the ZOIs for this project. Marine mammal sightings will be shared with Orca Network and The Whale Museum.

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Appendix A
Project Sheets (Attached)

Appendix B
Seattle Multimodal Project Year One Acoustic Monitoring Report (Attached)

Appendix C
**Seattle Test Pile Vibratory Pile Monitoring Technical Memorandum
(Attached)**

Appendix D
Level A/B Distance Calculations (Attached)

Appendix E
Marine Mammal Monitoring Plan (Attached)

Appendix F
ArcMap Map Package (Attached)