Request for an Incidental Harassment Authorization

Under the Marine Mammal Protection Act

for the

Railroad Dock Dolphin Installation

White Pass & Yukon Route

November 9th, 2018

Submitted to:

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ACRONYMS AND ABBREVIATIONS

- 4MP Marine Mammal Monitoring and Mitigation Plan
- AMP Acoustical Monitoring Plan
- CFR Code of Federal Regulations
- CM cubic meters
- CWA Clean Water Act
- CV coefficient of variation
- dB decibel
- DPS distinct population segment
- eDPS Eastern Distinct Population Segment
- ESA Endangered Species Act
- FR Federal Register
- Hz hertz
- IHA Incidental Harassment Authorization
- MD Mooring Dolphin
- MMPA Marine Mammal Protection Act
- NMFS National Marine Fisheries Service
- NOAA National Oceanic and Atmospheric Administration
- PND PND Engineers, Inc.
- PTS permanent threshold shift
- RMS root mean square
- RR Dock Railroad Dock
- SEL Sound Exposure Level
- SPL sound pressure level
- SSV sound source verification
- TTS temporary threshold shift
- wDPS Western Distinct Population Segment
- WFA Weighting Factor Adjustment
- WP&YR White Pass & Yukon Route
- WSDOT Washington State Department of Transportation

1. Description of the Activity

1.1 Introduction

In response to demand from the cruise ship lines that call in Skagway, White Pass & Yukon Route (WP&YR), proposes to install two new 200-ton pile supported mooring dolphins at the south end of the company's Railroad Dock (RR Dock) to accommodate an increased number of large cruise ships. The aft berth of the dock is located at the southwest end of town near the terminus of Congress Way (Figure 1 and Figure 2). The proposed project will occur in marine waters that support several marine mammal species. The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of all 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) of the MMPA allows for the issuance of an Incidental Harassment Authorization (IHA), provided an activity results in negligible impacts to marine mammals and would not adversely affect subsistence use of these animals. The project may result in marine mammals protected under the MMPA being exposed to sound levels above allowable noise harassment or non-serious injury thresholds.

Figure 1. Skagway Alaska

1.2 Project Purpose and Need

The proposed project is necessary to provide safe moorage when both a Norwegian Breakaway and Royal Caribbean Quantum class cruise ship vessel are moored simultaneously at the RR Dock aft berth. Both Breakaway (326 m [1,068 ft], 146,600 gross tonnage) and Quantum (348 m [1,142 ft], 168,666 gross tonnage) class vessels are scheduled to be in Skagway at the start of the 2019 cruise ship season (May 2019). The existing dolphin infrastructure does not extend far enough south to accommodate both cruise ship vessels on the same day as needed. Without the proposed improvements, the community of Skagway is facing significant financial impacts with only one of two ships able to use berth on any given day.

1.3 Project Description

The proposed project would install two new 200-ton mooring dolphins (MD#4 and MD#5) approximately 100 feet and 200 feet, respectively, south of the existing southernmost mooring dolphin (MD#3) along the Railroad Dock south floating dock extension. Two crane barges, one material barge, and three work boats (each under 25 feet) will be used to install and subsequently remove (14) 36" temporary template piles and install (12) 42" permanent dolphin piles. Barges will be moored on-site for the duration of construction. All in-water work (pile driving and drilling) will take place from February 1 to April 30, 2019 (89 days).

Construction activities generally include mobilization, pile driving and drilling, pile splicing, pile-to-dolphin cap welding, erecting temporary weather structures and templates, and setting catwalks. Each element is further described below.

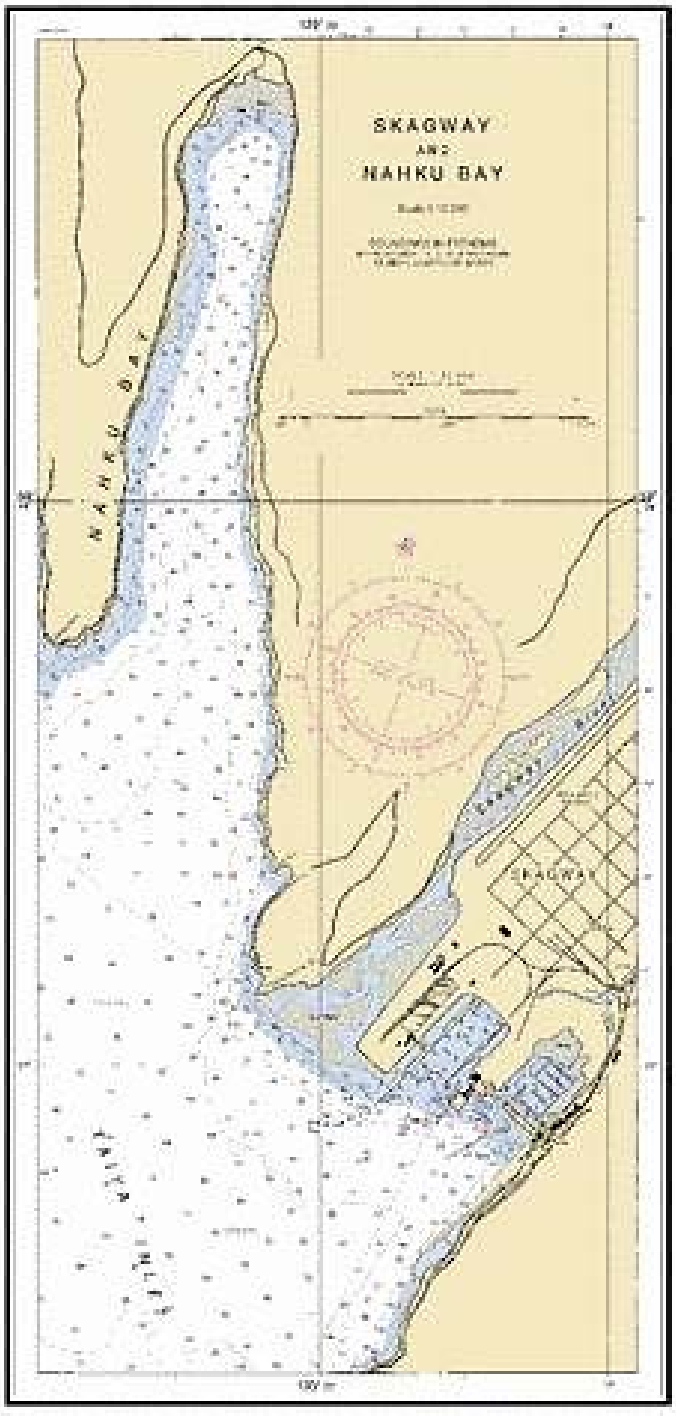

Figure 2. Vicinity Map, Skagway, Alaska

1.3.1 Temporary Template Piles

Temporary template piles will be installed to aid with construction and will be removed after the permanent dolphin piles have been installed. Temporary template piles will include fourteen (14) piles, 36-inch in diameter

or smaller (Table 1). Seven (7) temporary template piles will be used per dolphin (14 total temporary template piles). Once installed, each temporary template pile will measure around 200-ft in length and will consist of up to two sections that will be spliced together as they are installed. Installation methods for the temporary template piles will be similar to the permanent dolphin piles. All temporary template piles and permanent dolphin piles will require a combination of three pile installation methods: vibratory driving, impact driving, and drilling. These methods are described further in '1.3.2 Permanent Dolphin Piles'. Removal of the temporary template piles will only involve use of a vibratory hammer.

Table 1. Temporary Template Pile Details for New Construction

Stage	Type	Quantity	Size
Temporary	Steel Pipe Pile	14	36-Inch

1.3.2 Permanent Dolphin Piles

As previously stated, each of the two proposed dolphins consists of six (6) 42-inch diameter steel pipe piles up to 300-feet in length (Table 2). These piles will be installed at water depths up to 140-feet deep and into loose substrate that is intermixed with cobbles and boulder-sized rocks. Due to the nature of deep-water pile installation in loose sediment, a variety of means and methods are required to install a single pile. Each pile will be installed using a combination of installation methods: vibratory hammer, impact hammer, and drilling (Table 3). The contractor may switch between each installation method multiple times per day depending on the conditions they encounter. Only one installation method will occur at a time. Throughout the project, one crane will be dedicated to drilling only while the second crane will alternate between the vibratory and impact hammers. In addition to alternating between installation methods, the contractor will also be required to splice on additional length (i.e. weld piles together to make them longer). Up to three splices are expected per pile.

Table 2. Permanent Pile Details for New Construction

Stage	Type	Quantity	Size
Permanent	Steel Pipe Pile	12	42-Inch

1.3.3 Pile Installation Equipment

Due to the challenging sub-bottom conditions, tight schedule, and the remote nature of Skagway, Alaska, the contractor will come prepared with an array of tools to utilize for the installation of the dolphin piles. Table 3 below provides a summary of the equipment which is estimated to be utilized on this project. The contractor will need to employ all of the pile installation equipment on this project.

Table 3. Pile Installation Equipment

Pile Installation Equipment	Model/Size	Description/Purpose
Crane	200-250-ton barge with a 200-250-ft boom (up to 2 cranes)	Install piles, set dolphin caps, set catwalks, move material, etc.
Vibratory Hammer	APE 200 or equivalent	Advance pile through overburden to vibratory refusal

Pile Installation Equipment	Model/Size	Description/Purpose
Impact Hammer	Delmag D100 Diesel hammer or equivalent	Advance pile through overburden once vibratory refusal has been reached.
Drill	Rock Anchor (8-inch hole): ICE - HS-27 Top drive down-hole hammer PDQL-80 or equivalent. Socket (42-inch hole): PPV ring bit MF34 down hole hammer or equivalent	A drill is inserted through the pile all the way down to bedrock. The drill breaks up rock into small flakes (tailings) which are removed from the drilled hole as the pile or casing advances.

2. Dates, Duration, and Region of Activity

2.1 Dates and Duration

The project is planned to occur over approximately 100 days between February 1, 2019 and May 1, 2019 (with mobilization occurring in December 2018 and January 2019). For a more detailed explanation of work activities, the following table summarizes the proposed general construction sequence and schedule; subject to adjustment by the construction contractor's means and methods (Table 4). A monthly breakdown of hours spent on each pile driving method it provided in Table 4.

Table 4. Construction Sequence

Task	Date(s)/ Duration/ Daylight	Description of Activity
Mobilize to Site	Dates December 2018 thru January 2019 Duration 30-60 days Daylight 7 hrs/day (avg)	• The contractor will mobilize the necessary equipment which generally includes 2 crane barges, 1 material barge, 3 work boats (each under 25'), and personnel. • The barges will most likely mobilize from Southeast Alaska depending on the Contractor, availability, and current moorage. • Barges will be moored on-site for the duration of construction.
Install and Remove Template Temporary Piles (14 piles)	Dates: February 2019 thru April 2019 Daylight 10 hrs/day (avg)	• Overview: The template piles require the tips of all piles to be embedded approximately 60-ft past mudline. The overburden (soil material above bedrock) generally consists of loose to dense material intermixed with cobbles and boulder-sized rocks or slabs (obstructions). During installation, some or all piles will encounter obstructions prior to reaching final tip elevation and will require drilling through obstructions to meet 60-ft minimum embedment requirements. • Step 1: The contractor will initially impact or vibratory drive all production piles to first refusal. First refusal occurs when the contractor is unable to advance the pile tip any further with a vibratory or impact hammer. This may occur when the pile tip is located on an obstruction (prior to reaching 60-ft of embedment). • Step 2: If the pile has not reached 60-ft of embedment and is stuck on an obstruction, the contractor will drill past the pile obstruction until 60-ft of embedment is achieved. *Notes:* 1) During Steps 1-2, the contractor will be required to splice additional length onto piles as they are being installed due to limitations on crane heights and length of piles required to reach minimum embedment requirements. Splicing pipe pile involves welding pipe pile end to end with a complete joint penetration weld. Up to two splices are anticipated. 2) On any given day, contractor may elect to use each installation method (vibratory, impact, or drilling). Any installation method may occur on the same day, but not at the same time.

Task	Date(s)/ Duration/ Daylight	Description of Activity
		3) Pile Installation Equipment: See Table 3 for potential pile installation equipment. Actual equipment used subject to adjustment by the construction contractor's means and method.
Install Dolphin Permanent Piles (12 piles)	<u>Dates:</u> February 2019 thru April 2019 <u>Daylight</u> 10 hrs/day (avg)	• Overview: The structural design requires the tips of all piles to bear (come into contact with) on bedrock. Bedrock is located anywhere from 100-ft to 200-ft below mudline. The overburden (soil material above bedrock) generally consists of loose to dense material intermixed with cobbles and boulder-sized rocks or slabs (obstructions). During installation, some or all piles will encounter obstructions prior to reaching final tip elevation and will require drilling through obstructions to meet project specifications. • Step 1: The contractor will initially impact or vibratory drive all permanent piles to first refusal. First refusal occurs when the contractor is unable to advance the pile tip any further with a vibratory or impact hammer. This will most likely occur when the pile tip is located on an obstruction (prior to reaching bedrock) or at bedrock. • Step 2: To determine whether the pile tip has reached bedrock, the contractor will drill past the pile tip. If the drill advances up to 20-ft past the pile tip through rock, bedrock is encountered. If the drill "punches through" the obstruction and encounters soft overburden material, the contractor may either continue to advance the pile with the drilling process to bedrock or repeat Step 1 with a vibratory or impact hammer. Once second refusal is reached, the contractor will again need to verify bedrock by drilling up to 20-ft past the pile tip into bedrock. This process is repeated until bedrock is confirmed. • Step 3: Once bedrock is confirmed, a smaller 8-inch drill will be used to drill a rock anchor hole into bedrock 50-ft past the pile tip. The 8" hole for the rock anchor is drilled beneath the pile tip from within the hallow pipe pile. *Notes:* 1) During Steps 1-2, the contractor will be required to splice additional length onto piles as they are being installed due to limitations on crane heights and length of piles required to reach bedrock. Splicing pipe pile involves welding pipe pile end to end with a complete joint penetration weld. Up to three splices will be required to achieve full pile length. On average, splicing is anticipated to require three to five days to complete. At their final installed lengths, pile will range between 200-ft to 300-ft in length. MD#4 will be installed at a water depth of approximately 115 feet and MD#5 will be installed at 125 feet deep. 2) On any given day, contractor may elect to use each installation method (vibratory, impact, or drilling). Any installation method may occur on the same day, but not at the same time. 3) Pile Installation Equipment: See Table 3 for potential pile installation equipment. Actual equipment used subject to adjustment by the construction contractor's means and method.

Task	Date(s)/ Duration/ Daylight	Description of Activity
Install Dolphin Caps (2 caps)	Date(s) April 2019 Duration 7-14 days Daylight 15 hrs/day (avg)	• Once all dolphin piles are installed, a prefabricated steel dolphin cap will be set on top of the piles and welded to the cap. • No in-water work will occur during this process. All welding work will occur above Mean Higher High Water (MHHW).
Install Catwalks (2 catwalks)	Date(s) April 2019 Duration 5-7 days Daylight 14 hrs/day (avg)	• The dolphin cap on MD#3 will require minor modifications to accept the new catwalk which will span between MD#3 and the proposed MD#4. Cap adjustments include, removing an approximate 5-ft section of bullrail and guardrail on the south side of the cap. • Once work on MD#3, #4, and #5 is completed, two 88-ft long catwalks will be set to provide access to all the dolphins. • For the above described work, no in-water work will occur during this process. All welding work will occur above MHHW.
Demobilize from Site	Date(s) May 2019	• Contractor will remove all barges, cranes, equipment, personnel, temporary structures, unused materials, etc. from the site upon project completion.

1. For information related to time to install piles, see Table 5, Table 6, Table 7, and Table 12.

Table 5. Pile Driving Scenarios

Description	Pile No.	Vibratory		Impact Driving				Drilling		Total Hrs	Total Hrs/ Pile (note 1)
		Hrs/ Pile	Total Hrs	Hrs/ Pile	Total Hrs (note 1)	Total Strikes	Avg Strikes /Pile	Hrs/ Pile	Total Hrs		
Template Installation/ Removal	14	2.7	38	0.9	12	43,200	3086	4.4	62	112	8.0
Dolphin Installation	12	6.7	80	3.1	37	133,200	11,100	18.3	220	337	28.1

1. Assumes average of 1 strike per second (i.e. includes time for hammer to rise and fall). A strike duration of 0.1 seconds is assumed for the value input into NMFS "User Spreadsheet."

Table 6. Anticipated Total Installation Time of Both Pile Types per Installation Method

Month	Template Piles (36-inch Steel Piles)						Permanent Piles (42-inch Steel Piles)					
	Vibratory Driving		Impact Driving		Drilling		Vibratory Driving		Impact Driving		Drilling	
	Hrs	Days	Hrs	Days	Hrs	Days	Hrs	Days	Hrs	Days	Hrs	Days
February	14	28	6	28	42	28	26	28	13	28	74	28
March	10	14	6	31	20	31	27	31	12	31	73	31
April	14	30	0	0	0	0	27	30	12	30	73	30
Totals	**38**	**72**	**12**	**59**	**62**	**59**	**80**	**89**	**37**	**89**	**220**	**89**

1. The day column totals exceed the number of days in each month because there will be multiple installation methods occurring in any given day (24-hour period).

Table 7. Summary of Total Installation Time per Installation Method

Month	Vibratory Driving		Impact Driving		Drilling	
	Hours	Days	Hours	Days	Hours	Days
February	40	56	19	56	116	37
March	37	45	18	62	93	40
April	41	60	12	30	73	9
Total	**118**	**161**	**49**	**148**	**282**	**148**

2.2 Region of Activity

The proposed activities will occur in Skagway Harbor, Alaska at the head of Taiya Inlet/Lynn Canal, the northernmost fjord on the Inside Passage. Taiya Inlet lies in a deep valley, with Skagway, to the north. Currently the area is heavily used for recreation and commercial proposes especially in summer during cruise ship season. Literature is limited regarding the deepwater habitat beneath RR Dock. However, it is known that the basin is composed of glacial till sediments. The shoreline along RR Dock is completely armored with riprap and contains little to no riparian vegetation. The armoring extends well below MHHW to an unknown depth. Upland from the project site, the ground is vegetated continuously with grasses, herbs, sedges, and conifer trees (Municipality of Skagway Biological Assessment, 2016). Waterfowl and other birds feed and rest along tidal flats, streambanks, and wetlands (Municipality of Skagway, 1990). The intertidal and subtidal zones of Taiya Inlet contain habitat for invertebrates and vertebrates including varieties of shellfish, finfish, and marine mammals. Rocky areas of the inlet are covered continuously in barnacles, mussels, and rockweed (*Fucus* sp.). Taiya Inlet is considered less productive than other parts of Lynn Canal due to the large freshwater and sediment inputs (City of Skagway 2005) and Arimitsu *et al.* (2003) even documented low fish diversity within the Taiya River estuary. There are three anadromous streams near the project location including Skagway River, Taiya River, and Pullen Creek. The Skagway River (AWC #115-34-10300) flows into the inlet west of the project site. This river provides spawning, rearing, and overwintering habitat for coho salmon, pink salmon, chum salmon, Dolly Varden char, and anadromous eulachon. Taiya River (AWC #115-34-10230) is located northwest of the project site and supports similar species as the Skagway River. Annual eulachon runs during the spring and salmon runs in the fall attract

marine mammals to the inlet such as Steller sea lions, harbor seals, and humpback whales. Pullen Creek (AWC #115-34-10310) is the most impacted of the three streams due to heavy development. The lower mile of the creek is listed as a 4a impaired waterbody for metal parameters including cadmium, copper, lead, and zinc (Alaska Department of Environmental Conservation Division of Water, 2018). Chinook salmon have been introduced to Pullen Creek via a hatchery program.

The project site's legal description is an un-surveyed parcel of state tide and submerged lands located south of ADL 108521 and seaward of upland Lot 8, U.S. Survey 5110 (approximately 59.4420º N, 135.3316º W [WGS84]), Taiya Inlet, Skagway, Alaska (Figure 3). The exact centroid location of MD#4 is 59.44258° N, 135.3296° W and of MD#5 is 59.44211° N, 135.35145° W.

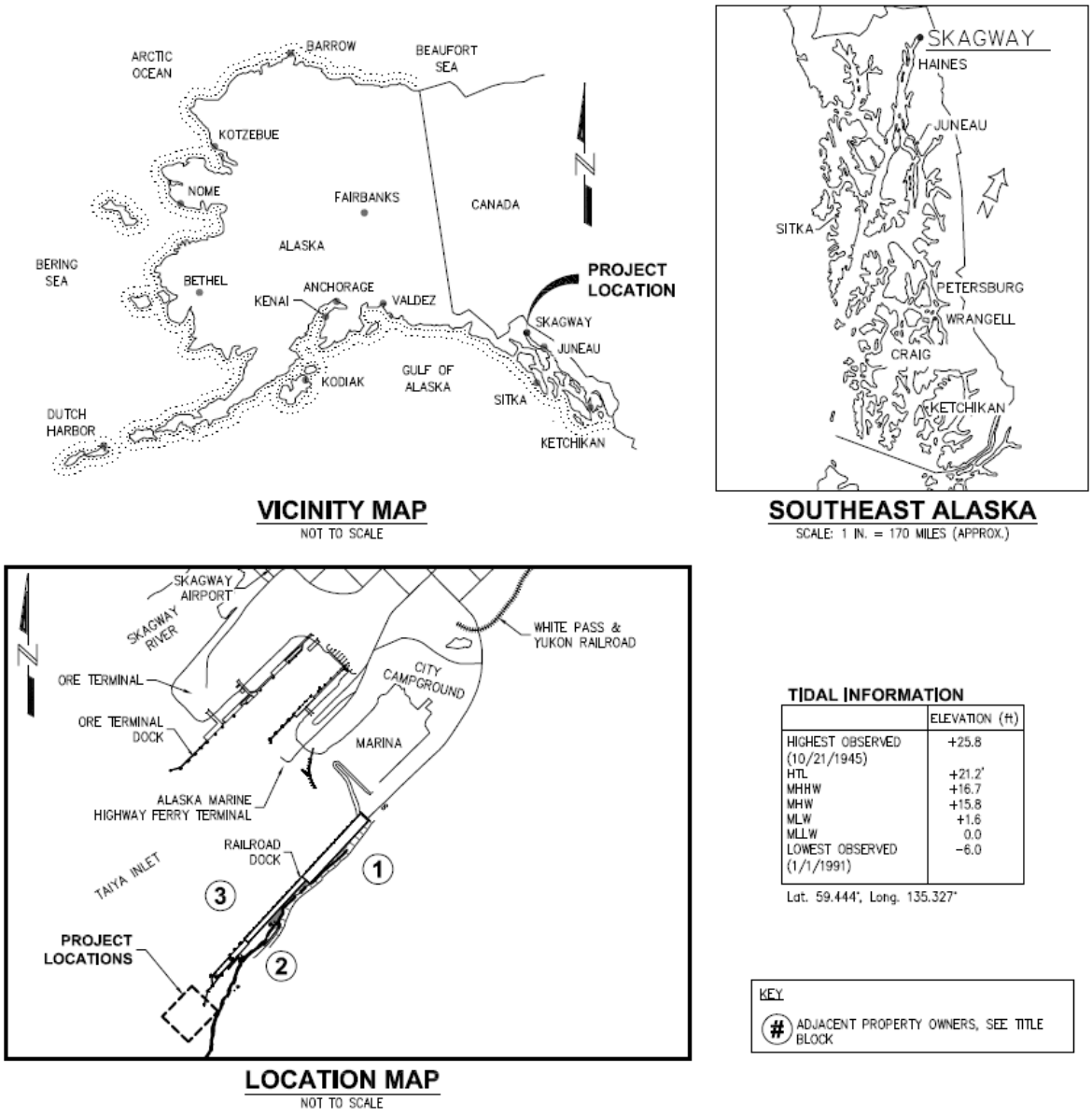

Figure 3. Region of Activity

3. Species and Number of Marine Mammals

Known distribution ranges of several marine mammal species, subspecies, stocks, or distinct population segments (DPSs) encompass the portion of the project's action area. These species are listed in Table 8 along with their stock population, seasonal occurrence in the action area, and estimated abundance. The Alaska Protected Resources Division Species Distribution mapper additionally lists the Pacific white-sided dolphin as a species with a range that may extend into the action area, however, no sightings have been documented in Skagway (K. Gross, Never Monday Charters, personal communication; R. Ford, Taiya Inlet Watershed Council, personal communication; Dahlheim *et al.* 2009)). Due to the very low likelihood of Pacific white-sided dolphin occurring within the action area, impacts are considered unlikely. As a result, incidental take of this species is not requested and not addressed further in this IHA application. Descriptions of species that are addressed in this IHA application – humpback whale, Steller sea lion, harbor seal, Dall's porpoise, harbor porpoise, killer whale, and minke whale – are provided in Section 4.

Two DPSs of marine mammals listed under the ESA could potentially occur in the action area; the Mexico DPS (California-Oregon-Washington stock) of humpback whales and the Western DPS (U.S. Western stock) of Steller sea lions. DPSs are discrete populations as defined under the ESA, while "stocks" are demographically independent populations as defined under the MMPA. DPSs and stocks do not necessarily coincide, but in the case of humpback whale and Steller sea lion populations in Alaska they do.

Both Eastern and Western DPSs of Steller sea lions may occur within the action area. The Western DPS (wDPS) is listed as endangered while the Eastern DPS (eDPS) was recently delisted.

Critical habitat has not been designated in the action area for either humpback whales or Steller sea lions.

Table 8. Species with Ranges Extending into the Project Site

Species	Estimated Abundance[1]/Stock	MMPA Status	ESA Status	Seasonal Occurrence in Action Area[3]
Humpback whale[2] ***(Megaptera novaeangliae)***	10,103 (Central North Pacific Stock)	Depleted, Strategic Stock	Delisted in 2016	Infrequent
	1,918 (California/Washington /Oregon Stock)		Threatened	Rare
Steller sea lion[2] ***(Eumetopias jubatus)***	41,638 (Eastern U.S. Stock)	Depleted, Strategic Stock	Delisted in 2013	Infrequent
	53,303 (Western U.S. Stock)		Endangered	Rare
Harbor seal ***(Phoca vitulina)***	9,478 (Lynn Canal/ Stephens Passage)	Protected, Nonstrategic Stock	Not Listed	Likely
Dall's porpoise ***(Phocoenoides dalli)***	83,400 (Entire Alaska Stock)	Protected, Nonstrategic Stock	Not Listed	Rare
Harbor porpoise ***(Phocoena phocoena)***	975 (Southeast Alaska)	Protected, Strategic Stock	Not Listed	Infrequent
Killer whale ***(Orcinus orca)***	261 (Eastern North Pacific, Northern Residents – Southeast Alaska)	Protected, Nonstrategic Stock	Not Listed	Infrequent
	2,347 (Eastern North Pacific, Alaska Residents)			
	243 (West Coast Transients)			
	587 (Gulf, Aleutian, Bering Transients)			
Minke whale (*Balaenoptera acutorostra*)	Unknown	Protected, Nonstrategic Stock	Not Listed	Very Rare

1. Abundance estimates are from the most recent published stock reports (Carretta *et al.* 2018, Muto *et al.* 2018).
2. Humpback whales and Steller sea lions are discussed in terms of the distinct population segments (DPS) in the following sections to better quantify the effects to the endangered population segments.
3. Seasonal Occurrence – Rare: Few confirmed sightings, or the distribution of the species is near enough to the area that the species could occur there. Infrequent: Confirmed, but irregular sightings. Likely: Confirmed and regular sightings of the species in the area at least seasonally.

4. Affected Species Status and Distribution

This section describes the status, distribution, behavior, and critical habitat (ESA-listed species only) for the species and stocks of marine mammals likely to be affected by the proposed project.

4.1 Humpback Whale (*Megaptera novaeangliae*)

4.1.1 Status

In 1970, the humpback whale was listed as endangered under the Endangered Species Conservation Act (ESCA) (35 FR 18319). In 1973 Congress replaced the ESCA with the Endangered Species Act (ESA), and humpback whales continued to be listed as endangered. Because humpback numbers subsequently increased across much of their range, NMFS conducted a global status review and reassessed the status of humpback whales under the ESA (Bettridge *et al.* 2015). Based on that review, 14 DPSs of humpback whales were identified, and listings revised as appropriate (81 FR 62260).

In the North Pacific, five DPSs that breed in subtropical and tropical waters from Asia to Central America then migrate north to feed in highly productive North Pacific feeding grounds were identified (Bettridge *et al.* 2015). Whales from three of these DPSs migrate to Alaskan waters: the Mexico DPS (ESA-listed as threatened), the Western North Pacific DPS (ESA-listed as endangered), and the Hawaii DPS (delisted) (81 FR 62260). These DPSs equate to the California/Oregon/Washington, Western North Pacific, and Central North Pacific stocks, respectively.

4.1.1.1 Distribution

The humpback whale is distributed worldwide in all ocean basins. Relatively high densities of humpback whales are found in feeding grounds in Southeast Alaska and northern British Columbia, particularly during summer months. Based on extensive photo identification data, NMFS has determined that individual humpback whales encountered in Southeast Alaska and northern British Columbia have a 93.9 percent probability of being from the recovered (delisted) Hawaii DPS (CV= 0.17) and a 6.1 percent probability of being from the currently threatened (ESA-listed) Mexico DPS (CV= 0.03) (Wade *et al.* 2016). There is a 0 percent probability that humpback whales in Southeast Alaska are from the endangered Western North Pacific DPS (Wade *et al.* 2016). Intermixed DPSs are not visually distinguishable; their identity can only be determined by DNA or photo identification. Therefore, we will use Wade *et al.* (2016) estimates that assume 93.9 percent of humpbacks in Southeast Alaska are from the Hawaii DPS and 6.1 percent are from the Mexico DPS.

Humpbacks migrate to Alaska to feed after months of fasting in low latitude breeding grounds. The timing of migration varies among individuals: most humpbacks begin returning to Alaska in spring and most depart Alaska for southern breeding grounds in fall or winter. Peak numbers of humpbacks in Southeast Alaska occur during late summer to early fall, but because there is significant overlap between departing and returning whales, humpbacks can be found in Alaska feeding grounds in every month of the year (Baker *et al.* 1985, Straley 1990, Witteveen and Wynne 2009). There is also an apparent increase in the number of humpbacks overwintering in feeding grounds in Alaska (Straley *et al.* 2017).

Humpback whale individuals of different DPS (natal) origin are indistinguishable from one another (unless fluke patterns are linked to the individual in both feeding and breeding ground). The frequency of occurrence of animals by DPS provided in this IHA application is only an *estimate* and is based on the DPS ratio and the assumption that the ratio is consistent throughout the Southeast Alaska region (Wade *et al.* 2016).

4.1.1.2 Hawaii Distinct Population Segment Humpback Whale (Hawaii DPS)

Humpbacks that breed around the main Hawaiian Islands have been observed in summer feeding grounds throughout the North Pacific. Most of the Hawaii DPS migrates to feeding grounds in Southeast Alaska and northern British Columbia (Bettridge *et al.* 2015). Mark-recapture analysis of identification photographs suggests the Hawaii DPS numbers approximately 10,103 individuals and is increasing (Calambokidis *et al.* 2008). A multi-strata analysis estimated the abundance of the Hawaii DPS as 11,398 individuals (CV=0.04) (81 FR 62260). As mentioned above, Wade *et al.* (2016) estimated that 93.9 percent of the humpbacks encountered in Southeast Alaska and Northern British Columbia are from the Hawaii DPS.

4.1.1.3 Mexico Distinct Population Segment Humpback Whale (Mexico DPS)

Whales in the Mexico DPS typically breed off the Revillagigedo Islands in Mexico and migrate to northern feeding grounds ranging from British Columbia to the western Gulf of Alaska. Given their widespread range and their opportunistic foraging strategies, Mexico DPS humpback whales may be in the vicinity during the proposed project activities. In the final rule changing the status of humpback whales under the ESA (81 FR 62260), the abundance of the Mexico DPS was estimated to be 3,264 individuals (CV= 0.06) with an unknown trend. Note that only a portion of the Mexico DPS migrates to Alaska for feeding; the probability that a whale encountered in Southeast Alaska and northern British Columbia is from the Mexico DPS is, again, 6.1 percent (Wade *et al.* 2016).

4.1.1.4 Presence, Abundance, and Seasonality in the Action Area

Humpback whales occur in relatively low numbers seasonally in the action area for brief periods. Local observations indicated humpback whales were present in Taiya Inlet infrequently and are most commonly sighted in April and May during the eulachon run. Charter boat captains reported observing four to five whales near Skagway from spring to fall, up to approximately one mile from Skagway and one whale in June 2018 several miles from Skagway (K. Gross, Never Monday Charters, personal communication cited in MOS 2016; Dahlheim et al. 2009). Humpback whale sightings during winter months have not been reported, which is consistent with seasonal migration patterns. Thus, it is anticipated few, if any, will be present in the action area during construction.

4.1.1.5 Critical Habitat

No critical habitat has been designated for the humpback whale in Alaskan waters.

4.1.2 Reproduction and Breeding

During the winter months most humpback whales make a long annual migration to the low-latitude subtropical and tropical waters to breed and calve. Humpback whales do not breed or calve in Alaska waters and individuals of the Hawaii DPS (North Central Pacific stock) primarily migrate to Hawaii for breeding and calving (Muto *et al.* 2018), while Mexico DPS (California/Oregon/Washington stock) whales breed in Mexican waters.

4.1.3 Foraging

While in their Alaskan feeding grounds, humpback whales prey on a variety of euphausiids and small schooling fishes including Pacific herring (*Clupea pallasii*), longfin smelt (*Spirinchus thaleichthys*), capelin (*Mallotus villosus*), Pacific sand lance (*Ammodytes hexapterus*), juvenile walleye pollock (*Theragra chalcogramma*), and salmon (*Oncorhynchus* spp.) smolts (Nemoto 1957, Kawamura 1980, Krieger and Wing 1986, Witteveen *et al.* 2008, Straley *et al.* 2017, Chenoweth *et al.* 2017). Herring targeted by Southeast Alaska whales in Lynn Canal were lipid-rich,

with energy content ranging from 7.3 to 10.0 kJ/gram (Vollenweider *et al.* 2011). The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring and euphausiids (Moran *et al.* 2017). Important feeding areas include Glacier Bay and adjacent portions of Icy Strait, Stephens Passage/Frederick Sound, Seymour Canal, Lynn Canal, and Sitka Sound. During autumn and winter, the non-breeding season, humpbacks remaining in Southeast Alaska target areas where herring and eulachon (*Thaleichthys pacificus*) are abundant, such as Seymour Canal, Berners Bay, Auke Bay, Lynn Canal, and Stephens Passage (Krieger and Wing 1986, Moran *et al.* 2017). Over 2,940 and 2,019 humpback whale foraging-days were documented in Lynn Canal alone in the 2007-2008 and 2008-2009 winter seasons, respectively (Moran *et al.* 2017).

Fidelity to feeding grounds by individual humpbacks is well documented; interchange between Alaskan feeding grounds is rare (Witteveen and Wynne 2017). Long-term research and photo-identification efforts have documented individual humpbacks that have returned to the same feeding grounds for as many 45 years (Straley 2017, Witteveen and Wynne 2017, Gabriele *et al.* 2017).

4.1.4 Acoustic Ecology

Humpback whales live in an acoustic world. Humpbacks produce a variety of vocalizations ranging from 20 Hz to 10 kHz to locate prey, coordinate communal feeding efforts, attract mates, and for mother-calf communication (Au *et al.* 2006, Vu *et al.* 2012). NMFS categorizes humpback whales in the low-frequency cetacean functional hearing group, with an applied frequency range between 7 Hz and 35 kHz (NMFS 2018e). Depending on its strength and duration, anthropogenic noise can result in social disturbance, physical discomfort, and masking of intraspecific humpback communication. Although difficult to detect visually, evidence that individual humpbacks are responding to elevated noise levels has been inferred by whales leaving/avoiding ensonified areas and reducing the duration and frequency of intraspecific vocalizations (NRC 2005, Nowacek *et al.* 2007). Humpback whales use singing as a form of underwater communication at their wintering grounds for mating and seasonally at feeding grounds, like the Aleutian Islands (Fleming and Jackson 2011). Loud underwater noises, such as those from seismic surveys and pile driving, can result in humpback whales adjusting their acoustic behavior in ways like altering song length (Fleming and Jackson 2011).

4.2 Steller Sea Lion (*Eumetopias jubatus*)

4.2.1 Status

The Steller sea lion was listed as a threatened species under the ESA in 1990 following declines of 63% on certain rookeries since 1985 and declines of 82% since 1960 (55 FR 12645). In 1997, two DPSs of Steller sea lion were identified based on differences in genetics, distribution, phenotypic traits, and population trends (Fritz *et al.* 2013, 62 FR 24345).

In 2014 Steller sea lions had a worldwide population estimated at 142,360-157,498 animals (Allen and Angliss 2014). The Eastern DPS (eDPS) population counts continued to increase during the same period and was removed from ESA listing in 2013 (78 FR 66140). The eDPS of Steller Sea Lions is protected under the MMPA but is not a strategic or depleted species. The Western DPS (wDPS) is listed as endangered under the ESA and is a depleted, strategic stock under the MMPA (Muto *et al.* 2018).

4.2.1.1 Eastern DPS

The eDPS stock is commonly found in the action area waters and were most recently surveyed in Southeast Alaska in June-July of 2015. The current population estimate for the US eDPS stock is 41,638 individuals. In Southeast Alaska the estimated total abundance is 28,594 individuals of which 20,756 are non-pups and 7,838

are pups. The eDPS has been increasing between 1990 to 2015 with an estimated annual increase of 4.76% for pups and 2.84% for non-pups (Muto *et al.* 2018).

4.2.1.2 Western DPS

The wDPS stock is found infrequently in the action area waters, however do occur rarely. The estimated overlap of the wDPS is discussed further in Section 6.2. The current abundance estimate for the US portion of the wDPS is 50,983. The overall trend for the wDPS in Alaska is an annual increase of 1.94% for non-pups and 1.87% for pups (Muto *et al.* 2018).

4.2.2 Distribution

Steller sea lions range throughout the North Pacific Ocean from Japan, east to Alaska, and south to central California (Muto *et al.* 2018). They range north to the Bering Strait, with significant numbers at haulouts on St. Lawrence Island, Alaska in the spring and fall. Their range extends around the North Pacific Ocean rim, with most sea lions occupying either rookeries or haulouts, depending on the season. Male sea lions are more likely to disperse beyond their typical habitat, but this primarily occurs after the breeding season (NMFS 2018a).

The wDPS generally occurs west of Cape Suckling (144° W longitude), and the eDPS) generally occurs east of the Cape. The centers of abundance and distribution for the wDPS are in the Gulf of Alaska and Aleutian Islands.

The geographic and genetic interplay between the wDPS and the eDPS needs to be understood to gauge potential project impacts in the action area on the endangered wDPS. Large movements by individual Steller sea lions on either side of the 144° W demarcation have occurred, and wDPS individuals have been documented in Southeast Alaska, especially north of Sumner Strait (Jemison *et al.* 2013, Fritz pers. comm. 2017). Most Steller sea lions in the action area are expected to be from the eDPS but approximately 6 percent of the sea lions inhabiting these waters originating from the wDPS population (Jemison *et al.* 2013). However, it is not possible to visually distinguish between the two DPSs without brandings.

Members of this species are not known to migrate, but individuals disperse widely outside of the breeding season (late May to early July). At sea, Steller sea lions commonly occur near the 656-foot (200-meter) depth contour but have been found from nearshore to well beyond the continental shelf (Kajimura and Loughlin 1988). Sea lions move on and offshore to pelagic waters for feeding excursions. They are also capable of traveling long distances in a season. Sea lions may make semi-permanent or permanent one-way movements from one site to another (Chumbley *et al.* 1997, Burkanov and Loughlin 2005). Round trip transit of greater than 4,040 mi (6,500 km) by individual Steller sea lions has been documented (Jemison *et al.* 2013).

Land sites used by Steller sea lions are referred to as rookeries and haulouts. Rookeries are used by adult sea lions for pupping, nursing, and mating during the reproductive season (generally from late May to early July). Haulouts are used by all age classes of both genders but are generally not where sea lions reproduce. At sea, they are seen alone or in small groups, but may gather in large "rafts" at the surface near rookeries and haulouts or foraging sites.

4.2.2.1 Presence, Abundance, and Seasonality in the Action Area

Steller Sea Lions occur seasonally in the action area. However, the action area does not overlap with any haulout sites. The nearest haulout sites from Skagway include a haulout at Taiya Point located 11 mi (18 km) south of construction site, and used only temporarily during the Lutak Inlet eulachon run, and Gran Point located 24 mi (38 km) south of the dock construction. Observations from local charter boat captains and watershed stewards indicate Steller sea lions can be abundant in the action area, particularly in April and May during the eulachon

run (K. Gross, Never Monday Charters and R. Ford, Taiya Inlet Watershed Council, both personal communications cited in MOS 2016), but are not expected to occur in the action area during the winter. During multiple sea lion use surveys conducted in 2002 and 2003, Womble *et al.* (2005) observed a maximum of about 400 sea lions in the water at the mouth of the Taiya River feeding on eulachon in 2003 (but virtually none near Skagway), but very few sea lions at the eulachon site in 2002. They noticed an opposite pattern at Lutak Inlet those years, a feeding site closer to both Taiya Point and Gran Point haulouts. Sea lion use of the upper Taiya Inlet appears to be episodic and related to the timing of the eulachon runs both at Lutak and Taiya.

4.2.2.2 Critical Habitat

There is no critical habitat designated for Steller sea lions within the action area. The nearest critical habitat, the Gran Point haulout, is located approximately 24 mi (38 km) south of the action area (Figure 4). All vessels associated with project construction will avoid the 3,000-ft (914-m) Steller sea lion designated aquatic zones surrounding any major rookery or haulout as they transit to and from the project site.

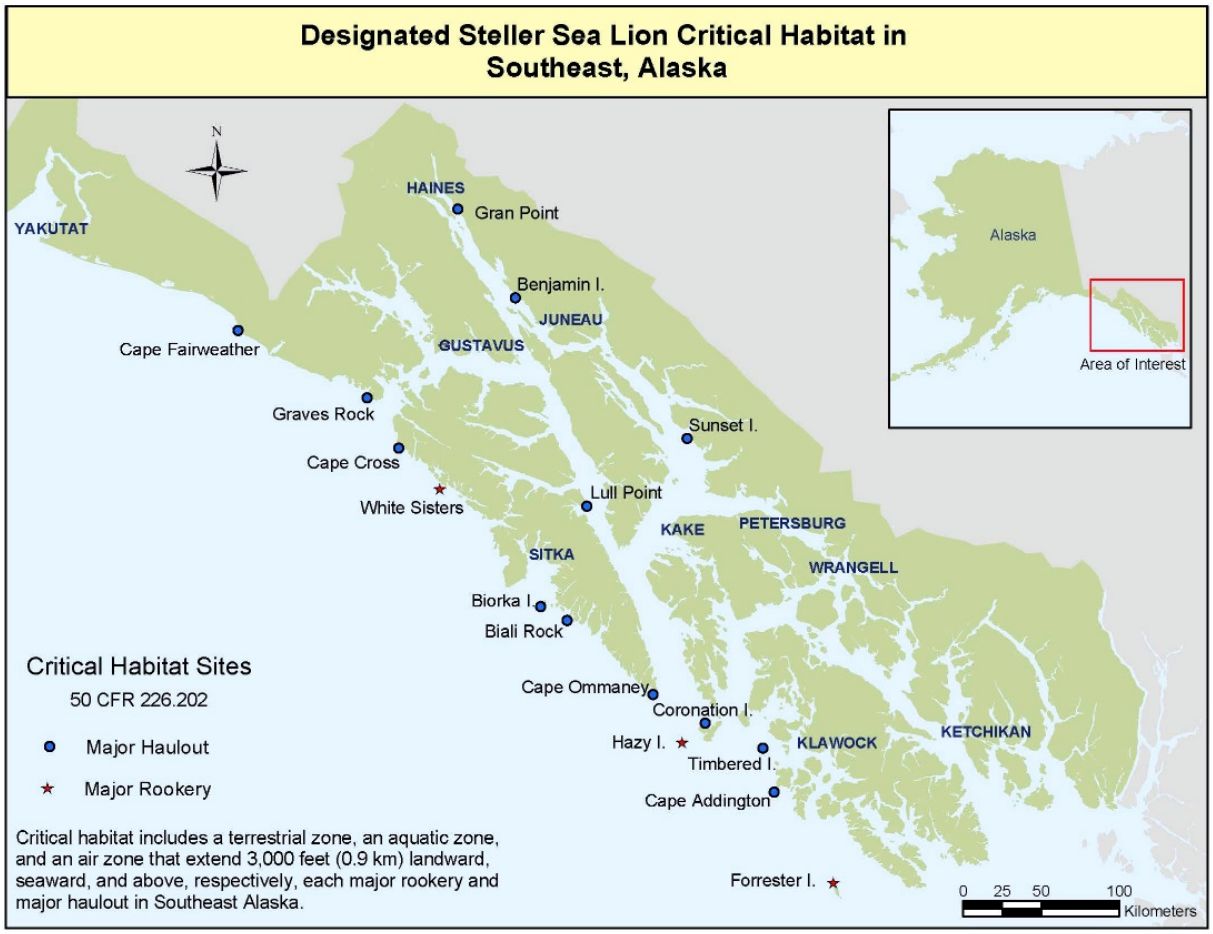

Figure 4. Steller Sea Lion Critical Habitat Sites in Southeast Alaska

4.2.3 Reproduction and Breeding

The breeding range extends along the northern edge of the Pacific Ocean from the Kuril Islands, Japan, through the Aleutian Islands and Southeast Alaska, south to California (Loughlin *et al.* 1984).

4.2.4 Foraging

Steller sea lions are opportunistic predators, feeding primarily on a wide variety of fishes (e.g., capelin, cod, herring, mackerel, pollock, rockfish, salmon, sand lance), bivalves, cephalopods (e.g., squid and octopus) and gastropods (Pitcher 1981, Merrick *et al.* 1997). On rare occasions, Steller sea lions prey on seals and possibly sea otter pups.

Their diet may vary seasonally depending on the abundance and distribution of prey. Womble *et al.* (2009) found that "a reasonable annual foraging strategy for Steller sea lions is to forage on herring (*Clupea pallasii*) aggregations in winter, spawning aggregations of forage fish in spring, salmon (*Oncorhynchus* spp.) in summer and autumn, and pollock (*Theragra chalcogramma*) and Pacific hake (*Merluccius productus*) throughout the year." They may disperse and range great distances to find aggregated prey but are not known to migrate. Steller sea lions can dive to approximately 1,300 ft (400 m) in depth to exploit deep prey resources.

4.2.5 Acoustic Ecology

Steller sea lion's hearing sensitivity is like that of other otariids. Steller sea lion in-air hearing ability ranges from approximately 0.25-30 kHz; however, hearing of one individual was found to be most sensitive to noise from 5-14.1 kHz (Muslow and Reichmuth 2010). Underwater, best hearing range of a Steller sea lion has been measured at from 1-16 kHz in a male individual and maximum hearing sensitivity of a female individual at 25 kHz, showing a marked sexual dimorphism (though hearing characteristics may also vary based on age or size of the individual). Generalized hearing ranges from 60 Hz to 39 kHz (NMFS 2018e). Steller sea lions use both aerial and underwater vocalizations during breeding, territorial disputes, and rearing of pups (Kastelein *et al.* 2005).

4.3 Harbor Seal (*Phoca vitulina*)

4.3.1 Status

The harbor seal is protected under the MMPA but is not listed as a strategic or depleted species under the MMPA (Muto *et al.* 2018). The harbor seal is not listed as threatened or endangered under the ESA.

The total statewide abundance estimate is 205,090 seals based on surveys taken between 1998 and 2011 (Muto *et al.* 2018).

Within Alaska there are a total of 12 stocks of harbor seals ranging along the coastal waters from the eastern coast of the Aleutian Islands to Cape Muzon in Southeast Alaska (Muto *et al.* 2018). The Lynn Canal/Stephens Passage stock is the only one found in the action area waters (Figure 5). The current population estimate for the Lynn Canal/Stephens Passage stock is 9,478 individuals, with a five-year trend estimate of negative 176. The probability of decrease of this stock is 0.71, suggesting the stock is declining. However, statewide nine Alaska harbor seal stocks are showing an increasing population trend (Muto *et al.* 2018).

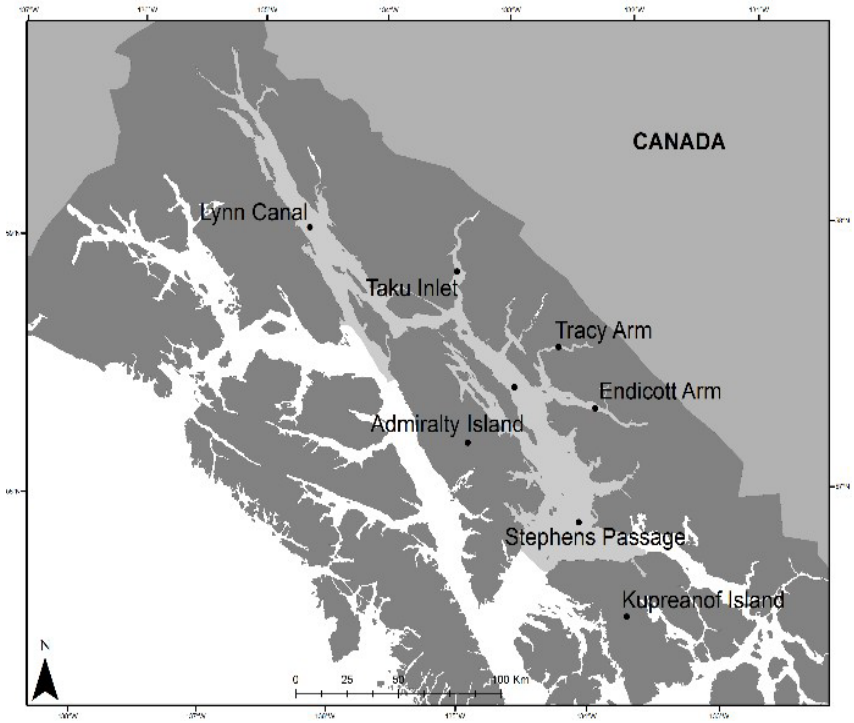

Figure 5. Map of Lynn Canal/Stephens Passage Stock Range

4.3.2 Distribution

Harbor seals are found in coastal and estuarine waters ranging from Baja California to the eastern Aleutian Islands of Alaska. Harbor seals often inhabit nearshore coastal waters and are considered non-migratory, typically staying within 15 to 31 mi (24 to 50 km) of their home. Harbor seals typically stay within 16 mi (25 km) of shore but have been found up to 62 mi (100 km) offshore (Kinkhart *et al.* 2008). Harbor seal movement is highly variable, with no seasonal patterns identified.

Up to 44 percent of their time is spent hauled out, with hauling out occurring more often during the summer (Pitcher and Calkins 1979, Kinkhart *et al.* 2008). Harbor seals haul out in groups of 30 or less but have been known to rarely haul out in numbers of several hundred. There are no defined haulout locations for harbor seals as harbor seals will haul out where conditions are preferable to rest, give birth, and/or molt (Sease 1992).

Harbor seals use a variety of terrestrial sites to haul-out for resting (year-round), pupping (May-July), and molting (August-September) including tidal and intertidal reefs, beaches, sand bars, and glacial/sea ice (Sease 1992; Kinkhart *et al.* 2008). Some sites have traditional/historic value for pupping and molting while others are used as temporary resting sites during seasonal foraging trips.

4.3.2.1 Presence, Abundance, and Seasonality in the Action Area

Harbor seals are observed in the action area year-round, however they are most abundant in April during the eulachon run (K. Gross, Never Monday Charters, personal communication cited in MOS 2016), when as many as 100 seals might be present in Taiya Inlet. The seal presence diminishes after the spawning and few, if any, harbor seals are present in the action area during the winter (K. Gross, Never Monday Charters, personal

communication cited in MOS 2016). There are known seasonal haulouts at Seal Cove and the mouth of Taiya River, located about 6 mi (9.7 km) and 3 mi (4.8 km) from the action area, respectively. These haulouts are not located in the ensonified area due to acoustical shadowing.

4.3.3 Reproduction and Breeding

In Alaska harbor seals typically give birth to single pups between May and mid-July (Kinkhart *et al.* 2008). Pupping and weaning coincide with the summer haulout and the weaning process is completed by July (Sease 1992). The birthing location of harbor seal pups occurs at many different haul-out sites and is not restricted to a few major rookeries (Kinkhart *et al.* 2008). There are no rookeries occurring within Taiya Inlet.

4.3.4 Diving and Foraging

Harbor seals commonly dive to depths that are less than 66 ft (20 m) but can reach depths of up to 1,640 ft (500 m). Harbor seals can remain submerged for over 20 minutes, although most dives are less than 4 minutes long (Kinkhart *et al.* 2008) with approximately 90 percent of dives being less than seven minutes (Eguchi and Harvey 2005). The maximum recorded dive time is 32 minutes (Eguchi and Harvey 2005)

Harbor seals commonly eat walleye pollock (*Theragra chalcogramma*), octopus (*Octopus* spp.), capelin (*Mallotus villosus*), herring (*Clupea pallasii*), and Pacific cod (*Gadus macrocephalus*). Pups usually eat small fishes (Pitcher and Calkins 1979).

4.3.5 Acoustic Ecology

The hearing range of harbor seals extends above 60 kHz (Jacobs and Terhune 2002) although their hearing is most acute below 60 kHz (Kastelein *et al.* 2009). Harbor seals are more sensitive to lower frequency sounds with the highest sensitivity occurring at 32 kHz in water and 12 kHz in air (Terhune and Turnball 1995, Kastak and Schusterman 1998, Wolski *et al.* 2003). Harbor seals are considered part of the Phocid Pinniped hearing group (NMFS 2018e).

4.4 Dall's Porpoise (*Phocoenoides dalli*)

4.4.1 Status

The Dall's porpoise is not designated as depleted or classified as strategic under the MMPA, nor are they listed under the ESA. Only one stock of Dall's porpoise is currently recognized in Alaskan waters – the Alaska stock – with an estimated abundance of 83,400, although this estimate is outdated (Muto *et al.* 2018). While the Dall's porpoise is generally considered abundant, there is insufficient data on population trends to determine whether the population is stable, increasing or decreasing (NMFS 2018b)

4.4.2 Distribution

Dall's porpoises are widely distributed in the North Pacific Ocean, usually in deep oceanic waters (>600 ft/183 m), over the continental shelf or along slopes (NMFS 2018b, Muto *et al.* 2018). They can be found along the west coast of the United States ranging from California to the Bering Sea in Alaska (NMFS 2018b).

4.4.2.1 Presence, Abundance, and Seasonality in the Action Area

Based on observations of local boat charter captains and watershed stewards, transient populations of Dall's porpoise are infrequently encountered in small numbers during the spring and fall within Taiya Inlet. They have not been documented near Skagway close to town nor have they been observed in the inlet during the winter.

4.4.3 Reproduction and Breeding

Dall's porpoises can be found in Alaskan waters year-round (Muto *et al.* 2018) and typically give birth between June and September to single calves (NMFS 2018b).

4.4.4 Foraging

Dall's porpoises feed on small schooling fish, mid- and deep-water fish, cephalopods, and crustaceans. Their prey includes anchovies, herring, hake, mytophids, smelts, squid, octopus, crabs, and shrimp (NMFS 2018b).

4.4.5 Acoustic Ecology

Dall's porpoises communicate through generation of clicks at the 165 to 175 kHz range and have a general hearing range between 275 Hz and 160 kHz (NMFS 2018e). They are considered part of the high-frequency cetacean hearing group.

4.5 Harbor Porpoise (*Phocoena phocoena*)

4.5.1 Status

The Southeast Alaska stock of harbor porpoise is not designated as depleted under the MMPA nor listed under the ESA but is considered Strategic due to human-induced mortality (Muto *et al.* 2018).

4.5.2 Distribution

In the eastern North Pacific Ocean, the harbor porpoise ranges from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California. NMFS currently acknowledges three stocks of harbor porpoise within this range (Muto *et al.* 2018), with the one encompassing the action area – the Southeast Alaska stock – ranging from Dixon Entrance to Cape Suckling. This stock is estimated to include 975 individuals based on 2010-2012 surveys (Muto *et al.* 2018).

The harbor porpoise frequents nearshore waters and coastal embayments throughout their range, including bays, harbors, estuaries, and fjords less than 650 ft (198 m) deep (NMFS 2018b).

4.5.2.1 Presence, Abundance, and Seasonality in the Action Area

Although it is possible that harbor porpoise could be encountered in the action area, no data exists to quantify harbor porpoise abundance in Taiya Inlet (MOS 2016). Based on observations of local boat charter captains, harbor porpoises are infrequently encountered within a lower portion of Taiya Inlet during the King Salmon run.

4.5.3 Reproduction and Breeding

Harbor porpoises are believed to typically mate during summer months and give birth between May and July, however very little is known about their reproduction and breeding (NMFS 2018b)

4.5.4 Foraging

Harbor porpoises forage primarily on Pacific herring, other small schooling fish, and cephalopods and will occasionally feed on squid and octopus (NMFS 2018b). In Southeast Alaska, large numbers of harbor porpoise may form temporary feeding aggregations in areas of localized prey concentration, such as Icy Strait and Sumner Strait (Muto *et al.* 2018).

4.5.5 Acoustic Ecology

Based on their hearing capacity, Harbor porpoise are considered to be in the high frequency functional hearing group, with assumed sensitivity matching sound they generate (NMFS 2018e). Harbor porpoise' best estimated hearing ranges from 16 to 140 kHz with maximum sensitivity occurring between 100 and 140 kHz (Kastelein et al. 2005b). The peak frequency produced by harbor porpoises for echolocation is 120 to 130 kHz, which corresponds with the maximum sensitivity range.

4.6 Killer Whale (*Orcinus orca)*

4.6.1 Status

NMFS considers four stocks of killer whales to occur in southeast Alaskan waters, which may occur separately or concurrently within the action area. These stocks are the Eastern North Pacific/Alaska Resident stock (2,347 individuals), Eastern North Pacific/Northern Resident stock (261 individuals), the West Coast Transient stock (243 individuals), and the Gulf, Aleutian and Bering Transient Stock (587 individuals) (Muto *et al.* 2018). These stocks represent two of the three ecotypes of killer whales occurring within the North Pacific Ocean – resident (forages on fish) and transient (forages primarily on marine mammals). However, NMFS is evaluating new genetic information that will likely result in a revision of the above stock structure (Muto *et al.* 2018). The killer whale is protected under the MMPA, but none of these stocks are listed as a strategic or depleted species under the MMPA nor is it listed as threatened or endangered under the ESA.

4.6.2 Distribution

Killer whales are found in every ocean of the world (NMFS 2018c) and are the most widely distributed marine mammal (Allen and Angliss 2014).

4.6.2.1 Presence, Abundance, and Seasonality in the Action Area

Dahlheim *et al.* (2009) did not document killer whales as occurring within the upper reaches of Lynn Canal, including Taiya Inlet. However, local observations have indicated that resident killer whales do visit Taiya Inlet a few times each year, generally staying within the inlet for one to four days (K. Gross, Never Monday Charters, personal communication cited in MOS 2016). Encounter rates are too small to statistically indicate seasonality of resident whales, although transient whales are more often observed in Southeast Alaska during the summer months (Dahlheim *et al.* 2009).

4.6.3 Reproduction and Breeding

Killer whales do not have a distinct breeding season and their birthing rate is not well understood, however it is estimated that killer whales will give birth once every five years (NMFS 2018c).

4.6.4 Foraging

Killer whales have no natural predators and are known as the top carnivores currently living on the Earth (Pitman 2011). The species has the most varied diet of all cetaceans; however, the transient populations typically hunt marine mammals while the resident populations feed on fish, particularly salmon and Atka mackerel (Barrett-Lennard *et al.* 2011, Parsons *et al.* 2013). Residents often travel in much larger and closer groups than transients and have been observed sharing fish they catch. Transient killer whales feed on other marine mammals including Steller sea lions, harbor seals, and various species of cetaceans. They are also more likely to rely on stealth,

making less frequent and less conspicuous calls and skirting "along shorelines and around headlands" in order to hunt their prey in highly coordinated attacks (Barrett-Lennard *et al.* 2011).

4.6.5 Acoustic Ecology

Killer whales rely on underwater sound for a variety of reasons including navigation, feeding, and communication. Killer whales use echolocation to assist with food gathering — transient killer whales use it rarely and most likely for hunting, while resident whales use it to locate salmon (Au *et al.* 2004). Killer whale social signals resemble the sound of mid-range tactical sonar (Southall *et al.* 2007), with signals commonly occurring as pulsed calls, whistles, and clicks (Szymanski *et al.* 1999). Increases in noise levels near killer whale habitat, like that associated with increasing vessel traffic, have been found to result in an increase in the duration of killer whale calls (Foote *et al.* 2004 as cited in Southall *et al.* 2007). Killer whales are part of the mid-frequency cetacean functional hearing group, with their estimated auditory bandwidth between 150 Hz and 160 kHz (Southall *et al.* 2007).

4.7 Minke Whale (*Balaenoptera acutorostra*)

4.7.1 Status

The minke whale is protected under the MMPA but is not listed as a strategic or depleted species. Minke whales are also not listed as threatened or endangered under the ESA, although no abundance estimates are available for minke whales (Muto *et al.* 2018). The minke whales population status is considered stable and they are the most abundant rorqual, or "great whale", in the world (NMFS 2018d)

4.7.2 Distribution

Minke whales are widely distributed throughout the northern hemisphere and are found in both the Pacific and Atlantic oceans. Minke whales in Alaska are considered migratory and during summer months are typically found in the Arctic and during winter months are found near the equator (NMFS 2018d).

4.7.2.1 Presence, Abundance, and Seasonality in the Action Area

A lone minke whale was observed in the inlet in 2015 (K. Gross, Never Monday Charters, personal communication; R. Ford, Taiya Inlet Watershed Council, both personal communications cited in MOS 2016), and is the only known record for the inlet. There is no quantifiable information on abundance or seasonality. It is assumed that minkes whales do not occur in the inlet numbers reasonable to request take authorization.

4.7.3 Reproduction and Breeding

Minke whales are believed to calve in the winter months (NMFS 2018d), however little is known about their breeding areas.

4.7.4 Foraging

Minke whales feed by side-lunging through schools of prey and are opportunistic predators feeding on a variety of crustaceans, plankton, and small school fish (NMFS 2018d).

4.7.5 Acoustic Ecology

Minke whales have a generalized hearing range of 7 Hz to 35 kHz and fall under the Low-frequency Cetacean hearing group (NMFS 2018e).

5. Type of Incidental Take Authorization Requested

Under Section 101(a)(5)(D) of the MMPA, WP&YR requests an IHA for takes by Level B and Level A harassment of the marine mammals described in this application during the dolphin construction project at the RR Dock. WP&YR requests an IHA for one year with an effective date of February 1, 2019. Once the IHA is received, WP&YR will proceed with impact pile driving, vibratory pile driving, and drilling per the terms agreed upon in the IHA. The requested authorization is for incidental harassment of any seven species of marine mammal that might enter the associated behavioral disturbance isopleth during project activities.

Take is requested for the following activities:

- Vibratory, impact, and drilling pile installation activities (as described in Sections 1 and 2 and combined with the mitigation measures described in Section 11) have the potential to take permitted marine mammals by Level B harassment resulting in behavioral disturbance due to the effects of increased underwater noise levels. The proposed installation methods have the potential to take porpoises and harbor seals by Level A harassment due to their small size, low profile, and sometimes cryptic behavior.

The noise levels and potential impact isopleths that are expected to result from the construction of this project are described in detail in the sections below. Mitigation measures (including operational shutdown and monitoring zones) will be incorporated into the project to minimize the potential for unauthorized injury or harassment. Protocols for observations and mitigation methods are discussed in detail in Section 11 and in Appendix B – Marine Mammal Monitoring and Mitigation Plan (4MP). Take is requested for all species with any likelihood of occurring with the action area. Takes of non-permitted species (those unlikely to be present) will be prevented by the mitigation measures described in Section 11, including shutting down of activities at the approach of a marine mammal to the Level B zone.

5.1 Method of Incidental Taking

The Railroad Dock Dolphin Installation Project includes pile installation in an area where marine mammals have been observed. Planned construction methodologies will temporarily increase the underwater and airborne noise within the action area. This increase in noise has the potential to result in the behavioral disturbance.

5.2 Regulatory Thresholds and Modeling for the Effects of Anthropogenic Sound

Unless otherwise noted, the following notations will be used to express thresholds:

- Peak Sound Pressure Level (SPL_{PK}): The maximum absolute value of the instantaneous sound pressure that occurs during a specified time interval, measured in dB re: 1 µPa (e.g., 198 dB_{PEAK}) (Buehler *et al.* 2015).
- Average Root Mean Square Sound Pressure Level (SPL_{RMS}): A decibel measure of the square root of mean square pressure. For pulses, the average of the squared pressures over the time that comprises that portion of the wave form containing 90 percent of the sound energy of the impulse in dB re: 1 µPa (for underwater) and in dB re: 20 µPa (for airborne) is used (e.g., 185 dB_{RMS}) (Buehler *et al.* 2015).
- Sound Exposure Level (SEL): The integral over time of the squared pressure of a transient waveform, in dB re: 1 μPa^2–sec. (e.g., 173 dB_{SEL}). This approximates sound energy in the pulse (Buehler *et al.* 2015).
- Cumulative Sound Exposure Level (SEL_{CUM}): Cumulative exposure over the duration of the activity within a 24-hr period (NMFS 2015).

5.2.1 Updated Cumulative Sound Threshold Guidance, PTS

Determination of the cumulative underwater sound exposure levels (SEL_{CUM}) required to cause permanent threshold shift (PTS) in marine mammals within the action area was based on the technical guidelines published by NMFS in August 2016 and revised in April 2018. This guidance considers the duration of the activity, the sound exposure level produced by the source during one working day, and the effective hearing range of the receiving species. Regulatory thresholds for potentially affected species, measured in one-day SEL_{CUM}, are summarized in Table 9.

Table 9. SEL_{CUM} PTS Onset Thresholds (NMFS 2018e)

UNDERWATER - (dB re: 1 µPa² s)					
Source	**Low-Frequency (LF) Cetaceans**	**Mid-Frequency (MF) Cetaceans**	**High-Frequency (HF) Cetaceans**	**Phocid Pinnipeds (PW)**	**Otariid Pinnipeds (OW)**
Non-impulsive Noise	199	198	173	201	219
Impulsive Noise	183	185	155	185	203

Calculation of impact isopleths under the new guidance utilized the methods presented in Appendix D of the *2018 Revision to Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* and the most recent version of the associated User Spreadsheet Tool (NMFS 2018e). The spreadsheet accounts for effective hearing ranges using Weighting Factor Adjustments (WFAs), and this application uses the recommended values therein. Activity durations were estimated based on similar project experience.

5.2.2 Updated Peak Sound Threshold Guidance, TTS, and PTS

In addition to thresholds for cumulative noise exposure, onset thresholds for peak sound pressures must be considered for impulsive sources. Peak sound pressure level (SPL_{PK}) is defined as "the greatest absolute instantaneous sound pressure within a specified time interval and frequency band" (NMFS 2018e). The peak pressure thresholds for each hearing group is found in Table 10.

Table 10. SPL_{PK} Thresholds for Impulsive Noise (NMFS 2018e)

UNDERWATER - (dB re: 1 µPa)					
Source	**Low-Frequency (LF) Cetaceans**	**Mid-Frequency (MF) Cetaceans**	**High-Frequency (HF) Cetaceans**	**Phocid Pinnipeds (PW)**	**Otariid Pinnipeds (OW)**
TTS Onset	213	224	196	212	226
PTS Onset	219	230	202	218	232

5.2.3 Interim Sound Threshold Guidance, Behavioral Disturbance

The updated guidance described above does not address behavioral disturbance from underwater or airborne noise. The interim sound threshold guidance previously published by NMFS and summarized in Table 11 will be used for estimating exposure behavioral disturbance isopleths (NMFS 2015).

Airborne noise thresholds have not been established for cetaceans (NMFS 2015), and no adverse impacts are anticipated from airborne noise to cetaceans in the action area.

Table 11. Behavioral Disturbance Thresholds (NMFS 2015)

UNDERWATER - (dB re: 1 µPa)		
Source	**Cetaceans & Pinnipeds**	
Non-impulsive Noise	120	
Impulsive Noise	160	
AIRBORNE - (dB re: 20 µPa)		
Source	**Harbor Seals**	**Other Pinnipeds**
All Source Types	90	100

Per the interim guidance, the practical spreading loss model was used to determine the zones in which pinnipeds and cetaceans have the potential to face behavioral disturbance from underwater noise.

The formula for calculating practical spreading loss in *underwater noise* is:

$$TL = GL \times \log \frac{R_1}{R_0}$$

where TL is the transmission loss (dB), GL is the geometric loss coefficient (15 is the only valued allowed without real-time sound source verification), R_1 is the range to the target sound pressure level (m), and R_0 is the distance from the source of the initial measurement (m).

Per the interim guidance, the spherical spreading loss model was used to determine the zones in which pinnipeds have the potential to face behavioral disturbance from airborne noise.

The formula for calculating spherical spreading loss in *airborne noise* is:

$$TL = GL \times \log \frac{R_1}{R_0}$$

where TL is the transmission loss (dB), GL is the geometric loss coefficient (20 is the standard value), R_1 is the range to the target sound pressure level (m), and R_0 is the distance from the source of the initial measurement in meters.

5.3 Sources of Anthropogenic Sound

In the Technical Guidance (NMFS 2018e), sound sources are divided as;

- Impulsive: produce sounds that are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay.

- Non-impulsive: produce sounds that can be broadband, narrowband or tonal, brief or prolonged, (continuous or intermittent) and typically do not have a high peak sound pressure with rapid rise/decay time that impulsive sounds do.

5.3.1 Underwater Sources

Table 12 provides the sound source values and parameters used in calculating impact isopleths for each source type. The vibratory and impact hammer source levels are 90th percentile levels measured by Austin *et al.* (2016) during installation of 48-inch round piles at Port of Anchorage. Denes *et al.* (2016) measured sound emanating from the drilling of 24-inch piles at Kodiak and calculated a 90th percentile SPL of 171 dB (at 10 m), which is the only drilling source available. Denes *et al.* (2016) also noted a transmission loss coefficient of 18.9 for drilling suggesting high attenuation when drilling below the seafloor.

Table 12. Parameters for Underwater Noise Calculations (Level A Estimates)

Source		Source Type	SPL_{PK} (dB)[1]	SPL_{RMS} (dB)[1]	SEL_{CUM} (dB)[1]	Weighting Factor Adjustment (kHz)	Estimated Duration	
							Hrs or Strikes /Day[2]	Total Number of Days Activity Would Occur
Template Piles	Vibratory Installation/ Removal	Non-impulsive, continuous	n/a	166.8	n/a	2.5	3 hours	72
	Impact Installation	Impulsive, intermittent	212.5	197.9	186.7	2	2,000 strikes	59
	Drilling Installation	Non-impulsive, continuous	n/a	171.0	n/a	2	6 hours	59
Permanent Piles	Vibratory Installation	Non-impulsive, continuous	n/a	166.8	n/a	2.5	8 hours	89
	Impact Installation	Impulsive, intermittent	212.5	197.9	186.7	2	2,000 strikes	89
	Drilling Installation	Non-impulsive, continuous	n/a	171.0	n/a	2	8 hours	89

1. Sources are referenced at 10 m.
2. Represents maximum hours per day or maximum number of strikes per day. Estimated strike hours assumed 1 strike per second.

5.3.2 Airborne Sources

Laughlin (2010) measured airborne noise from a 30-inch test pile at the Keystone Ferry Terminal (Puget Sound) and found an overall average un-weighted level of 96.5 $dB_{LEQ/RMS}$ standardized to 15 m. Soderberg and Laughlin (2016) measured airborne sound levels from impact driving a 36-inch steel pile at Colman Dock (Puget Sound) and calculated an un-weighted level of 101 $dB_{LEQ/RMS}$ standardized to 15 m, and an A-weighted value of 97 $dBA_{LEQ/RMS}$. The A-weighted measurements emphasize the frequency range (1 to 6.3 kHz) where human hearing

is most effective and may not be suitable for amphibious pinnipeds adapted to both in-air and underwater hearing. Thus, only the unweighted values are used in calculating airborne isopleths.

5.4 Calculated Impact Isopleths

The radii to calculated isopleths are found in Table 13 (underwater sources) and Table 14 (airborne sources). These distances are used to develop shutdown and monitoring zones shown in the 4MP (Appendix B). Impact hammer use has the highest radii for onset of PTS and the lowest for behavioral disturbance, characteristic of loud impulsive sound energy effects on hearing and behavior. The greatest calculated radial distance for the Level B harassment zone is 25.1 km from proposed drilling operations by using a 15 Log (r) practical spreading model (generally required by NMFS when site-specific sources are not available); however, the actual maximum Level B monitoring zone distance is 13.0 km due to inlet topography. Same is true to some point for the Level A zone in that the maximum radius is 4.4 km (high-frequency cetaceans), but the inlet is only 2 km (1.25 mi) wide at Skagway. Also, Denes *et al.* (2016) found a transmission loss coefficient of 18.9 Log (r), which is probably more representative of sound levels emanating from below the seafloor (given that the drilling occurs within the steel pipe below the seafloor), which applied would reduce the drilling Level B radius to 5 km and the vibratory radius to 2.78 km.

Because the SEL values exceed the peak values, they are more appropriate for estimating exposures.

Table 13. Calculated Isopleths – Underwater Sources

Source	PTS Onset Isopleth – Cumulative (m)					Behavioral Disturbance Isopleth (km)	Behavioral Disturbance Ensonified Area[1] (km²)
	LF	MF	HF	PW	OW	Cetaceans & Pinnipeds	Cetaceans & Pinnipeds
Vibratory Installation	73.2	6.5	108.2	44.5	3.1	13.0[2]	17.9[2]
Drilling Installation	127.5	7.2	111.8	68.3	5.0	13.0[3]	17.9[3]
Impact Installation	3,700	132	4,407	1,980	144	3.7	10.6
Source	PTS Onset Isopleth – Peak (meters)						
Impact Installation	4.1	n/a	55.1	4.7	n/a		

1. Reflects the area within the maximum ensonified zone shown in Figure 6 ensonified by the three installation types.
2. Based on maximum distance before landfall. Calculated distance was 14.5 km.
3. Based on maximum distance before landfall. Calculated distance was 25.1 km.

Table 14. Calculated Isopleths – Airborne Sources

Source	Source Level	Behavioral Disturbance Isopleth (m)	
		Harbor Seals	Other Pinnipeds
Vibratory Installation	96.5 dB_{LEQ} at 15 meters[1]	32	10
Impact Installation	101 dB_{LEQ} at 15 meters[2]	53	17

1. Laughlin 2010
2. Soderberg and Laughlin 2016

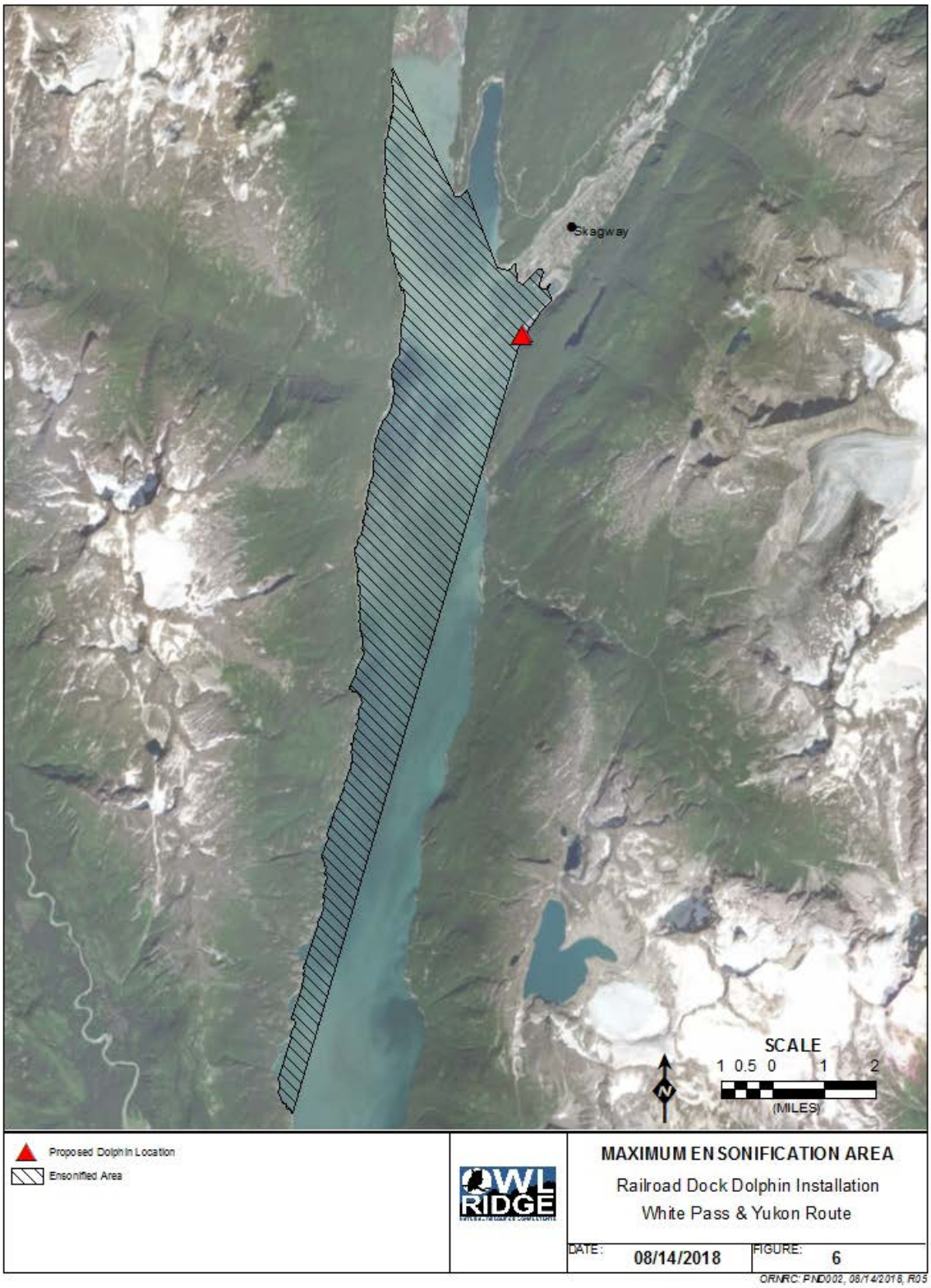

Figure 6. Maximum Ensonified Area

6. Number of Marine Mammals that May Be Affected

Issuance of an IHA is requested from February 1, 2019 through May 1, 2019 for Level B and Level A harassment for MMPA-defined stocks that include endangered Steller sea lions from the wDPS and humpback whales from the threatened Mexico DPS. This IHA request covers these ESA-listed species in their respective MMPA-defined stocks and covers anticipated takes of non-ESA listed populations and harbor seals, Dall's porpoises, harbor porpoises, killer whales and minke whales. It is anticipated that only harbor seals and Steller sea lions and possibly harbor porpoises will be foraging in the action area on a regular basis and likely to be exposed multiple times during the project. Due to the low prevalence of other marine mammals in the area it is likely exposure periods will be brief and will occur during transits to feed on schooling fish.

The number of marine mammals that may be exposed to harassment thresholds is calculated by estimating the likelihood of a marine mammal being present within a harassment zone during a given day of pile driving or drilling activity and accounting for seasonal presence or absence. Expected marine mammal presence is determined by past observations and general abundance near the proposed action area during construction.

Based upon the actions described above, their anticipated effect on marine mammals, and number of animals in the action area, we anticipate that several animals will be taken by the proposed actions. The estimated number of takes are based upon conservative ranges from the best scientific data currently available for these species near the action area. We do not anticipate these many takes will occur, as our avoidance and minimization of impacts efforts on the ground during the construction activity will be informed, deliberate, focused, and integrated throughout all levels of project management and monitoring.

6.1 Survey Data

Dahlheim *et al.* (2009) reported results of cetacean surveys conducted between 1991 and 2007 for spring, summer, and fall, including distributional patterns, group size, seasonality, and annual trends for humpback whales, minke whales, harbor porpoises, and Dall's porpoises. Taiya Inlet was surveyed during greater than 66 percent of surveys conducted in the spring, and 34 to 66 percent of surveys conducted in the summer and fall (Table 15). However, no marine mammals were recorded within Taiya Inlet during these surveys. Dahlheim *et al.*'s surveys did regularly observe humpback whales, harbor porpoise, and Dall's porpoise south of the action area within Lynn Canal, but did not observe minke whales or either transient or resident killer whales within Lynn Canal.

The best data on marine mammal use of upper Taiya Inlet comes from personal communications by K. Gross (Never Monday Charters) and R. Ford (Taiya Inlet Watershed Council), both of which were interviewed for a previous IHA consultation for the Skagway Gateway Initiative Project (MOS 2016). These personal communication data are the most reliable available and are supplemented in this application by regional literature and the 2017 Alaska marine mammal stock assessments. Except for a rough density estimate for harbor seals (MOS 2016), there are no local density estimates for the marine mammals under consideration in this application. Based on previous NMFS guidance, it is assumed that a given marine mammal can be "taken" only once within a 24-hour period.

6.2 Level B Take Estimation

Because of the compressed schedule to complete the dock construction by May 1, multiple pile driving/drilling operations will occur simultaneously resulting in the possibility that hammering or drilling will occur for at least very brief periods during all 89 days of the February-April field schedule. Therefore, there are 89 exposure days; 28 for February, 31 for March, and 30 for April. There are no density estimates for any species of marine mammal

in Taiya Inlet. Therefore, exposure estimates were calculated based upon observations by knowledgeable local charter boat operators or inlet keepers.

6.2.1 Humpback Whale

Due to seasonal migration patterns and the low frequency of humpbacks in the area it is anticipated few, if any, will be present in the action area during the beginning of construction. Humpback whale sightings during winter months have not been reported, which is consistent with seasonal migration patterns. Thus, it is anticipated no takes will occur for work conducted during February 2019. K. Gross (personal communication in MOS 2016) indicated that four to five individuals may occur near Skagway during the spring eulachon run, which occurs in April and May. Therefore, for this analysis it is conservatively assumed that four individuals may be present in the action area during April only, coinciding with 30 days of project activity. It is unclear whether humpback whales occur in the inlet in March, so it is assumed that one whale might be found in the inlet during that month for five days, or 0.16 whales per day (Table 15).

Table 15. Anticipated Takes of Humpback Whales per Month

Month	Animals in Inlet per Day	Days in Month	Exposures
February	0	28	0
March	0.16	31	5
April	4	30	120
TOTAL			**125**

WP&YR is requesting authorization for 125 Level B acoustical harassment takes of humpback whales. Approximately 8 whales (6.1 percent) are expected to be from the listed Mexico DPS, while the remaining 117 whales are expected to be from the delisted Hawaii DPS (Wade *et al.* 2016).

6.2.2 Steller Sea Lion

Observations from local charter boat captains and watershed stewards indicate Steller sea lions can be abundant in the action area, particularly in April and May during the eulachon run, but are not expected to occur in the action area during the winter. MOS (2016) previously estimated that approximately 25 to 40 sea lions haul out at Taiya Rocks during the eulachon run and might be found feeding in Taiya Inlet. Following this estimate, it is assumed 40 animals may be present during any given day of April pile driving and drilling work. Few sea lions are expected to occur in February (two are assumed) and 16 animals are assumed to occur daily in March following the precedent of MOS (2016) (Table 16).

Table 16. Anticipated Takes of Steller Sea Lions per Month

Month	Animals in Inlet per Day	Days in Month	Exposures
February	2	28	56
March	16	31	496
April	40	30	1,200
TOTAL			**1,032**

WP&YR is requesting authorization for 1,032 Level B (underwater) acoustical harassment takes of Steller sea lions. Of these takes, approximately 62 (6 percent) sea lions are expected to have originated from the endangered

wDPS (Jemison *et al.* 2013) and the remaining 970 animals from the threated eDPS. Because there are no sea lion haulouts within the ensonified zone, no in-air takes are requested.

6.2.3 Harbor Seal

Based on observations from local observers, a few resident harbor seals are expected to occur within Taiya Inlet during the winter months, but during the April and May eulachon run numbers can range from 20 to over 100 (K. Gross and R. Ford, both personal communications cited in MOS 2016). For purposes of take estimation, it is assumed that 20 seals (the lower end of the range) occur within the inlet February through March (MOS 2016), and 100 seals (the higher end of the range) during April (Table 17). These values are based on maximum use of the inlet by harbor seals and, therefore, are conservative.

Table 17. Anticipated Takes of Harbor Seals per Month

Month	Animals in Inlet per Day	Days in Month	Exposures
February	20	28	560
March	20	31	620
April	100	30	3,000
TOTAL			**4,180**

WP&YR is requesting authorization for 4,180 Level B (underwater) acoustical harassment takes of harbor seals (recognizing this a represents multiple takes of approximately 100 individuals or less). No in-air takes are requested as there are no harbor seal haulouts within the ensonified areas. The nearest haulout locations (9.7 km and 4.8 km) are well beyond the maximum radius (53-m) of the in-air harassment zone (Table 14), and probably acoustically shadowed from the pile driving by land.

6.2.4 Dall's Porpoise

Dall's porpoises were not observed in the action area during any of the line transect and non-line-transect surveys in Taiya Inlet conducted between 1991 and 2007, however they were observed just south of the action area in the northern portion of Lynn Canal during all seasons (Dahlheim *et al.* 2009). Local observation indicated Dall's porpoise have not been seen during the winter but during the spring and late fall they occasionally enter Taiya Inlet (K. Gross and R. Ford, both personal communications cited in MOS 2016). Local observations, in conjunction with survey data, indicate Dall's porpoises may be present in the action area during spring construction (March and April).

Observations by Dahlheim *et al.* (2009) indicated the average group size of 3.7 individuals during the spring. Locals have observed only three to six of these porpoises in the inlet from early spring to late fall (K. Gross and R. Ford, both personal communications cited in MOS 2016). Therefore, it is conservatively estimated that a group of four Dall's porpoise may visit the inlet every other day from March through April (Table 18), or approximately two Dall's porpoise per day on average for these months.

Table 18. Anticipated Takes of Dall's Porpoises per Month

Month	Animals in Inlet per Day	Days in Month	Exposures
February	0	28	0
March	2	31	62
April	2	30	60

TOTAL	122

WP&YR is requesting authorization for 122 Level B acoustical harassment takes of Dall's porpoises.

6.2.5 Harbor Porpoise

Harbor porpoises were not observed in the action area during any of the surveys conducted in Taiya Inlet between 1991 and 2007, however they were observed during the spring and summer, just south of the action area in Lynn Canal (Dahlheim *et al.* 2009). However, observations from local charter captains indicate that harbor porpoises commonly occur in small groups of two or three in Taiya Inlet, although not daily. Therefore, it is conservatively estimated that one group of three individuals may be present in the inlet 75% of the time during each month, or 2.25 porpoises per day on average (Table 19).

Table 19. Anticipated Takes of Harbor Porpoises per Month

Month	Animals in Inlet per Day	Days in Month	Exposures
February	2.25	28	63
March	2.25	31	70
April	2.25	30	68
TOTAL			**201**

WP&YR is requesting authorization for 201 Level B acoustical harassment takes of harbor porpoises.

6.2.6 Killer Whale

Resident and transient killer whales were not observed in the action area during any of the surveys conducted in Taiya Inlet between 1991 and 2007, nor were they observed just south of the project in Chilkoot Inlet or in the northern portion of Lynn Canal (Dahlheim *et al.* 2009). However, according to local observations, resident pods are occasionally seen in Taiya Inlet. The average size of resident pods observed by Dahlheim *et al.* (2009) elsewhere in Southeast Alaska was 30.5 animals during the spring, with a maximum observed group size of 45 individuals. Local observations indicate killer whales are observed four or five times a year (between spring and fall) in numbers between 15 and 20. There is no evidence of transient whales occurring within Taiya Inlet.

While the resident pods remain in Alaska year-round there are no reports of sightings during winter months (January-March) in Taiya Inlet and it is assumed no impact to killer whales will occur during winter construction. It is assumed that a single group of 20 individuals may enter the action area once in each March and April and remain within the inlet for two days each time, or 80 potential whale takes total (40 per month).

WP&YR is requesting authorization for 80 Level B acoustical harassment takes of killer whales.

6.2.7 Minke Whale

NMFS (2016) did not authorize minke whale take for the Skagway Gateway Initiative Project probably because of low density, although one minke whale was observed in the action area in 2015. Dahlheim *et al.* (2009) did not report any sightings of the minke whale, during any season, in Taiya Inlet or the nearby Chilkoot Inlet/Lynn Canal. Based on the available information it is very unlikely minke whales will be present in the inlet, and thus there is little risk of exposure to Level B harassment. However, minke whale presence is possible based on a single sighting and presence of potential prey (eulachon) in the spring. Thus, an arbitrary two (Level B) harassment takes are requested for the minke whale, one for each month of March and April.

6.3 Level A Take Estimation

WP&YR intends to avoid Level A take by shutting down installation activities at approach of any marine mammal to the representative Level A (PTS onset) ensonification zone up to a practical shutdown monitoring distance of 2 km. As there is the possibility of marine mammals entering a Level A zone before shutdown mitigation procedures can be implemented, and some animals will occur between the maximum Level A ensonification zone (4 km) and the maximum shutdown safety zone (2 km), WP&YR is requesting Level A take for an arbitrary 20 percent of the Level B exposures estimates for species to cover these events (Table 20).

6.4 Take Request

Table 20 summarizes the total Level B and Level A takes requested by species.

Table 20. Requested Take

Species	Level B Harassment	Level A Harassment	Abundance of Stock	Requested Level B Take as a Percentage of Stock
Humpback Whale	125	25	10,103 (Central North Pacific Stock)	1.2
			1,918 (California/ Washington/Oregon Stock)	6.5
Minke Whale	2	0	Unknown	Unknown
Killer Whale	80	16	261 (Eastern North Pacific, Northern Residents – Southeast Alaska)	30.7
			2,347 (Eastern North Pacific, Alaska Residents)	3.4
			243 (West Coast Transients)	32.9
			587 (Gulf, Aleutian, Bering Transients)	13.6
Dall's Porpoise	122	24	83,400 (Entire Alaska Stock)	0.1
Harbor Porpoise	201	40	975 (Southeast Alaska)	20.6
Harbor Seal	4,180	836	9,478 (Lynn Canal/ Stephens Passage)	44.1
Steller Sea Lion	1,032	206	41,638 (Eastern U.S. Stock)	2.5
			53,303 (Western U.S. Stock)	1.9

WP&YR will implement shutdown procedures as necessary to avoid all unauthorized take, including for species not list above, or when authorized take is approaching exceedance. The requested take for ESA-listed DPSs of marine mammal populations is found in Section 6.2.1 (humpback whales) and 6.2.2 (Steller sea lions).

7. Anticipated Impact on Species or Stocks

The proposed project has the potential to impact the marine mammals described above (primarily Steller sea lions, harbor seals, and humpback whales) by increasing noise in Taiya Inlet. The project also has the potential to temporarily increase the low likelihood of vessel interactions with marine mammals.

7.1 Noise

Pinnipeds and cetaceans are sensitive to underwater and airborne noise. Recent studies have shown that even moderate levels of underwater noise can cause a temporary loss in hearing sensitivity in some marine mammals. Increases in noise levels from in-water activities can reduce a marine mammal's capability to hear other noises, like background noise and noise created by their prey and predators, otherwise known as auditory masking (Southall *et al.* 2007). This results in difficulties with communication, predator avoidance, and prey capture, among others. Anthropogenic sounds can also result in behavioral modification, including changes in foraging and habitat use or separation of mother and infant pairs (Marine Mammal Commission 2007).

Marine mammals can also experience changes in sensitivity to sounds after exposure to intense sounds for long periods. These changes, called threshold shifts, can occur on a temporary or permanent level, depending on the intensity of the sound and length of time to which the animal is exposed to the sound. Typically, TTS includes impacts to middle-ear muscular activity, increased blood flow, and general auditory fatigue (Southall *et al.* 2007). At the TTS level, the animals do not experience a permanent change in hearing sensitivity and exhibit no signs of physical injury. PTS would occur if the animal subjected to the increased sound level did not return to pre-exposure conditions within an order of weeks or if the animal exhibited physical injuries (Southall *et al.* 2007).

The proposed project will have the possibility of resulting in both Level A and Level B harassment of pinnipeds and cetaceans. Level A take will be avoided to the extent possible by shutting down noise-producing activities in at the approach of a marine mammal to the Level A shutdown zone. Level B harassment is temporary in nature, and the impacts associated with the potential harassment resulting from this project will be temporary.

7.2 Vessel Interactions

Taiya Inlet lies in a deep valley, with Skagway to the north. Taiya Inlet is mainly used for recreation and marine transportation, especially for the cruise ship industry. The proposed dolphin infrastructure will facilitate larger vessels, specifically same day moorage of the Breakaway and Quantum class vessels; both of which are scheduled to visit Skagway during the 2019 cruise ship season. Therefore, this project is not likely to contribute to an increase in vessel traffic, but rather an increase in the size of vessels. Nor is the project likely to result in a permanent increase in vessel traffic during the winter months. During construction, an increase in the likelihood of vessel interactions may occur but will be limited to the duration of dolphin installation.

8. Anticipated Impact on Subsistence

Subsistence harvest of harbor seals and Steller sea lions by Alaska Natives is authorized under the MMPA. The proposed project will occur near but not overlap the subsistence area used by the villages of Hoonah and Angoon (Wolfe *et al.* 2013, N. Kovaces, Skagway Traditional Council, personal communication). Harbor seals and Steller sea lions are available for subsistence harvest in this area (Wolfe *et al.* 2013). There are no harvest quotas for other non-listed marine mammals found there. The Alaska Department of Fish and Game (Wolfe *et al.* 2013) has regularly conducted surveys of harbor seal and sea lion subsistence harvest in Alaska. Since proposed work at the project site will only cause temporary, non-lethal disturbance of marine mammals, no impacts to subsistence harvest of marine mammals in the region are anticipated.

9. Anticipated Impact on Habitat

Critical habitat is defined as "specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations for protection" and "specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation." Critical habitat typically supports unique foraging, refugia, or reproductive habitat features.

There is no critical habitat designated within the action area. Physical impacts to habitat are anticipated to be temporary.

9.1.1 Direct Impacts

The primary reason that animals would leave habitats in the action area would be due to elevated noise levels and an increase in turbidity. However, the local currents will disperse suspended sediments from pile driving operations at a moderate to rapid rate depending on tidal stage.

Construction activities will likely have temporary impacts on marine mammal habitat through increases in underwater and airborne sound from pile installation. Project-related disturbances will not be detectable at the nearest known Steller sea lion haulouts, and all harbor seal haulouts are well beyond the maximum distance (53 m) of in-air acoustical disturbance (and none occur within the underwater ensonified area).

Effects will be short-term and are not anticipated to extend significantly beyond the construction phase of the project. The level of habitat alteration in the action area will be insignificant and discountable, and most species should already be tolerant of noise levels associated with an active marine harbor. However, a study by Russell *et al.* (2016) did indicate that pile driving activity can cause harbor seals to move out of the ensonified zone (displacement), but that distribution would return to normal 2 hours after cessation of pile driving activity. Further, most harbor seal activity is closer to the mouth of the Taiya River where foraging and haulout opportunities are highest. This area is acoustically shadowed by land and, therefore, provides a retreat for seals (and other marine mammals) initially occurring within the ensonification area, especially during the spring eulachon run. Avoidance of the ensonification zone is expected to be temporary and unlikely to restrict marine mammals from accessing prey such as eulachon.

Best management practices and mitigation used to minimize potential environmental effects from project activities are described in Section 11 and Appendix B (4MP).

9.1.2 Indirect Impacts

Indirect effects to marine mammals, such as noise-induced dispersal or disaggregation of prey, would be insignificant and discountable due to the temporary nature of the activity.

9.1.3 Cumulative Impacts

The sum of these effects is not expected to adversely modify habitat or jeopardize the local populations of marine mammals. No critical habitat has been designated in the action area.

10. Anticipated Impact of Loss or Modification of Habitat

The placement of the dolphins and catwalks, and the seasonal presence of ships, will result in both an extremely minor loss of benthic habitat and a very small increase in features for fish (e.g., pile perch [*Rhacochilus vacca*]). However, this loss would be insignificant and discountable regarding a permanent loss or modification of Steller sea lion, harbor seal, or humpback whale habitat.

11. Mitigation Measures

The following mitigation measures will be implemented during permitted activities to ensure the least practicable adverse impact, to minimize the effects of authorized impacts, and to record unavoidable, observable effects.

11.1 All Construction Activities

The proposed project avoids impacts as much as practicable, but impacts cannot be avoided entirely as this project is dependent on, and being constructed for, maritime access. The applicant will incorporate the following measures and BMPs to minimize potential impacts:

- Dolphin installation will be performed in a manner that does not introduce any pollutants or debris into the water.
- Fuels, lubricants, chemicals and other hazardous substances will be stored above the high tide line to prevent spills.
- Oil booms will be readily available for containment should any releases occur.
- Standard spill-prevention measures will be implemented during construction to prevent spills or leakage of hazardous material. The contractor will always provide and maintain a spill clean-up kit on-site.
- The contractor will regularly monitor equipment and gear storage areas for drips or leaks, including inspection of fuel hoses, oil drums, oil or fuel transfer valves and fittings, and fuel storage that occurs at the project site. Equipment will be maintained and stored properly to prevent spills and mobilization of fuels, lubricants, chemicals, and other hazardous substances.
- If contaminated or hazardous materials are encountered during construction, all work near the contaminated site will be stopped until a corrective action plan is devised and implemented to minimize impacts on surface waters and organisms in the action area.

11.2 Soft Start Procedures

Soft start procedures shall be used prior to pile installation to allow marine mammals to leave the area prior to exposure to maximum noise levels. For the drilling equipment, the contractor shall run the machines for no more than 30 seconds followed by a quiet period of at least 60 seconds without pile installation. The process shall be repeated twice more within 10 minutes before beginning installation operations that last longer than 30 seconds. For other heavy equipment operating from barges, the equipment will be idled for 15 minutes prior to operation. If work ceases for more than 30 minutes, soft start procedures must recommence prior to performing additional work.

11.3 Observation and Shutdown Procedures

Qualified observers with stop-work authority will be on site before and during any in-water construction. Observers will monitor permitted activities in accordance with protocols reviewed and approved by NMFS. To monitor the shutdown and monitoring zones effectively, observers will be positioned at the best practicable vantage points taking into consideration security, safety, access, and space limitations. Observers will be stationed at locations that provide adequate visual coverage for shutdown and monitoring zones (see Section 13). A detailed 4MP is provided in Appendix B.

All permitted pinnipeds and cetaceans that come within monitoring zones for pile installation activities will be recorded as potential exposures. If a marine mammal is observed approaching a shutdown zone, permitted activities will cease.

11.4 In-Water Construction Activities

To prevent acoustical injury to marine mammals from noise sources exceeding Level A thresholds, shutdown safety zones will be monitored and shutdowns initiated as necessary (Table 21). In the case of impact installation, the Level A shutdown safety zone is reduced from 4 km (calculated Level A radius) to 2 km, a more practical area to monitor, which also corresponds to the width of the inlet at Skagway (some Level A take is requested to account for animals occurring within the ensonification zone but outside the shutdown safety zone). PSOs will also monitor the Level B zones found in Table 21, which will provide an alert system to marine mammals approaching the Level A zone.

Table 21. Level B monitoring and Level A Safety Zone Radii to Thresholds.

Source	Level B Monitoring Zone (km)	Level A Safety Zone (m)
Vibratory Installation	13.0	110
Drilling Installation	13.0	130
Impact Installation	3.4	2,000[1]

1. Taiya Inlet is approximately 2.0 km wide at Skagway.

11.5 Vessel Interactions

To minimize impacts from vessel interactions with marine mammals, the crew aboard project vessels will follow NMFS's marine mammal viewing guidelines and regulations as practicable. (https://alaskafisheries.noaa.gov/protectedresources/mmv/guide.htm), including not approaching any marine mammals by the marine mammal monitoring vessels.

12. Arctic Subsistence Uses, Plan of Cooperation

This section is not applicable to the proposed project. The project will take place in Skagway, which is in waters south of the 60° North latitude demarcation. No activities will take place in or near a traditional Arctic subsistence hunting area.

13. Monitoring and Reporting Plans

13.1 Monitoring Plans

Measures to monitor potential impacts the project could have on marine mammals are discussed at length in the AMP (Appendix A) and 4MP (Appendix B) and summarized below.

13.2 Acoustical Monitoring Plan

13.2.1 Methodology

Sound emanating from the pile driving and drilling activity will be measured to determine both sound source levels and sound propagation within Taiya Inlet. The results of the monitoring will be used to adjust both harassment and shutdown safety monitoring zones as appropriate. Methodology will include fixed underwater station moored to the seafloor near the dock construction, and boat-based "drift" monitoring with the hydrophones lowered to varied depths and the vessel allowed to drift with tide for several kilometers while the acoustician takes continuous measurements of the sound levels to accurately record change in sound pressure levels over distance.

13.2.2 Reporting

After the acoustical monitoring is completed, a preliminary report with monitoring results will be prepared and delivered to NMFS within a week of the acoustician returning to the sound laboratory. This report will assist NMFS with determining in changes necessary in the marine mammal monitoring zones. A final detailed report will be delivered within 60 days of monitoring completion.

13.3 Marine Mammal Monitoring and Mitigation Plan

13.3.1 Observer Qualifications

Monitoring will be conducted by qualified, trained observers. Observers will be independent (i.e. not construction personnel) and that at least one observer will have prior experience working as a marine mammal observer during construction activities. Specific requirements to be considered qualified are detailed in Appendix B (4MP).

13.3.2 Data Collection

Observers will use a National Marine Fisheries Service (NMFS)-approved Observation Record (see Appendix B, 4MP) which will be completed by each observer for each survey day and location. The form will include columns for recording date and time, weather parameters, species and numbers, construction activities, marine mammal behaviors, reactions, observer and marine mammal location, and mitigation measures implemented. Additional detail is found in the 4MP (Appendix B).

13.3.3 Equipment

Standard equipment during monitoring will include Personal Protective Equipment, radios, cellular phones, contact information, tide tables, binoculars, GPS units, copies of the IHA and 4MP, and a notebook. Equipment detail is found in the 4MP (Appendix B).

13.3.4 Shutdown and Monitoring Zones

WP&YR has established shutdown and monitoring zones to delineate areas in which marine mammals may be exposed to injurious underwater sound levels due to in-water construction. Work which could cause noise levels to rise above non-permitted thresholds will shut down if marine mammals are approaching shutdown zones. Observers will also monitor and document activities in areas where animals could be subjected to noise levels at or above the permitted thresholds.

Determination of shutdown and monitoring zones are fully discussed in Section 5 and the radii to thresholds summarized in Table 13. A shutdown zone will be implemented during all over-water construction activities that have the potential to affect marine mammals, and species/activity specific monitoring zones will be monitored to ensure that animals are not endangered by physical interaction with construction equipment. Take, in the form of Level B harassment, of marine mammals other than permitted species is not authorized and will be avoided by shutting down construction activities before individuals of these species enter the Level B harassment zone.

13.3.5 Observer Monitoring Locations

To monitor the shutdown and monitoring zones effectively, observers will be positioned at the best practicable vantage points taking into consideration security, safety, access, and space limitations. Observers will be stationed at locations that provide adequate visual coverage for shutdown and monitoring zones. During all types of installation observers will be stationed at the Railroad Dock, Yakutania Point, and Dyea Point (see Appendix B, 4MP). These stations will allow full monitoring of the impact hammer monitoring zone and the Level A shutdown zones. The vibratory and drilling monitoring zone will be additionally monitored using PSOs stationed either along the western slopes of Taiya Inlet, or on boats anchored near the shoreline, with each team (of two) stationed approximately 2 km (1.25 mi) apart.

13.3.6 Monitoring Techniques

Observers will collect sighting data and behaviors of marine mammal species that are observed in the shutdown and monitoring zones during construction. All observers will be qualified and trained in marine mammal identification and behaviors. Shutdown and monitoring zones will be monitored 30 minutes prior to pile driving startup, during all activity, during delays of less than one hour. Activity will not start if the shutdown and monitoring zones are not fully visible due to weather or darkness, and for 30 minutes after activity ceases. The monitoring zone will serve as a shutdown zone for unauthorized species are present or the authorized take has been exceeded. Soft start procedures will be implemented prior to startup and after delays exceeding 30 minutes. Specific monitoring detail is found in the 4MP (Appendix B).

13.3.7 Reporting

The procedures for reporting are listed below and in the 4MP (Appendix B).

13.3.7.1 Initial Notification

WP&YR will notify NMFS of that project startup is eminent one week prior to the actual start date.

13.3.7.2 Monthly Report

WP&YR will provide NMFS with a report at the end of each month of activity that includes 1) the number of animal sightings recorded during that month, 2) the number of sightings that occurred within the Level B zone (exposed), 3) the number of sightings that occurred within the Level A zone, 4) the number within the Level A zone that were exposed, and 5) the number of shutdowns that were implemented to avoid Level A take.

13.3.7.3 Annual Report

A comprehensive annual marine mammal monitoring report documenting marine mammal observations will be submitted to NMFS at the end of the in-water work season. The draft report will be submitted to NMFS within 90 calendar days of the end of the in-water work period. The report will include marine mammal observations (pre-activity, during-activity, and post-activity) during in-water work. A final comprehensive report will be prepared and submitted to NMFS within 30 calendar days following resolution of comments on the draft report from NMFS.

The reports shall include at a minimum:

- General data:
  - Date and time of activity
  - Water conditions (e.g., sea-state)
  - Weather conditions (e.g., percent cover, percent glare, visibility)
- Specific pile driving data:
  - The construction contractor and/or marine mammal monitoring staff will coordinate to ensure that pile driving/drilling times (including strike counts) are accurately recorded. The duration of soft start procedures should be noted as separate from the full power duration; and
  - Description of in-water construction activity not involving pile driving/drilling (location, type of activity, onset and completion times).
- Pre-activity monitoring data:
  - Date and time permitted activity is initiated and terminated;
  - Description of any observable marine mammals and their behavior in the immediate area during monitoring; and
  - Times when in-water construction is delayed due to presence of marine mammals within shutdown zones.
- During-activity monitoring data:
  - Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding the monitoring zones, including the following:
    - Distance from animal to pile driving/drilling sound source;
    - Reason why/why not shutdown implemented;
    - If a shutdown was implemented, behavioral reactions noted and if they occurred before or after implementation of the shutdown;
    - If a shutdown was implemented, the distance from animal to sound source at the time of the shutdown;
    - Behavioral reactions noted during soft starts and if they occurred before or after implementation of the soft start;
    - Distance to the animal from the sound source during soft start; and
    - Description of pile activities completed.
- Post-activity monitoring data:
  - Results, which include the detections and behavioral reactions of marine mammals, the species and numbers observed, sighting rates and distances; and

- Refined exposure estimate based on the number of marine mammals observed. This may be reported as a rate of take (number of marine mammals per hour or per day) or using some other appropriate metric.

14. Coordinating Research to Reduce and Evaluate Incidental Take

The data recorded during marine mammal monitoring for the proposed project will be provided to NMFS in monitoring reports. These reports will provide information on the usage of the site by marine mammals. The monitoring data will inform NMFS and future permit applicants about the behavior and adaptability of pinnipeds and cetaceans for future projects of a similar nature.

15. Conclusion

For the reasons described in this document, WP&YR has determined that the proposed project is likely to result in the Level A harassment of porpoises and harbor seals and the Level B harassment of Steller sea lions, humpback whales, harbor seals, Dall's porpoises, harbor porpoises, killer whales, and minke whales. This project has implemented impact minimization measures, including a 4MP, to reduce the potential for unauthorized harassment.

While the project has the potential to result in minor behavioral effects or minor injury to any marine mammals present during project activities, based on the analysis presented in this document, these individual impacts will have a negligible effect on the stocks of marine mammals described in this document or on their habitats.

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Appendix A. Acoustical Monitoring Plan

Appendix B. Marine Mammal Monitoring and Mitigation Plan