PROPOSED ACTION:	Issuance of an Incidental Harassment Authorization to the Municipality of Skagway to Take Marine Mammals by Harassment Incidental to the Skagway Gateway Initiative Project
TYPE OF STATEMENT:	Environmental Assessment
LEAD AGENCY:	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service
RESPONSIBLE OFFICIAL:	Donna S. Wieting, Director Office of Protected Resources, National Marine Fisheries Service
FOR FURTHER INFORMATION:	Laura McCue National Marine Fisheries Service Office of Protected Resources Permits and Conservation Division 1315 East West Highway Silver Spring, MD 20910 301-427-8401
LOCATION:	Skagway, Alaska
ABSTRACT:	This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources proposals to issue an Incidental Harassment Authorization (IHA) to the Municipality of Skagway for the taking, by Level B harassment, of marine mammals incidental to the Skagway Gateway Initiative Project in Skagway, Alaska. The IHA would be valid from July 1, 2016 through June 30, 2017.
DATE:	May 2016

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

µPa	microPascal
Authorization	Incidental Harassment Authorization
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
FR	Federal Register
HTC	Huna Totem Corporation
Km	kilometer
m	meter
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OPR	Office of Protected Resources
OMB	Office of Management and Budget
rms	root-mean-square
ACOE	US Army Corp of Engineers
USFWS	US Fish and Wildlife Service
WSDOT	Washington State Department of Transportation

Chapter 1 Introduction and Purpose and Need

1.1. Description of Proposed Action

The Marine Mammal Protection Act (MMPA) prohibits the incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury, or harassment, which includes injury and behavioral effects. The MMPA defines harassment as any act of pursuit, torment, or annoyance which: (1) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). There are exceptions to the MMPA's prohibition on take such as the authority at issue here for us to authorize the incidental taking of small numbers of marine mammals by harassment upon the request of a U.S. citizen provided we follow certain statutory and regulatory procedures and make determinations. This exception is discussed in more detail in Section 1.2.

We propose to issue an Incidental Harassment Authorization (Authorization) to the Municipality of Skagway (MOS) in Skagway, Alaska under the MMPA for the incidental taking of small numbers of marine mammals, incidental to construction activities associated with the Skagway Gateway Initiative Project at the Skagway Ore Terminal (SOT) in Skagway harbor. We do not have the authority to permit, authorize, or prohibit the SOT's construction activities under the MMPA, as that authority lies with a different Federal agency.

Our proposed action is a direct outcome of MOS requesting an authorization under Section 101(a)(5)(D) of the MMPA to take marine mammals, by harassment, incidental to conducting construction of the Skagway ore terminal because the associated activities have the potential to take, by harassment, marine mammals during construction activities. MOS therefore requires an Authorization for incidental take.

Our issuance of an Authorization to MOS is a major federal action under the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations in 40 CFR §§ 1500-1508, and NOAA Administrative Order (NAO) 216-6. Thus, we are required to analyze the effects of our proposed action.

This Environmental Assessment (EA), titled "*Issuance of an Incidental Harassment Authorization to the Municipality of Skagway to Take Marine Mammals by Harassment Incidental to the Skagway Gateway Initiative Project*," (hereinafter, EA) addresses the potential environmental impacts of two alternatives, namely:

- Issue the Authorization to MOS for Level B harassment of marine mammals under the MMPA during their project, taking into account the prescribed means of take, mitigation measures, and monitoring requirements required in the proposed Authorization; or
- Not issue an Authorization to the MOS in which case, for the purposes of NEPA analysis only, we assume that the activities would proceed without the mitigation and monitoring measures that would otherwise be prescribed in a proposed Authorization.

1.1.1. Background on MOS's MMPA Application

The MOS is seeking an IHA for work that includes demolition of existing in- and overwater infrastructure including in-water removal of timber, steel, and concrete piling; mechanical dredging of and upland beneficial reuse or disposal of contaminated sediments in the Skagway Ore Terminal (SOT) basin of Skagway Harbor; and construction of new infrastructure including a bulkhead wall at the northern end of the Terminal basin, a wharf structure at the western edge of the SOT, an ore loader and supporting infrastructure, seven new or refurbished moorage dolphins and associated catwalks, and a concrete floating dock and associated gangways (or an additional three moorage dolphins and catwalks, depending on funding). Development of this new infrastructure involves a combination of in-water, over-water, and upland work. The construction activities are designed to upgrade and enhance current shipping needs and increase the capacity and efficiency of the existing terminal for shipment and export. It will facilitate ongoing and new industrial operations, accommodate a wider variety of vessels, and improve environmental conditions in Skagway Harbor.

Project activities are proposed to begin during the summer of 2016, with pile driving occurring from the end of July to the middle of October 2016 and again in March 2017. Pile removal will occur in July 2016 and December 2016 to January 2017. Dredging will occur from January through the beginning of March 2017.

1.1.2. Marine Mammals in the Action Area

The proposed construction project could adversely affect the following marine mammal species under our jurisdiction:

- humpback whale (*Megaptera novaeangliae)*
- Steller sea lion (*Eumatopius jubatus*)
- harbor seal (*Phoca vitulina*)
- Dall's porpoise (*Phocoenoides dalli*)
- harbor porpoise (*Phocoena phocoena*)
- killer whale (*Orcinus orca*)
- minke whale (*Balaenoptera acutorostrata*)
- gray whale (*Eschrichtius robustus*)
- Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)
- Sperm whale (*Physeter macrocephalus*)

Some species in this area are not expected to be impacted by the project activities, due to habitat preference including the gray whale, sperm whale, and the Pacific white-sided dolphin, and are therefore not considered further in this document. Sperm whales have been observed in southeast Alaska with more frequency in recent years and have been tracked in Lynn canal (seaswap.info). It is unknown whether they occur as far north as Taiya inlet and the action area (J. Moran personal communication, March 2016); however, there are no documented sightings in the area (seaswap.info). This species prefers deeper waters, and are unlikely to occur in the narrow inlets near Skagway. Gray whale sightings in the portion of Southeast Alaska are very rare; there have only been eight sightings since 1997, none of which were in Taiya Inlet or Lynn Canal. Pacific white-sided are also considered rare in the action area, with habitat preferences in southern waters of southeast Alaska. While minke whales may occur in the action area, our analysis suggests this species will not be taken for this activity; therefore, no take of this species will be authorized. Therefore, only the six remaining species are considered further in this document.

1.2. Purpose and Need

The MMPA prohibits "takes" of marine mammals, with a number of specific exceptions. The applicable exception in this case is an authorization for incidental take of marine mammals in section 101(a)(5)(D) of the MMPA.

Section 101(a)(5)(D) of the MMPA directs the Secretary of Commerce (Secretary) to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if we make certain findings and provide a notice of a proposed authorization to the public for review. Entities seeking to obtain authorization for the incidental take of marine mammals under our jurisdiction must submit such a request (in the form of an application) to us.

We have issued regulations to implement the Incidental Take Authorization provisions of the MMPA (50 CFR Part 216) and have produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for authorizations. All applicants must comply with the regulations at 50 CFR § 216.104 and submit applications requesting incidental take according to the provisions of the MMPA.

Purpose: The primary purpose of our proposed action – the issuance of an Authorization to MOS – is to authorize (pursuant to the MMPA) the take of marine mammals incidental to MOS's proposed activities. The Authorization, if issued, would exempt MOS from the take prohibitions contained in the MMPA.

To authorize the take of small numbers of marine mammals in accordance with Section 101(a)(5)(D) of the MMPA, we must evaluate the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and not have an unmitigable adverse impact on the availability of affected marine mammal species for certain subsistence uses. We cannot issue an Authorization if it would result in more than a negligible impact on marine mammal species or stocks or if it would result in an unmitigable adverse impact on subsistence.

In addition, we must prescribe, where applicable, the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat (i.e., mitigation), paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. Authorizations must also include requirements or conditions pertaining to the monitoring and reporting of such taking in large part to better understand the effects of such taking on the species. Also, we must publish a notice of a proposed Authorization in the *Federal Register* for public notice and comment.

The purpose of this action is therefore to determine whether the take resulting from MOS's project would have a negligible impact on affected marine mammal species or stocks, would not have an unmitigable adverse impact on the availability of marine mammals for taking for subsistence uses, and develop mitigation and monitoring measures to reduce the potential impacts.

Need: On December 2, 2015, MOS submitted an application to NOAA requesting an IHA for the possible harassment of small numbers of seven marine mammal species incidental to construction associated with the Skagway Gateway Initiative Project in Skagway, Alaska. On January 22, 2016, MOS submitted a revised IHA application with updated information on mitigation measures, species included, and revised take numbers. Additional proposed modifications were submitted to NMFS on March 14, 2016 and March 17, 2016 with updated mitigation measures. We now have a corresponding duty to determine whether and how we can authorize take by Level B harassment incidental to the activities described in MOS's application. Our responsibilities under section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame the proposed action and its alternatives.

Our described purpose and need guide us in developing reasonable alternatives for consideration, including alternative means of mitigating potential adverse effects. Thus, we are developing and analyzing alternative means of developing and issuing an Authorization, which may require the applicant to include additional mitigation and monitoring measures in order for us to make our determinations under the MMPA.

1.3. The Environmental Review Process

NEPA compliance is necessary for all "major" federal actions with the potential to significantly affect the quality of the human environment. Major federal actions include activities fully or partially funded, regulated, conducted, authorized, or approved by a federal agency. Because our issuance of an Authorization would allow for the taking of marine mammals consistent with provisions under the MMPA and incidental to the applicant's activities, we consider this as a major federal action subject to NEPA.

Under the requirements of NAO 216-6 section 6.03(f)(2)(b) for incidental harassment authorizations, we prepared this EA to determine whether the direct, indirect and cumulative impacts related to the issuance of an Authorization for incidental take of marine mammals during the conduct of MOS's project could be significant. If we deem the potential impacts to be not significant, this analysis, in combination with other analyses incorporated by reference, may support the issuance of a Finding of No Significant Impact (FONSI) for the proposed Authorization.

1.3.1. Laws, Regulations, or Other NEPA Analyses Influencing the EA's Scope

We have based the scope of the proposed action and nature of the alternatives considered in this EA on the relevant requirements in section 101(a)(5)(D) of the MMPA. Thus, our authority under the MMPA bounds the scope of our alternatives. We conclude that this analysis – when combined with the analyses in the following documents – fully describes the impacts associated with the proposed project with mitigation and monitoring for marine mammals. After conducting an independent review of the information and analyses for sufficiency and adequacy, we incorporate by reference the relevant analyses on the HTC's proposed action as well as a discussion of the affected environment and environmental consequences within the following documents per 40 CFR 1502.21 and NAO 216-6 § 5.09(d):

- our notice of the proposed Authorization in the *Federal Register* (81 FR 26630, May 3, 2016);
- *Application Amendment and Monitoring Plan* (February 26, 2015)

- *Request for an Incidental Harassment Authorization under the Marine Mammal Protection Act – Skagway Gateway Initiative Project (Revised March, 2016)*

MMPA APPLICATION AND NOTICE OF THE PROPOSED AUTHORIZATION

The CEQ regulations (40 CFR §1502.25) encourage federal agencies to integrate NEPA's environmental review process with other environmental reviews. We rely substantially on the public process for developing proposed Authorizations and evaluating relevant environmental information and provide a meaningful opportunity for public participation as we develop corresponding EAs. We fully consider public comments received in response to our publication of the notice of proposed Authorization during the corresponding NEPA process.

On May 3, 2016, we published a notice of proposed Authorization in the *Federal Register* (81 FR 26630), which included the following:

- a detailed description of the proposed action and an assessment of the potential impacts on marine mammals;
- plans for MOS's mitigation and monitoring measures to avoid and minimize potential adverse impacts to marine mammals and their habitat and proposed reporting requirements; and
- our preliminary findings.

We considered MOS's proposed mitigation and monitoring measures and preliminarily determined that they would effect the least practicable impact on marine mammals. These measures include: (1) visual monitoring for marine mammals and implementation of shutdown zones; (2) use of soft start and ramp-up techniques for pile driving; (3) use of a bubble curtain and pile caps; and (4) time restrictions (5) reducing exposure to contaminants through the use of a silt curtain and employing a contamination sequence. Through the MMPA process, we preliminarily determined – provided that MOS implements the required mitigation and monitoring measures – that the impact on marine mammals of conducting the proposed project would result, at worst, in a temporary modification in behavior of small numbers of certain species of marine mammals that may be present in the vicinity of the proposed activity, resulting in a negligible impact on the affected species or stocks.

Within our notice, we requested that the public submit comments, information, and suggestions concerning the MOS's request, the content of our proposed Authorization, and potential environmental effects related to the proposed issuance of the Authorization. This EA incorporates by reference and relies on MOS's application (March 2016), MOS's application modification and monitoring plan (March 2016) and our notice of a proposed Authorization (81 FR 26630, May 3, 2016).

In summary, those analyses support our conclusion that the issuance of an Authorization MOS's Skagway Gateway Initiative Project would not result in any direct, indirect, or cumulative significant impacts. Based on our analysis, there is no possibility of injury or death to marine mammals due to the nature and duration of the proposed activity. Further, the incorporation of monitoring and mitigation measures proposed by MOS will reduce the effects of the specified activities to the level of least practicable impact. Finally, the analyses support our conclusion that no significant additive or cumulative effects of the project on its own or in combination with other activities would occur.

1.3.2. Scope of Environmental Analysis

Given the limited scope of the decision for which we are responsible (i.e., whether to issue an MMPA Authorization including prescribed means of take, mitigation measures, and monitoring requirements) this EA provides more focused information on the primary issues and impacts of environmental concern related specifically to our issuance of the Authorization. Therefore, this EA does not further evaluate effects to the elements of the human environment listed in Table 1.

Table 2. Components of the human environment not affected by our issuance of an Authorization.

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans	Geography	Military Activities
Non-Indigenous Species	Land Use	Oil and Gas Activities
Seabirds	Oceanography	Recreational Fishing
	State Marine Protected Areas	Shipping and Boating
	Federal Marine Protected Areas	National Historic Preservation Sites
	National Estuarine Research Reserves	National Trails and Nationwide Inventory of Rivers
	National Marine Sanctuaries	Low Income Populations
	Park Land	Minority Populations
	Prime Farmlands	Indigenous Cultural Resources
	Wetlands	Public Health and Safety
	Wild and Scenic Rivers	Historic and Cultural Resources
	Ecologically Critical Areas	

1.3.3. NEPA Public Involvement Summary

NAO 216-6 established agency procedures for complying with NEPA and the implementing NEPA regulations issued by the CEQ. Consistent with the intent of NEPA and the clear direction in NAO 216-6 to involve the public in NEPA decision-making, we requested comments on the potential environmental impacts described in MOS's MMPA application and in the *Federal Register* notice of the proposed Authorization. The CEQ regulations further encourage agencies to integrate the NEPA review process with review under the environmental statutes. Consistent with agency practice we integrated our NEPA review and preparation of this EA with the public process required by the MMPA for the proposed issuance of an Authorization.

The *Federal Register* notice of the proposed Authorization, combined with our preliminary determinations, supporting analyses, and corresponding public comment period are instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments to us for consideration in both the MMPA and NEPA decision-making processes. We posted MOS's application on our website concurrently with the release of the *Federal Register* notice of the proposed Authorization and this Draft EA.

1.4. Other Permits, Licenses, or Consultation Requirements

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action.

1.4.1. Marine Mammal Protection Act

The MMPA and its provisions that pertain to the proposed action are discussed above in section 1.2.

1.4.2. Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSFCMA.

The action area of Skagway and Taiya Inlet is within designated EFH for chum, pink, coho, and chinook salmon species, and Dolly Varden char and hooligan. The proposed action may result in temporarily impaired water quality conditions, and temporarily elevated noise levels within the action area during pile installation activities. The project will also result in a small amount of direct impacts to benthic and aquatic habitat at the site associated with pile footprints and new overwater structure. Pile installation activities could disturb sediments and temporarily increase turbidity within waterbodies that represent EFH for chum, pink, coho, and chinook salmon species, and Dolly Varden char and hooligan.

The greatest potential for short term noise-related effects will result from pile installation activities. The project will implement several conservation measures and best management practices (BMPs) to reduce, eliminate, or minimize the effects of the proposed action to EFH-listed species.

Construction activities in the form of increased noise by pile driving and increased turbidity due to dredging activity have the potential for short-term effects on EFH for Gulf of Alaska Groundfish species and EFH for Alaska Salmon, particularly habitats used by juvenile salmonids, the forage fish complex (e.g., Pacific herring, hooligan, and Pacific sand lance), and several flatfish species. It is expected that juvenile salmon use EFH within the action area as a juvenile migratory corridor, juvenile rearing area, and adult migratory corridor. Forage fish and demersal species are marine residents that likely use the area for year-round residence and feeding, though their presence has not been documented in the area. In addition, no Pacific herring or other forage fish spawning has been reported in the area and project-associated noise levels are not likely to exceed injury thresholds.

EFH-managed juvenile salmonids, forage fish species, and demersal species may temporarily avoid designated EFH within injury exceedance thresholds during pile-driving activities. No long-term effects on EFH will occur; after pile driving and dredging is completed, ecological functions and habitat use will return to pre-construction levels.

Pile driving, dredging, and fill activities could cause temporary and localized impacts to the water quality of EFH in the vicinity of active work. The slight increase in turbidity that could occur during these work activities would take place in a limited mixing zone within the construction area. Conservation measures will be implemented to reduce the area of increased turbidity and introduction of construction related

debris into the water. Localized turbidity plumes are expected to dissipate relatively rapidly by tidal mixing present in the area.

Based on these data, it is unlikely that the short-term and localized elevated turbidities generated by the proposed action would directly affect EFH for juvenile or adult salmonids. This is especially the case when background turbidity is already elevated due to the influence of glacially fed streams in the area. Short-term effects on designated EFH may occur if petroleum or other contaminants accidentally spill into Taiya Inlet, but discharges are expected to be small and are not expected to result in high concentrations of contamination within the surface waters. BMPs and an approved spill response plan will be implemented to minimize the risk of fuel spills and other potential sources of contamination. Benthic habitat communities can also be directly affected by installation of new piling, which displaces seafloor habitat. The piles associated with the proposed project represent a total of approximately 1,513 square feet of benthic habitat impact.

Short term alteration of designated EFH will occur with the proposed dredge activities. There will be short-term decrease of epi/infauna followed by a rapid recovery to near or above pre-dredge levels. In addition, permanent loss of intertidal/subtidal foraging habitat will also result from fill and new pile installation, but the vertical structure of the piles will provide a new hard substrate for attachment of epibiota that may provide prey for EFH species.

Removal of contaminated sediments and creosote-treated timber piles, placement of clean fill material, and a net reduction of over-water coverage will result in a long-term net positive effect on designated EFH for Alaska salmon stocks.

In accordance with the EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS notified the Alaska regional office about this activity, and EFH consultation was not considered necessary for issuance of this IHA. In summary, the proposed action incorporates several conservation measures intended to avoid and/or minimize potential effects to habitat. Impacts that may result from the proposed action will be temporary or will be fully mitigated and will result in no significant effects to any functional component of EFH for chum, pink, coho, and chinook salmon species, and Dolly Varden char and hooligan.

1.4.3. Endangered Species Act

The Endangered Species Act (ESA) established protection over and conservation of threatened and endangered species (T&E) and the ecosystems upon which they depend. An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the near future throughout all or in a significant portion of its range. The USFWS and NMFS jointly administer the ESA and are responsible for the listing of species (designating a species as either threatened or endangered) and designating geographic areas as critical habitat for (T&E) species. The ESA generally prohibits the "take" of an ESA-listed species unless an exception or exemption applies. The term "take" as defined in section 3 of the ESA means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action may affect a listed species, that agency is required to consult with NMFS and/or the USFWS under procedures set out in 50 CFR Part 402. NMFS and USFWS can also be action agencies under section 7. Informal consultation is sufficient for species the action agency determines are not likely

to be adversely affected if NMFS or USFWS concurs with the action agency's findings, including any additional measures mutually agreed upon as necessary and sufficient to avoid adverse impacts to listed species and/or designated critical habitat.

NMFS issuance of an IHA is a federal action that is also subject to the requirements of section 7 of the ESA. As a result, we are required to ensure that the issuance of an IHA to the Municipality of Skagway is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of critical habitat for these species. There are two marine mammal species under NMFS' jurisdiction listed as endangered under the ESA with confirmed or possible occurrence in the proposed project area (i.e., Skagway, Taiya Inlet): the humpback whale and the Steller sea lion. The U.S. Army Corps of Engineers and NMFS Office of Protected Resources (OPR) initiated consultation with NMFS Alaska Region on this proposed project pursuant to section 7 of the ESA on April 4, 2016. A biological opinion will be issued prior to finalizing the environmental assessment.

Chapter 2 Alternatives

2.1. Introduction

The NEPA and the implementing CEQ regulations (40 CFR §§ 1500-1508) require consideration of alternatives to proposed major federal actions and NAO 216-6 provides agency policy and guidance on the consideration of alternatives to our proposed action. An EA must consider reasonable alternatives, including Alternative 1 (Preferred Alternative). It must also consider all reasonable alternatives, including the No Action Alternative. This provides a baseline analysis against which we can compare the other alternatives.

To warrant detailed evaluation as a reasonable alternative, an alternative must meet our purpose and need. In this case, as we previously explained in Chapter 1 of this EA, an alternative only meets the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA. We evaluated each potential alternative against these criteria; identified one action alternative along with the No Action Alternative; and carried these forward for evaluation in this EA.

Alternative 1 includes a suite of mitigation measures intended to minimize potentially adverse interactions with marine mammals. This chapter describes the alternatives and compares them in terms of their environmental impacts and their achievement of objectives.

2.2. Description of MOS's Proposed Activities

We presented a general overview of MOS's project in our *Federal Register* notice of proposed Authorization (81 FR 26630, May 3, 2016). We incorporate those descriptions and those found in MOS's request for incidental take authorization (2016) by reference in this EA and briefly summarize them here.

2.2.1. Specified Time and Specified Area

The Skagway Ore Terminal (SOT) is located in the Skagway harbor. In-water work, which is work occurring below the mean higher high water (MHHW), will be limited to pile installation and pile extraction. These activities will be limited to the period between July 1, 2016 and Mar 1, 2017 to avoid the period (15 April to 31 May) when hooligan are most likely to be present within the project area. The project will require the installation of 209 steel pipe piles of varying diameters below the MHHW.

2.2.2. Description of Construction Activities

The proposed action would involve demolition of existing in- and overwater infrastructure including in-water removal of timber, steel, and concrete piling; mechanical dredging of and upland beneficial reuse or disposal of contaminated sediments in the SOT basin (Terminal basin) of Skagway Harbor; and construction of new infrastructure including a bulkhead wall at the northern end of the Terminal basin, a wharf structure at the western edge of the SOT, an ore loader and supporting infrastructure, seven new or refurbished moorage dolphins and associated catwalks, and a concrete floating dock and associated gangways. Development of this new infrastructure involves a combination of in-water, over-water, and upland work.

2.2.2.1. Pile Installation

Construction of new in- and overwater infrastructure is proposed, including the AML bulkhead wall, wharf structure, and ore loader. In addition, either a concrete floating dock or additional moorage

dolphins connected by a catwalk will be constructed. Whether the concrete floating dock or moorage dolphins and catwalk are constructed depends on available funding. All piles will be installed using a vibratory and/or impact hammer. Piles to be installed are summarized in Table 2.

Table 2 – Piles to Be Installed

Project Component	Pile Size and Number				
	24 in	**36 in**	**48 in**	**60 in**	**Total**
AML Bulkhead Wall	0	0	0	0	0
Wharf Structure at Ore Dock	16	20	4	0	40
Ore Loader and Foundation	0	58	0	0	58
Moorage Dolphins and Catwalk	0	70	0	0	70
Fuel Infrastructure	0	17	0	0	17
Concrete Floating Dock Structure	3	14	0	7	21
Total, Concrete Floating Dock	19	179	4	7	**209**

AML Bulkhead Wall

The proposed new AML bulkhead wall will be constructed at the northern end of the harbor. The wall will be 350 feet long and constructed of steel sheet pile. The top of the wall will be at approximately 30 feet above mean lower low water (MLLW), and the future bottom of the wall at a depth of –4 feet MLLW. The ground surface where fill will be placed behind the new bulkhead wall is entirely above mean higher high water (MHHW). Therefore, this project component includes no placement of fill in the intertidal or subtidal zone. Sheet pile will be installed using a vibratory and/or impact hammer.

Wharf Structure at Ore Dock

A new wharf structure is proposed at the harbor, including a wharf bulkhead wall, an associated AML pier, and an AML ramp.

The proposed wharf bulkhead wall will be constructed of steel sheet pile walls in the form of a rectangle of approximately 220 by 75 feet (16,500 square feet). The top of the walls will be at approximately 30 feet above MLLW, and the future bottom of the walls at a depth of –4 feet MLLW. The structure will be filled with 2,000 to 4,000 cubic yards of suitable dredged material, of which 150 to 300 cubic yards will be placed below MHHW. The ground surface where fill will be placed is primarily above MHHW. Only fill placed in the southeastern corner of the structure will be within the intertidal zone. The steel sheet pile will be installed using a vibratory and/or impact hammer.

The proposed AML pier will be a steel and concrete structure abutting the new wharf structure. The pier will be 65 by 30 feet, supported by twenty 36-inch-diameter steel piles. Finished height will be 30 feet above MLLW. Piles will be installed with a vibratory and/or impact hammer.

The proposed AML ramp will be a steel ramp of 96 by 23 feet supported by four 48-inch-diameter steel guide piles and sixteen 24-inch-diameter steel piles. Finished height will be 30 feet above MLLW. The ramp will be installed by crane.

Ore Loader Foundation

A new ore loader is proposed in the harbor, including a loader, foundation, and access platform. The proposed ore loader foundation will be a steel and concrete structure, 50 by 50 feet and supported by fifty 36-inch-diameter steel piles. Finished height will be 30 feet above MLLW. Piles will be installed with a vibratory and/or impact hammer.

The proposed access platform will connect the ore loader to the Ore Terminal uplands. It will be a steel and concrete structure, 90 by 15 feet, and supported by twenty 36-inch-diameter steel piles. Finished height will be 30 feet above MLLW. Only the eastern 40 feet of length and eight piles will be over the intertidal or subtidal zones (the remainder will be above and tied into the uplands). Piles will be installed with a vibratory and/or impact hammer.

Concrete Floating Dock

The concrete dock and seven moorage dolphins (see Section 2.2.4.5) or up to 10 moorage dolphins will be installed depending on funding. A concrete floating dock is proposed for the southern end of the project area, including the dock, a transfer bridge, a pile-supported pedestrian platform, and a pedestrian gangway. The proposed floating dock will be a 300-by-50-foot concrete structure supported by seven 60-inch- diameter piles and fourteen 36-inch-diameter piles. The finished height will vary with the tide; the dock will have approximately 7 feet of freeboard above the waterline. Piles will be installed with a vibratory and/or impact hammer.

The proposed transfer bridge will be a 200-by-19-foot steel structure supported by a concrete abutment founded on ten 24-inch-diameter piles placed above the intertidal zone. The top of the ramp will be 30 feet above MLLW and the bottom of the ramp will be supported by the floating dock. Only the eastern 150 feet of length will be over the intertidal or subtidal zones (the remainder will be above and tied into the uplands). The ramp will be installed by crane.

The proposed pedestrian platform will be a 25-by-55-foot concrete structure, placed adjacent to the existing timber walkway that will remain after the ore dock demolition. Finished height will be 30 feet above MLLW. The pedestrian platform will be supported on six 24-inch diameter steel piles. Only the eastern 10 feet and three piles of this structure will be over the intertidal or subtidal zones (the remainder will be above and tied into the uplands).

The proposed pedestrian gangway will be a 150-by-8-foot steel structure that spans between the pedestrian platform and the concrete floating dock. The top of the ramp will be 30 feet above MLLW and

the bottom of the ramp will be supported by the floating dock. The full length of the pedestrian gangway will be over the intertidal or subtidal zones. It will be installed by crane.

Moorage Dolphins and Catwalk

As many as 10 new moorage dolphins may be constructed, along with connecting catwalks, located as follows:

- Up to two dolphins and a catwalk 200 by 6 feet extending from the AML bulkhead wall toward the AML ramp;
- Up to five dolphins and a catwalk 400 by 6 feet extending north and south from the ore loader; and
- Up to three dolphins and a catwalk 300 by 6 feet north of the existing concrete pier, if the concrete floating dock is not constructed.

Each dolphin will consist of a 15-foot-square steel and concrete superstructure atop ten 36-inch steel piles.

Each catwalk will be a 6-foot-wide steel structure, supported by the dolphins. Finished height will be 30 feet above MLLW. Dolphins will be installed by vibratory and/or impact hammer and the catwalk will be installed by crane.

Fuel Infrastructure

A new fuel manifold and fuel lines will be constructed on a pier extending from the ore loader platform infrastructure. The proposed fuel pier will be a steel and concrete structure. The approach pier will be 60 by 15 feet, supported by eight 36 inch-diameter steel piles. The fuel pier will be 30 by 30 feet supported by nine 36 inch-diameter steel piles. Finished height will be 30 feet above MLLW. Piles will be installed with a vibratory and/or impact hammer.

2.2.2.2. Demolition

Demolition of this infrastructure will generally occur as follows. Above-water infrastructure, including concrete pads, timber decking, pile caps, utilities, and piping will be removed. Timber piles will then be extracted entirely using a vibratory hammer or broken off at the mudline if extraction is not practical. The timber piles will be removed as both a source control measure (i.e., through removal of creosote- treated timber piles) and as a necessary step to perform environmental dredging in this area. Table 3 shows the total number of piles to be removed during demolition.

Table 3 – Number of Piles to be Removed via Demolition

	Number of Creosote-treated Piles to be Removed	Number of Steel Piles to be Removed
Timber Pier	400	50
Ore Loader	0	50

AML Pier	0	15
Fuel Infrastructure	0	4
Moorage Dolphins2	0	0
Total	**400**	**119**

2.3. Description of Alternatives

2.3.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures

The Proposed Action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an Authorization to MOS (valid from July 1, 2016 through June 30, 2017) allowing the incidental take, by Level B harassment, of six species of marine mammals subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed Authorization, if issued, along with any additions based on consideration of public comments.

MITIGATION, MONITORING, AND REPORTING MEASURES

As described in Section 1.2.1, we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider MOS's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measures to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the measures to minimize adverse impacts as planned; and (3) the practicability of the measures for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);
- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base; activities that block or limit passage to or from biologically important areas; permanent destruction of habitat; or temporary destruction/disturbance of habitat during a biologically important time; and

- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

To reduce the potential for disturbance associated with the activities, MOS has proposed to implement several monitoring and mitigation measures for marine mammals. NMFS has proposed some additional measures. The proposed monitoring and mitigation measures include:

1. Time restrictions: For all in-water pile driving activities, the MOS shall operate only during daylight hours, and to minimize impacts to Hooligan (*Thaleichtys pacificus*), Pacific herring (*Clupea pallasii*), and capelin (*Mallotus catervarius*), all in-water pile extraction and installation is planned to be completed by March 31, 2017;
2. Marine mammal monitoring by NMFS-approved protect species observers (PSOs) from barges and support vessels during construction activities;
3. Establishing level B harassment zone in which behavioral harassment may occur and exposures will be monitored;
4. Establishing shutdown zones within which marine mammals could be exposed to received sound levels associated with injury during the construction activities;
5. Implement use of ramp-up and soft start techniques for vibratory and impact pile driving activities.
6. Employ use of sound attenuation devices including bubble curtains and pile caps/cushions to reduce impacts from sound exposure.
7. Employ floating silt curtains and contamination sequencing to reduce impacts from the sediment plume caused by dredging activities.

MOS is required to submit a draft monitoring report to NMFS Office of Protected Resources within 90 days after the conclusion of the activities. A final report shall be prepared and submitted within 30 days following resolution of any comments on the draft report from NMFS. A description of the activities conducted by MOS and the monitoring protocols would be included in the report.

In our *Federal Register* notice of proposed Authorization, which we incorporate by reference, we preliminarily determined that the measures included in the proposed Authorization were sufficient to reduce the effects of MOS's activity on marine mammals to the level of least practicable impact. In addition, we described our analysis of impacts and preliminarily determined that the taking of small numbers of marine mammals, incidental to MOS's project would have a negligible impact on the relevant species or stocks and would not have an unmitgable adverse impact on affected species or stocks for taking for subsistence uses. Accordingly, this Preferred Alternative would satisfy the purpose and need of our proposed action under the MMPA–issuance of an Authorization, along with required mitigation measures and monitoring that meets the standards set forth in section 101(a)(5)(D) of the MMPA and the implementing regulations. These proposed mitigation, monitoring, and reporting measures may change based on public comments received on the proposed Authorization and/or this Draft EA.

2.3.2. Alternative 2 – No Action Alternative

We are required to evaluate the No Action Alternative per CEQ NEPA regulations. The No Action Alternative serves as a baseline to compare the impacts of the Preferred and other Alternatives. Under the No Action alternative, we would not issue an Authorization to MOS for the proposed project.

Under the No Action Alternative, MOS could choose not to proceed with their proposed activities or to proceed without an Authorization. If they choose the latter, MOS would not be exempt from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

For purposes of this EA, we characterize the No Action Alternative as MOS not receiving an Authorization and MOS conducting the project without the protective measures and reporting requirements required by an Authorization under the MMPA. We take this approach to meaningfully evaluate the primary environmental issues relevant to the no action alternatives – the impact on marine mammal species or stocks from these activities in the absence of protective measures.

2.4. Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet the purpose and need and support MOS's proposed project. An alternative that would allow for the issuance of an Authorization with no required mitigation or monitoring was considered but eliminated from consideration, as it would not be in compliance with the MMPA and therefore would not meet the purpose and need. For that reason, this alternative is not analyzed further in this document.

Chapter 3 Affected Environment

This chapter describes existing conditions in the proposed action areas. Complete descriptions of the physical, biological, and social environment of the action area are contained in the documents listed in Section 1.3.1 of this EA. We incorporate those descriptions by reference and briefly summarize or supplement the relevant sections for marine mammals in the following subchapters.

3.1. Physical Environment

We are required to consider impacts to the physical environment under NAO 216-6. As discussed in Chapter 1, our proposed action and alternatives relate only to the authorization of incidental take of marine mammals and not to the physical environment. Certain aspects of the physical environment are not relevant to our proposed action (see subchapter 1.3.2 - Scope of Environmental Analysis). Because of the requirements of NAO 216-6, we briefly summarize the physical components of the environment here.

3.1.1. Marine Mammal Habitat

We presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed Authorization. In summary, there are no rookeries or major haul-out sites nearby or ocean bottom structure of significant biological importance to marine mammals that may be present in the vicinity of the ensonified areas. No critical habitat exists in the area of the proposed activities.

3.1.2. Ambient Sound

The need to understand the marine acoustic environment is critical when assessing the effects of anthropogenic noise on marine wildlife. Sounds generated by coastal construction such as pile driving and dredging within the marine environment can affect its inhabitants' behavior (e.g., deflection from loud sounds) or ability to effectively live in the marine environment (e.g., masking of sounds that could otherwise be heard).

Ambient sound levels are the result of numerous natural and anthropogenic sounds that can propagate over large distances and vary greatly on a seasonal and spatial scale. These ambient sounds occupy all frequencies and contributions in ocean soundscape from a few hundred Hz to 200 kHz (NRC, 2003). In typical urban coastal waters such as the one at the proposed action area, the main sources of underwater ambient sound would be associated with:

- Wind and wave action
- Precipitation
- Vessel activities
- Biological sounds (e.g. fish, snapping shrimp)

The contribution of these sources to the background sound levels differs with their spectral components and local propagation characteristics (e.g., water depth, temperature, salinity, and ocean bottom conditions). In deep water, low-frequency ambient sound from 1-10 Hz mainly comprises turbulent pressure fluctuations from surface waves and the motion of water at the air-water interfaces. At these infrasonic frequencies, sound levels depend only slightly on wind speed. Between 20-300 Hz, distant anthropogenic sound (ship transiting, etc.) dominates wind-related sounds. Above 300 Hz, the ambient

sound level depends on weather conditions, with wind- and wave-related effects mostly dominating sounds. Biological sounds arise from a variety of sources (e.g., marine mammals, fish, and shellfish) and range from approximately 12 Hz to over 100 kHz. The relative strength of biological sounds varies greatly; depending on the situation, biological sound can be nearly absent to dominant over narrow or even broad frequency ranges (Richardson et al. 1995).

3.2. Biological Environment

3.2.1. Marine Mammal Habitat

The action area is within designated EFH for chum, pink, coho, and chinook salmon species, and Dolly Varden char and hooligan. The proposed action may result in temporarily impaired water quality conditions, and temporarily elevated noise levels within the action area during pile installation activities. The project will also result in a small amount of direct impacts to benthic and aquatic habitat at the site associated with pile footprints and new overwater structure. Pile installation activities could disturb sediments and temporarily increase turbidity within waterbodies that represent EFH for chum, pink, coho, and chinook salmon species, and Dolly Varden char and hooligan. Section 1.4.2 describes how the proposed action incorporates several conservation measures intended to avoid and/or minimize potential effects to habitat. That section also concludes that impacts from the proposed action will be temporary or will be fully mitigated and will result in no significant effects to any functional component of EFH for chum, pink, coho, and chinook salmon species, and Dolly Varden char and hooligan.

We presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed Authorization. In summary, marine mammal prey (i.e., fish) may be present in the project area but not in high densities, except during the April - May period when spawning herring are likely to be present, but no construction activities are to occur.

3.2.2. Marine Mammals

We provide information on the occurrence of marine mammals most likely present in the proposed activity areas in section 1.1.2 of this EA. The marine mammals most likely to be harassed incidental to conducting the pile driving activities associated with the project are humpback whale, Steller sea lion, harbor seal, Dall's porpoise, harbor porpoise, killer whale, and minke whale (Table 4). Humpback whale and the Western Distinct Population Segment (DPS) of Steller sea lion are listed as endangered under the Endangered Species Act. NMFS' 2015 draft Stock Assessment Reports (Muto and Angliss 2015) provide the latest abundance and life history information about each species/stock in Alaska. We provided information on the distribution, population size, and conservation status for each species in the proposed Authorization *Federal Register* notice, and we incorporate those descriptions by reference here. We briefly summarize this information here.

Table 4. Marine mammal species likely to occur near the project area

Species name	Stock(s) abundance Estimate[1]	ESA* Status	MMPA** Status	Frequency of Occurrence in project area
Harbor seal	Lynn Canal/Stephens	Not listed	Not strategic,	Likely

(*Phoca vitulina)*	Passage stock: 9,478		non-depleted	
Steller sea lion (*Eumetopias jubatus)*	wDPS:49,497 eDPS: 60,131- 74,448	Endangered	Strategic, depleted	Likely
Harbor porpoise (*Phocoena phocoena)*	Southeast AK stock: 11,146	Not listed	Strategic, non-depleted	Likely
Dall's porpoise (*Phocoenoides dalli)*	Alaska stock: 83,400	Not listed	Not strategic, non-depleted	Rare
Killer whale (*Orcinus orca)*	Northern resident stock: 261 Gulf of Alaska stock: 587 West coast transient stock:243	Not listed	Not Strategic, non-depleted	Infrequent
Humpback whale (*Megaptera novaeangliae)*	Central North Pacific Stock: 10,252	Endangered	Strategic, depleted	Rare
Minke whale (*Balaenoptera acutorostrata)*[2]	Alaska stock: N/A	Not listed	Not strategic	Unlikely

[1] 2015 draft marine mammal Stock Assessment Reports at http://www.nmfs.noaa.gov/pr/sars/species.htm.
[2]While minke whales may occur in the action area, our analysis suggests this species will not be taken for this activity; therefore, no take of this species will be authorized.
*Endangered Species Act
**Marine Mammal Protection Act

3.2.2.1.1. Humpback Whale

Humpback whales are found in all ocean basins. They range from California to the Chukchi Sea, Hawaii, and the Mariana Islands (NMFS 1991). During summer and fall, humpback whales in the North Pacific forage in the high latitude northern water. Within this feeding area there are three relatively separate populations that migrate from these colder, highly productive higher-latitude waters to winter/spring calving and mating areas in warmer, lower-latitude coastal waters. Humpback whales in the waters of southeast Alaska belong to the Central North Pacific stock. This stock forages seasonally in the waters of British Columbia and Alaska and then, during winter, migrates to the Hawaiian Islands for mating and calving; however, a portion of the population remains in southeast Alaska waters year-round. Humpback whales are primarily observed foraging in southeast Alaska from May through December with numbers peaking in late August and September.

While the estimated population of the North Pacific stock remains much lower than the population size before whaling, humpback whales are increasing in abundance throughout much of their range. While the

species currently remains listed as endangered throughout its range, the State of Alaska, in 2014, filed a petition with NMFS to designate the Central North Pacific Stock of humpback whale as a DPS and to delist this DPS under the ESA (ADF&G 2014). The status of the stock is currently under review with NMFS.

In the North Pacific, humpback abundance was estimated at fewer than 1,400 whales in 1966, after heavy commercial exploitation. The current abundance estimate for the Central North Pacific stock is approximately 10,252 whales (Muto and Angliss 2015). The population across Southeast Alaska experienced a 10.6% annual population increase over the 1991-2007 study period (Dahlheim *et al*., 2009). Humpback whales have been observed within the waters of the action area during all months of the year, with annual concentrations of humpback whales occurring in SE Alaska, including Lynn Canal (Dahlheim *et al*., 2009). Overall numbers of humpback whales tend to increase during the summer (June/July) and fall (August/September) but are more evenly distributed with fewer identifiable population concentrations (Dahlheim *et al*. 2009).

3.2.2.1.2. Dall's Porpoise

Dall's porpoise are only found in the North Pacific and adjacent seas. Based primarily on the population response data and preliminary genetics analyses (Winans and Jones 1988), delineation between Bering Sea and western North Pacific stocks has been recognized. However, similar data are not available for the eastern North Pacific, thus one stock of Dall's porpoise is recognized in Alaskan waters. Dall's porpoise along the west coast of the continental U. S. from California to Washington comprise a separate stock (Muto and Angliss 2015).

Dall's porpoise occur throughout Alaska, and in general, are considered to be common throughout their range (Buckland et al. 1993a). This porpoise was also one of the most frequently sighted species during summer seismic surveys in the central and eastern Gulf of Alaska and southeast Alaska (MacLean and Koski 2005; Hauser and Holst 2009). In one study from 1991-2007, Dall's porpoise were encountered throughout Southeast Alaska with concentrations of animals consistently found in Lynn canal (Dahlheim et al., 2009). Dall's porpoise also have strong seasonal patterns in Southeast Alaska, with the highest numbers observed in the spring and numbers lowest in the fall (Dahlheim et al., 2009).

The current best population estimate for the Alaskan stock of Dall's porpoise is 83,400 (Muto and Angliss 2015). However, surveys for this stock are greater than 20 years old and, consequently, NMFS considers the minimum population estimate to be "unknown", and has also not calculated a Potential Biological Removal (PBR) level for Dall's porpoise (Muto and Angliss 2015). In the Southeast Alaska region, Dall's porpoise populations increased annually by 2.5% between 1991 and 2007(Dahlheim et al., 2009). Dall's porpoise are not designated as "depleted" under the MMPA or listed as "threatened" or "endangered" under the Endangered Species Act. The level of human-caused mortality and serious injury is not known to exceed the PBR, which is undetermined as the most recent abundance estimate is more than 8 years old. The Alaska stock of Dall's porpoise is not classified as a strategic stock (Muto and Angliss 2015).

3.2.2.1.3. Harbor Porpoise

The harbor porpoise inhabits temporal, subarctic, and arctic waters. In the eastern North Pacific Ocean, the harbor porpoise ranges from Point Barrow and offshore areas of the Chukchi Sea, along the Alaska coast, and down the west coast of North America to Point Conception, California (Muto and Angliss 2015). In the eastern North Pacific, harbor porpoises range from Point Barrow, Alaska, to Point Conception, California. Harbor porpoise primarily frequent coastal waters and occur most frequently in waters less than 100 m deep (Hobbs and Waite 2010). They may occasionally be found in deeper offshore waters.

In Alaska, harbor porpoises are currently divided into three stocks, based primarily on geography or perceived areas of porpoise low density: 1) the Southeast Alaska stock - occurring from the northern border of British Columbia to Cape Suckling, Alaska, 2) the Gulf of Alaska stock - occurring from Cape Suckling to Unimak Pass, and 3) the Bering Sea stock - occurring throughout the Aleutian Islands and all waters north of Unimak Pass. These are the Bering Sea stock, the Southeast Alaska stock, and the Gulf of Alaska stock (Allen and Angliss 2014). Only the Gulf of Southeast Alaska stock is considered here because the other stocks are not found in the geographic area under consideration.

Harbor porpoises are neither designated as depleted under the MMPA nor listed as threatened or endangered under the ESA. Because the most recent abundance estimate is 14 years old and information on incidental harbor porpoise mortality in commercial fisheries is not well understood, the Gulf of Southeast Alaska stock of harbor porpoise is classified as strategic. Population trends and status of this stock relative to optimum sustainable population size are currently unknown. The Gulf of Southeast Alaska stock is currently estimated at 11,146 individuals (Muto and Angliss 2015). No reliable information is available to determine trends in abundance. Dahlheim et al (2015) published on dedicated line-transect surveys conducted to determine the density and abundance of harbor porpoise in Southeast Alaska over a 22-year period from 1991 through 2012. It was noted that the overall abundance of harbor porpoise significantly declined from the early 1990s, followed by a significant increase in the early 2010s when abundance rose to levels similar to those observed 20 years earlier (Dahlheim et al 2015).

According to the online database, Ocean Biogeographic Information System, Spatial Ecological Analysis of Megavertebrate Populations (Halpin 2009 at OBIS-SEAMAP 2015), West Coast populations have more restricted movements and do not migrate as much as East Coast populations. Most harbor porpoise groups are small, generally consisting of less than five or six individuals, though for feeding or migration they may aggregate into large, loose groups of 50 to several hundred animals. Dahlheim et al (2015) noted that the average group size was between 1 and 2 individuals.

Harbor porpoises are expected to be encountered rarely in the project area, although no data exist to quantify harbor porpoise attendance in Skagway harbor or adjacent Taiya Inlet, or Lynn Canal.

3.2.2.1.4. Killer Whale

Although resident in some parts of its range, the killer whale can also be transient. Killer whale movements generally appear to follow the distribution of their prey, which includes marine mammals, fish, and squid. Killer whales have been observed in all oceans and seas of the world, but the highest densities occur in colder and more productive waters found at high latitudes. Killer whales are found throughout the North Pacific, and occur along the entire Alaska coast, in British Columbia and

Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (Allen and Angliss, 2013).

Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized: (1) the Alaska Resident stock; (2) the Northern Resident stock; (3) the Southern Resident stock; (4) the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock; (5) the AT1 Transient stock; (6) the West Coast transient stock, occurring from California through southeastern Alaska; and (7) the Offshore stock, and (8) the Hawaiian stock. Only the Norther resident, Gulf of Alaska, Aleutian Islands, and Bering Sea Transient (Gulf of Alaska transient), and the West coast transient stocks are considered in here because other stocks occur outside the geographic area under consideration.

The Northern resident stock occurs from Washington State through part of southeastern Alaska. The Eastern North Pacific Northern Resident stock is a transboundary stock, and includes killer whales that frequent British Columbia, Canada and southeastern Alaska (Dahlheim *et al*., 1997; Ford *et al*., 2000). The population estimate for this stock is currently 261 whales (Allen and Angliss, 2013). This population is increasing, with an average of 2.1% annual increase over a 36 year time period (Ellis *et al*., 2011). PBR for this stock is 1.96 animals. This stock is not designated as depleted or strategic under the MMPA, and is not listed as threatened or endangered under the ESA.

The Gulf of Alaska transient stock occurs mainly from Prince William Sound through the Aleutian Islands and Bering Sea. Current abundance estimate for this stock is 587 animals (Allen and Angliss, 2013). PBR is 5.87 animals per year (Allen and Angliss, 2013). Current trends for this stock are unavailable, but the stock is not designated as depleted or strategic under the MMPA, and they are not listed under the ESA.

The West coast transient stock includes animals that occur in California, Oregon, Washington, British Columbia and southeastern Alaska. Current abundance estimate for this stock is 243 animals, which should be considered a minimum count for this stock (Allen and Angliss, 2013). PBR is 2.4 animals per year (Allen and Angliss, 2013). No reliable estimates of population trends are available, but this stock is not designated as depleted or strategic under the MMPA, and is not listed under the ESA.

3.2.2.1.5. Minke Whale

In the Northern Hemisphere, minke whales are usually seen in coastal areas, but can also be seen in pelagic waters during northward migrations in spring and summer, and southward migration in autumn. In the North Pacific, the summer range of the minke whale extends to the Chukchi Sea; in the winter, the whales move farther south close within 2o of the equator (Perrin and Brownell 2002).

The International Whaling Commission (IWC) recognizes three stocks of minke whales in the North Pacific: the Sea of Japan/East China Sea, the rest of the western Pacific west of 180oN, and the remainder of the Pacific (Donovan 1991). For management purposes in Pacific U.S. waters, three stocks of minke whales are recognized ― the Alaska, Hawaii, and California/Oregon/ Washington stocks (Muto and Angliss 2015). Minke whales that could potentially occur within the action area are members of the Alaska stock.

Minke whales are relatively common in the Bering and Chukchi seas and in the inshore waters of the Gulf of Alaska, but they are not considered abundant in any other part of the eastern Pacific (Muto and Angliss, 2015). They are seen occasionally around Glacier Bay in southeast Alaska and in central Icy Strait and south of the project area in northern Stephen's passage, and are considered rare in the northern parts of Lynn canal (Dalheim et al., 2009). Gabriele and Lewis (2000) documented a total of 29 minke whales during a four-year period conducting opportunistic marine mammal surveys in Glacier Bay and Icy Strait. Another study found Minke whales scattered throughout inland waters from Glacier Bay and Icy Strait to Clarence Strait with concentrations near the entrance of Glacier Bay. Although sightings of minke whales were infrequent over the 17-year study period, minke whales were encountered during all seasons, with a few animals recorded each year. (Dahlheim et al. 2008)

The current best abundance estimate for the Alaska stock of minke whales is unknown (Muto and Angliss 2015). This stock of minke whales is not designated as "depleted" under the MMPA nor are they listed as "threatened" or "endangered" under the ESA. The greatest uncertainty regarding the status of the Alaska minke whale stock has to do with the uncertainty pertaining to the stock structure of this species in the eastern North Pacific (Muto and Angliss 2015). Because minke whales are considered common in the waters off Alaska and because the number of human-related removals is currently thought to be minimal, this stock is currently presumed to not be a strategic stock (Muto and Angliss 2015). Reliable estimates of the minimum population size, population trends, PBR, and status of the stock relative to optimum sustainable population size are currently not available (Muto and Angliss 2015).

While minke whales may occur in the action area, our analysis and take calculation suggests this species will not be taken for this activity; therefore, no take of this species will be authorized and this species will not be discussed further in this document.

3.2.2.1.6. Harbor Seal

Harbor seals inhabit coastal and estuarine waters off Baja California, north along the western coasts of the United States, British Columbia, and Southeast Alaska, west through the Gulf of Alaska and Aleutian Islands, and in the Bering Sea north to Cape Newenham and the Pribilof Islands (Muto and Angliss 2015). Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands.

In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Muto and Angliss 2015). Only the Lynn Canal/Stephens Passage stock is considered here because other stocks occur outside the geographic area under consideration.

The current statewide abundance estimate for Alaskan harbor seals is 152,602, based on aerial survey data collected during 1998–2007. The abundance estimate for the Lynn Canal/Stephens Passage stock is 9,478 individuals, with a minimum estimate of 8,605 (Muto and Angliss 2015). Harbor seals have declined dramatically in some parts of their range over the past few decades, while in other parts their numbers have increased or remained stable over similar time periods.

Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice (Muto and Angliss 2015). They are non-migratory; their local movements are associated with tides, weather, season, food availability, and

reproduction, as well as sex and age class (Muto and Angliss 2015; Boveng et al. 2012; Lowry et al. 2001; Swain et al. 1996).

Harbor seals are likely to be seen in the project area. There are no documented long-term haulout sites for harbor seals in Taiya Inlet; however, seasonal haulouts are present within five miles of the project area at Seal cove, and at the mouth of the Taiya River. During the hooligan run in April and May, between 20 and 100 individual harbor seals have been observed actively feeding in these areas. After the hooligan run, harbor seal numbers decline, with very few observed in the winter months.

3.2.2.1.7. Stellar Sea Lion

The Steller sea lion is a pinniped and the largest of the eared seals. Steller sea lion populations that primarily occur west of 144° W (Cape Suckling, Alaska) comprise the western Distinct Population Segment (wDPS), all others are considered part of the eastern Distinct Population Segment (eDPS). However, Jemison et al. (2013) summarized that it is noted that there is regular movement of Steller sea lions from the western distinct population segment (DPS) (males and females equally) and eastern DPS (almost exclusively males) across the DPS boundary (Muto and Angliss 2015). Both DPS are considered likely to occur in the project area and are included here. Steller sea lions were listed as threatened range-wide under the ESA on 26 November 1990 (55 Federal Register [FR] 49204). Steller sea lions were subsequently partitioned into the western and eastern DPSs in 1997 (Allen and Angliss 2010), with the wDPS being listed as endangered under the ESA and the eDPS remaining classified as threatened (62 FR 24345) until it was delisted in November 2013.

On 27 August 1993, NMFS published a final rule designating critical habitat for the Steller sea lion as a 20 nautical mile buffer around all major haul-outs and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (50 CFR 226.202)

The range of the Steller sea lion includes the North Pacific Ocean rim from California to northern Japan with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands (Muto and Angliss 2015). Steller sea lions forage in nearshore and pelagic waters where they are opportunistic predators. They feed primarily on a wide variety of fishes and cephalopods. Steller sea lions use terrestrial haulout sites to rest and take refuge. They also gather on well-defined, traditionally used rookeries to pup and breed. These habitats are typically gravel, rocky, or sand beaches; ledges; or rocky reefs (Muto and Angliss, 2015).

Steller sea lions have a worldwide population estimated at 120,000 to 140,000 animals, with approximately 93,000 in Alaska. The most recent comprehensive estimate (pups and non-pups) for abundance of the wDPS in Alaska is 49,497 individuals, which is the same as the minimum estimate, based on aerial surveys of non-pups conducted in June and July 2008–2011 and aerial and ground-based pup counts conducted in June and July 2009–2011 (Muto and Angliss 2015).

The western stock of Steller sea lions decreased from an estimated 220,000 to 265,000 animals in the late 1970s to less than 50,000 in 2000 (Muto and Angliss 2015). The wDPS of Steller sea lions declined approximately 75 percent from 1976 to 1990. Factors that may have contributed to this decline include (1) incidental take in fisheries, (2) legal and illegal shooting, (3) predation, (4) contaminants, (5) disease, and (6) climate change. During the late 1980s, counts in Alaska overall declined at ~15% per year, and

continued to decline in the 1990s prompting the status listing and subsequent up-listing under the ESA. Since 2000, the abundance of the western stock has increased, but there has been considerable regional variation in trend (Muto and Angliss 2015). There is strong evidence that non-pup counts of western stock Steller sea lions in Alaska increased between 2000 and 2014, and overall, there is strong evidence that pup counts increased in the overall western stock in Alaska (Muto and Angliss 2015). Non-pup Steller sea lion counts at trend sites in the wDPS increased 11 percent during 2000–2004. These counts were the first region-wide increases for the wDPS since standardized surveys began in the 1970s, and were due to increased or stable counts in all regions except the western Aleutian Islands. During 2004-2008, western Alaska non-pup counts increased only 3 percent; eastern Gulf of Alaska (Prince William Sound area) counts were higher; counts from the Kenai Peninsula through Kiska Island, including Kodiak Island, were stable; and western Aleutian counts continued to decline (Allen and Angliss 2010).

The eastern DPS of Steller sea lions include animals born east of Cape Suckling, Alaska (144°W). There current population estimate is between 60,131- 74,448 individuals, with a minimum estimate of 36,551 (Muto and Angliss 2015). The stock is not listed under the ESA, but is considered a strategic stock under the MMPA. PBR is set at 1,645 individuals.

Steller sea lions are relatively rare as far north as Skagway, and are only seen in the Taiya inlet during the hooligan run in April, and thereafter are scarce. Steller sea lions are the most obvious and abundant marine mammals in the project area. The major natural Steller sea lion haulouts closest to the project area are located on Long Island and Cape Chiniak, which are approximately 4.6 nautical miles (8.5 kilometers) and 13.8 nautical miles (25.6 kilometers) in Lynn Canal. The nearest long-term Steller sea lion haulout is located at Gran Point, near Haines, approximately 20 miles (~32km) south of Skagway. Other haulous are located at Met Point, Benjamin Island, and Little Island, south near Juneau. In the Taiya inlet, there is one seasonal haulout at Taiya Point rocks at the southern tip of the inlet, just outside of the project's ZOI. An estimate of 25-40 animals use this haulout for about three weeks during the hooligan run (when the in water construction will not be occurring). Critical habitat is associated with breeding and haulout areas in Alaska, California, and Oregon (NMFS 1993). Steller sea lion critical habitat is defined by a 20-nautical-mile (37-km) radius (straight line distance) encircling a major haulout or rookery. The project area does not occur within critical habitat.

3.3. Socioeconomic Environment

3.3.1. Subsistence

The subsistence harvest of marine mammals transcends the nutritional and economic values attributed to the animal and is an integral part of the cultural identity of the region's Alaska Native communities. Inedible parts of the whale provide Native artisans with materials for cultural handicrafts, and the hunting itself perpetuates Native traditions by transmitting traditional skills and knowledge to younger generations (NOAA, 2007).

The proposed Project will occur near but not overlap the subsistence area used by the villages of Hoonah and Angoon (Wolfe et al. 2013). 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.

Chapter 4 Environmental Consequences

This chapter of the EA analyzes the impacts of the two alternatives and addresses the potential direct, indirect, and cumulative impacts of our issuance of an Authorization. MOS's application, our notice of a proposed Authorization, and other related environmental analyses identified previously, inform an analysis of the direct, indirect, and cumulative effects of our proposed issuance of an Authorization.

Under the MMPA, we have evaluated the potential impacts of MOS's activities on the affected marine mammal species or stocks in order to determine whether to authorize incidental take of marine mammals. Under NEPA, our EA is appropriate to evaluate the potential significance of environmental impacts resulting from the issuance of our Authorization.

4.1. Effects of Alternative 1 – Issuance of an Authorization with Mitigation Measures

Alternative 1 is the Preferred Alternative where we would issue an Authorization to MOS allowing the incidental take, by Level B harassment, of six species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed Authorization, and described earlier in this EA (see Section 2.3.1).

4.1.1. Impacts to Marine Mammal Habitat

The proposed activities at SOT would not result in permanent negative impacts to habitats used directly by marine mammals, but may have potential short-term impacts to food sources such as forage fish and may affect acoustic habitat. There are no known foraging hotspots or other ocean bottom structure of significant biological importance to marine mammals present in the marine waters of the project area. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this document, as well as potential short-term effects to water and sediment quality.

The primary potential acoustic impacts to marine mammal habitat are associated with elevated sound levels produced by vibratory and impact pile driving and removal in the area. However, other potential impacts to the surrounding habitat from physical disturbance are also possible.

The proposed dredging activities were designed to remove impacted sediments (i.e., sediments with metals and/or polycyclic aromatic hydrocarbon (PAH) concentrations exceeding sediment cleanup objectives. The volume of potentially contaminated material subject to dredging and treatment or disposal in an approved hazardous waste facility is estimated to be 17,300 cubic yards. The dredging activities are predicted to have a positive impact on the habitat, and any negative short term impacts (discussed below) are inconsequential in comparison to the overall benefit the environment will receive from these actions.

Sediment chemistry data show levels of sediment contamination that may cause low, chronic, long term ecological effects to benthic habitats, but would not likely cause acute, toxic effects within the water column. The dredge prism of potentially contaminated sediment occupies approximately 41,000 square feet (0.004 square kilometers), adjacent to the Ore Dock. Physical resuspension of sediments would occur during dredging and would produce localized impacts to water quality in the form of elevated turbidity plumes that would last from a few minutes to several hours. Associated contaminants are expected to be tightly bound to the sediment matrix. Because of the relatively small dredge prism, these plumes would be limited to the immediate vicinity of the Ore Dock and this portion of Skagway Harbor. There is the potential for pinnipeds to be exposed to increased turbidity during dredge operations within Skagway

Harbor. However, exposure to resuspended contaminants is expected to be low since sediments would not be ingested and contaminants would be tightly bound to them.

Best management practices will be instituted to limit exposure pathways in areas where dredge materials are being handled. To minimize the potential for marine mammals to be exposed to harmful or toxic contaminants in the sediment during dredging operations, mitigation measures will be employed. These measures include a partial height silt curtain and contamination sequencing. The objective when using silt curtains is to create a physical barrier around the dredge equipment by protecting against the spread of suspended sediment that is generated during dredging operations in the portion of the water column in which the silt curtain extends. Silt curtains can be effective tools to minimize or reduce potential water quality impacts during dredging, when used properly and in the right site conditions. The silt curtain will be constructed of flexible, reinforced, thermoplastic material with flotation material in the upper hem and ballast material in the lower hem. The curtain will be placed in the water surrounding the dredging operation. The specifications will require that the Contractor maintain the silt curtain(s) around either the point of dredging or the dredging area (and potentially other in-water construction areas) at the contractor's discretion, in order to reduce the potential for water quality impacts and the transport of suspended solids beyond the project dredging boundaries.

Because they are mostly impermeable, silt curtains are easily affected by tides and currents and their effectiveness can be adversely impacted by high current velocities, moderate to large wave conditions, or large tidal variation. The required height of the silt curtain will be determined during subsequent design to determine a height that balances environmental protection and the efficiency to maintain the silt curtain in place during dredging based on tidal and current velocities in the harbor. The effectiveness of the silt curtain will be monitored during construction and changes may be implemented based on the results of monitoring to either enhance the protection of the silt curtain or otherwise make modifications to the silt curtain configuration to provide for more effective dredge operations while still meeting water quality requirements.

Contamination sequencing involves prioritizing the removal of the most impacted areas (i.e., the area with the highest observed concentrations of contaminants of concern) before the surrounding areas. Ultimately, the necessary phasing and sequencing of the overall project (e.g., dock demolition to facilitate remedial dredging) must be taken into consideration along with the safety of the dredging contractor.

Given the relatively small dredge footprint, which limits the size of the dredge plume; the turbidity will be limited by efforts taken to limit/prevent exposure through BMPs; the plume will be temporary and will not have a direct exposure mechanism to marine mammals; and activities will occur during the winter period when fewer pinnipeds have been observed in the area, effects on marine mammals are considered negligible.

Construction Effects on Potential Prey

Construction activities would produce continuous (i.e., vibratory pile driving sounds and pulsed (i.e. impact driving) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies in support of large, multiyear bridge construction projects (e.g., Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Sound pulses at received levels of 160 dB may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson

et al., 1992; Skalski *et al.,* 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality.

The most likely impact to fish from pile driving activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe for the project.

Construction activities, in the form of increased turbidity, have the potential to adversely affect forage fish and juvenile salmonid outmigratory routes in the project area. Both herring and salmon form a significant prey base for Steller sea lions, and herring is a primary prey of humpback whales. Increased turbidity is expected to occur in the immediate vicinity (on the order of 10 feet or less) of construction activities. However, suspended sediments and particulates are expected to dissipate quickly within a single tidal cycle. Given the limited area affected and high tidal dilution rates any effects on forage fish and salmon are expected to be minor or negligible. In addition, best management practices will be in effect, which will limit the extent of turbidity to the immediate project area. Finally, exposure to these contaminants from dredging is not expected to be different from the current exposure; fish and marine mammals in the Taiya Inlet/Lynn Canal region are routinely exposed to substantial levels of suspended sediment from glacial sources.

Construction Effects on Potential Foraging Habitat

Pile installation may temporarily increase turbidity resulting from suspended sediments. Any increases would be temporary, localized, and minimal. MOS must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area. In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile (Everitt *et al.* 1980). Cetaceans are not expected to be close enough to the project pile driving areas to experience effects of turbidity, and any pinnipeds will be transiting the area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals. Furthermore, pile driving and removal at the project site will not obstruct movements or migration of marine mammals.

Noise measurements of dredging activities are rare in the literature, but dredging is considered to be a low-impact activity for marine mammals, producing non-pulsed sound and being substantially quieter in terms of acoustic energy output than sources such as seismic airguns and impact pile driving. Noise produced by dredging operations has been compared to that produced by a commercial vessel travelling at modest speed (Robinson *et al.,* 2011). Further discussion of dredging sound production may be found in the literature (*e.g.*, Richardson *et al*., 1995, Nedwell *et al*., 2008, Parvin *et al*., 2008, Ainslie *et al*., 2009). Generally, the effects of dredging on marine mammals are not expected to rise to the level of a take. However, one study found peak sound pressure levels from clamshell dredging in Cook Inlet measured 124 decibels (re 1 μPa) at the 150 meter isopleth with the peak sound levels associated with the dredger striking the hard ocean floor (Dickerson et al. 2001). Therefore, to further reduce potential acoustic impacts to endangered humpback whales and Steller sea lions, there will be a 200 meter dredging shutdown zone for ESA- listed species. Take of marine mammals from dredging activities is not authorized for this activity; therefore, this project component will not be discussed further.

4.1.2. Impacts to Marine Mammals

We expect that behavioral disturbance resulting from exposure to underwater sound resulting from the activities associated with the project has the potential to impact marine mammals and comprises the only likely source of effects to marine mammals. These activities are not anticipated to result in injury, serious injury, or mortality of any marine mammal species and none is proposed to be authorized. The current acoustic exposure criteria are summarized in Table 5. Our notice of proposed Authorization and MOS's application (2016) provide detailed descriptions of these potential effects of the proposed project activities on marine mammals. That information is incorporated herein by reference and summarized next.

Table 5. Current Acoustic Exposure Criteria.

Criterion	Criterion Definition	Threshold*
Level A harassment (underwater)	PTS (injury) conservatively based on TTS**	190 dB RMS for pinnipeds 180 dB RMS for cetaceans
Level B harassment (underwater)	Behavioral disruption	160 dB RMS (impulsive source) 120 dB RMS (continuous source)
Level B harassment (airborne)	Behavioral disruption	90 dB (harbor seals) 100dB (other pinnipeds) (unweighted)

*All decibel levels referenced to 1 micropascal (re: 1 μPa). Note all thresholds are based off root mean square (RMS) levels
** PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

Based on this information, we expect that the proposed activities would result, at worst, in a temporary modification in behavior and/or temporary changes in animal distribution (Level B harassment) of certain species or stocks of marine mammals. At most, we interpret these effects on marine mammals as falling within the MMPA definition of Level B (behavioral) harassment. We expect these impacts to be minor because we do not anticipate measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance.

We expect no long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment. We base our conclusion on the results of previous monitoring for the same activities and anecdotal observations for the same activities in the proposed area.

4.1.3. Estimated Take of Marine Mammals by Level B Incidental Harassment

The MOS has requested take by Level B harassment as a result of underwater sound produced through pile driving associated with the project. We expect that the proposed project would cause short-term behavioral disturbance and/or displacement for marine mammals in the proposed areas.

Table 6 outlines the number of Level B harassment takes that we propose to authorize in this Authorization, the regional population estimates for marine mammals in the action area, the percentage of each population or stock that may be taken as a result of MOS's activities, and the trend of each marine mammal population. Our proposed Authorization notice and MOS's application contain complete descriptions of how these take estimates were derived.

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a Zone of Influence (ZOI) during active pile driving. Expected marine mammal presence is

determined by past observations and general abundance near the project area during the construction window. Typically, potential take is estimated by multiplying the area of the ZOI by the local animal density. This provides an estimate of the number of animals that might occupy the ZOI at any given moment, or a daily density, which can then be multiplied by the anticipated number of pile driving days to give a total exposure estimate. However, this type of calculation is not applicable in this case, because there are no specific local animal densities for the marine mammal species under examination, except for harbor seals. As a result, the method used for calculating potential exposures to impact and vibratory pile driving noise for each threshold for all other marine mammals was estimated using published reports of group sizes and population estimates, and anecdotal observational reports from local commercial entities.

Harbor Seals— There are no documented long-term haulout sites for harbor seals in Taiya Inlet; however, seasonal haulouts are present within five miles of the project area at Seal Cove and at the mouth of the Taiya River. During the spring run of hooligan in April and May, 20 to over 100 individual animals have been observed in these areas, with animals within inner Taiya Inlet actively feeding. After the spawning run, much lower numbers of harbor seals are present. Local observers have found that very few, if any, harbor seals are present during the winter. Harbor seals within the Lynn Canal/Stephens Passage stock have maintained a steady to slightly declining population over the past five years. The latest stock assessment analysis indicates that there is a 71 percent probability that the stock has declined by 1.8 percent over this period (Muto and Angliss 2015). Using seal stock assessment data from within the Lynn Canal/Stephens Passage stock, the calculated density of this stock is 1.7 animals per square kilometer (total population divided by total area). This density was applied to the area within the behavioral impact zone for vibratory driving (21 square kilometers, which includes most of Taiya Inlet) for a total of 36 animals in the whole of Taiya Inlet. These animals are mostly on haulouts in the vicinity of Seal Cove, swimming in areas near the waterfront, and hauled out at the mouth of the Taiya River. Proposed pile driving will occur in March, and in July through October, avoiding the hooligan spawning run and the period of maximum local abundance of harbor seals.

For the purposes of our analysis, the estimated number of local animals within the area is eight animals (one half of the mean range within the lower inlet). This estimate is based on the conservative assumption that about half of the animals hauled out at Seal Cove and the Taiya River mouth may be transiting through the area at any given time during the summer (14 days). The haulouts themselves are outside of the behavioral impact zones, approximately five miles from the project area. No exposure to the injury zone is expected because of the mitigation measures designed to prevent Level A harassment. It is expected that the marine mammal monitoring program will significantly prevent injury take in this zone. Based on calculated density estimates, all 36 animals will be exposed to the continuous noise behavioral zone, which includes most of Taiya Inlet for all days when pile driving activities are expected to occur (60 days) for a total of 2,160 takes during this time period. Total requested harbor seal takes is 2,272.

Steller Sea Lion— There are no density estimates of Steller sea lions available in the action area There are several long-term Steller sea lion haulouts in Lynn Canal but none occur in Taiya Inlet. The nearest long-term Steller sea lion haulout is located at Gran Point, in the vicinity of Haines approximately 20 miles south of Skagway. Other year-round haulouts in Lynn Canal are present at Met Point, Benjamin Island, and Little Island, closer to Juneau (Fritz *et al*. 2015). A seasonal haulout site is located on Taiya Point rocks at the southern tip of Taiya Inlet. Estimates of 25 to 40 animals use this haulout for about three

weeks during the hooligan run, during which they frequent the inlet. However, most animals leave the inlet shortly after the hooligan run and are scarce after about the first week in June. Sea lions are rarely observed in the inlet during the winter. This is consistent with the National Marine Mammal Laboratory database (Fritz *et al*., 2015), which has identified the largest number of Lynn Canal sea lions during the fall and winter months at Benjamin Island in the lower reaches of the canal.

Taiya Point Rocks are located approximately 12 miles south of Skagway and 1.3 miles outside of the continuous noise vibratory behavioral impact zone. Given that sea lion presence in Taiya Inlet occurs during the hooligan run, during which no pile driving will occur, and the nearest haulout site is outside of the behavioral impact zone, it is expected that Steller sea lion exposure to pile driving will be low. This is similar to observations from local observers, who have reported one to three sea lions in Taiya Inlet outside of the hooligan spawning run, Others, however, have observed sea lions in greater numbers in nearby Lutak Inlet in the fall during salmon runs, and at the Gran Point haulout near Haines. These observations and data suggest that it is reasonable to expect more sea lions to travel into Taiya Inlet. There have been no observations of Steller sea lions in Taiya Inlet during the winter. For the purpose of this assessment, it is assumed that 16 Steller sea lions (half of the mean found on Taiya Rocks during the hooligan run) will be present within Taiya Inlet during any given time while pile driving and pile removal operations are occurring in the summer and fall (60 and14 days, respectively), for a total of 1,184 total takes for Steller sea lions. Exposure to pile-driving and removal activities during the winter is not expected to occur. No Steller sea lions are expected to be exposed to the small injury zone near the facility. If any do appear, the marine mammal monitoring program would effectively prevent take.

Harbor Porpoises— There are no density estimates of harbor porpoise available in the action area. Harbor porpoise primarily frequent coastal waters, and in the Gulf of Alaska and Southeast Alaska, they occur most frequently in waters less than 100 meters (Dahlheim *et al*. 2009). Within the inland waters of Southeast Alaska, the harbor porpoise distribution is clumped, with greatest densities observed in the Glacier Bay/Icy Strait region, and near Zarembo and Wrangell Islands and the adjacent waters of Sumner Strait (Allen and Angliss 2014). Dedicated research studies of harbor porpoise in this area only occur as far north in Lynn Canal as Haines during the summer (Dahlheim *et al*., 2009; 2015); approximately 16 miles south of SOT. Group sizes were on average, between 1.37-1.59 animals (less than 2) (Dahlheim *et al*., 2009; 2015). In Lynn Canal, observations were less frequent, primarily in lower Lynn Canal from Chatham Strait to Juneau. The species has been observed as far north as Haines during the summer (Dahlheim *et al*., 2009, Dalheim *et al*., 2015). Encounters of small groups of two or three animals have been reported by local vessel charters from spring through fall in Taiya Inlet. Observations have been frequent, but not on a daily basis. The mean group size of harbor porpoise in Southeast Alaska is estimated at two individuals (Dahlheim *et al*. 2009). For the purposes of this analysis it is estimated that two harbor porpoises will be present in Taiya Inlet, but because observations do not occur daily, we estimate their presence within the inlet on 75 percent of days during the pile driving period (84 days) for a total of 168 take exposures.

Based on observations, exposure would not occur during the winter pile-driving periods. Exposure to the behavioral disturbance zone from impact pile driving or pile removal is not likely to occur, because the species has rarely been observed in areas close to the waterfront.

Dall's Porpoise— There are no density estimates of Dall's porpoise available in the action area. Dall's porpoise are widely distributed across the entire North Pacific Ocean. Throughout most of the eastern North Pacific they are present during all months of the year, although there may be seasonal onshore-offshore movements along the west coast of the continental United States and winter movements of populations out of Prince William Sound and areas in the Gulf of Alaska and Bering Sea (Allen and Angliss 2014).

Dahlheim *et al.* (2009) found Dall's porpoise throughout Southeast Alaska, with concentrations of animals consistently found in Lynn Canal, Stephens Passage, Icy Strait, upper Chatham Strait, Frederick Sound, and Clarence Strait. Local observers have observed only three to six Dall's porpoises in Taiya Inlet during the early spring and late fall. Observations have been occasional to sporadic, not occurring daily. The species has not been observed near the waterfront, and no animals have been observed during the summer or winter. This is consistent with Dahlheim *et al*. (2009), who have only documented this species in Lynn Canal as far north as Haines, Alaska, about 15 miles south of Skagway and 5 miles south of the continuous noise behavioral impact zone. The mean group size of Dall's porpoise in Southeast Alaska is estimated at three individuals (Dahlheim *et al*. 2009). For the purposes of this analysis, we estimate that three animals will be present in outer Taiya Inlet for the latter half of the summer pile-driving period (30 days between September 1 and October 14). Since observations during the fall have been occasional, we also assume a presence in the inlet every other day, for a total of 15 days of exposure, and 45 total takes.

Killer Whales— There are no density estimates of killer whales available in the action area. Resident and transient killer whales have been documented in the middle to lower reaches of Lynn Canal, but not within the upper reaches or in Taiya Inlet (Dahlheim *et al*., 2009). Two resident pods identified as AF and AG pods were frequently encountered throughout Icy Strait, Lynn Canal, Stephens Passage, Frederick Sound and upper Chatham Strait (Dahlheim *et al*., 2009). The seasonality of resident killer whales could not be investigated statistically owing to low encounter rates. Mean group size of resident whales did not vary significantly among seasons and ranged from 19 to 33 individuals.

Transient killer whales were found in all major waterways, including Lynn Canal in open-strait environments, near-shore waters, protected bays and inlets, and in ice-laden waters near tidewater glaciers (Dahlheim *et al*. 2009). Dahlheim *et al.* (2009) found that transient killer whale mean group size ranged from four to six individuals in Southeast Alaska. Transient killer whale numbers were highest in summer, with lower numbers observed in spring and fall.

Local observations indicate that resident pods occasionally enter Taiya Inlet, usually a group of 15 to 20 animals. These animals are typically observed only a few times a year. In 2015 a resident pod was only observed in Taiya Inlet twice, remaining for one to four days per visit. Based on these observations, we estimate that a resident pod of 15 animals enter the inlet on two occasions during the summer, remaining in the inlet for two days per visit, for a total of 60 takes.

Humpback whale— There are no density estimates of humpback whales available in the action area. Humpback whales are the most commonly observed baleen whale in the area and surrounding Southeast Alaska, particularly during spring and summer months. Humpback whales in Alaska, although not limited to these areas, return to specific feeding locations such as Frederick Sound, Chatham Strait, North Pass,

Sitka Sound, Glacier Bay, Point Adolphus, and Prince William Sound, as well as other similar coastal areas (Wing and Krieger 1983). In Lynn Canal they have been observed in the spring and fall from Haines to Juneau. Scientific surveys have not documented the species within Taiya Inlet (Dahlheim *et al*., 2009). The humpback whale population in Southeast Alaska appears to be increasing with estimates of 547 animals in the mid-1980s (Angliss and Outlaw 2005) and 961 animals in 2000 (Straley *et al*., 2002).

Local observers have reported humpback whales in Taiya Inlet, sometimes fairly close to the Skagway waterfront. In 2015, only one whale was observed for a few weeks close to Skagway. On average, four to five individuals may occur near the town during the spring hooligan run, after which, only a few individuals are observed on and off through the summer. No pile driving will occur during the spring hooligan run. For the purpose of this analysis, it is estimated that two humpback whales will be present over two 3-week periods (42 days) during the summer, for a total of 84 takes.

The numbers of animals authorized to be taken for all species would be considered small relative to the relevant stocks or populations even if each estimated taking occurred to a new individual – an extremely unlikely scenario. The total percent of the population for which take is requested is less than one percent for humpback whales, and less than 2.5 percent for Steller sea lions and harbor porpoise. The most recent abundance estimate for this stock of Dall's porpoise (83,400) is over 20 years old (Allen and Angliss 2012); therefore, the stock size is unknown for Dall's porpoise. The total percent of the population for which take is requested is therefore also unknown; however, the 45 total take requests is a small enough number that it would be considered a small percent of this stock, which we know is fairly large based on anecdotal information. For killer whales and harbor seals, the percentage of the stock for which take is requested is less than 25 percent. For pinnipeds, especially harbor seals occurring in the vicinity of the SOT, there will almost certainly be some overlap in individuals present day-to-day, and these takes are likely to occur only within some small portion of the overall regional stock.

Most of the marine mammal species potentially impacted have a low take request as a percent of the stock. While the resident killer whale take request and percentage of stock affected appears high, in reality 60 resident killer whale individuals will not be temporarily harassed. Instead, it is assumed that there will be a relatively short period of takes of a smaller number of individuals. We make this assumption because resident pods are known to occasionally frequent Taiya Inlet. It is possible that all or part of these pods will enter the disturbance zone once or twice during the course of the project. Therefore, we can conservatively estimate that, because of the gregarious nature of killer whales, a single pod of resident (15–20) killer whales may occur in the disturbance zone once or twice during the course of the project.

Take requests are assumed to include multiple harassments of the same individual(s), resulting in estimates of Take Request Percent of Stock that are high compared to actual take that will occur. This is the case with the harbor seal. As reported, a small number of harbor seals, most of which reside in Taiya Inlet year-round, will be exposed to vibratory pile driving and removal for nearly 4 months. The total population estimate in the Lynn Canal/Stephens Passage stock is 9,478 animals over 1.37 million acres of area. This is a density of 36 animals within Taiya Inlet. The largest Level B harassment Zone within the inlet occupies 21.0 square kilometers, which represents less than 0.4 percent of the total geographical area occupied by the stock. The great majority of these exposures will be to the same animals that have habituated to pile driving and pile removal activities within the inlet and the general port activities

associated with the Skagway waterfront. Given that the Taiya Inlet area represents less than 0.4 percent of the total stock area, broader impacts to this stock are highly unlikely. In addition, marine mammal monitoring for the project can provide an early alert in the unlikely event that cumulative exposure of seals residing in the area is leading to adverse behavioral or physical effects.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, which are expected to reduce the number of marine mammals potentially affected by the proposed action, NMFS finds that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Table 6. Estimated Numbers of Incidences that Marine Mammals May Be Exposed to Level B Harassment

Species	Total proposed authorized takes*	Abundance	Percentage of total stock
Harbor seal (Lynn Canal/Stephens passage stock)	2,272	9,478	24
Steller sea lion (Eastern DPS) (Western DPS)	1,184	60,131 49,497	2.0 2.4
Harbor porpoise (Southeast Alaska Stock)	168	11,146	1.5
Dall's porpoise (Alaska Stock)	45	unk[1]	n/a
Killer whale (Alaska stock Northern resident stock Gulf of Alaska stock West coast transient stock)	60	2,347 261 587 243	2.6 23 10.2 24.7
Humpback whale (Central North Pacific Stock)	84	10,252	0.82

*Note that these numbers assume that every modeled take happens to a different animal, which is unlikely, as both individuals and groups of marine mammals are observed utilizing the same geographic location repeatedly.

[1]The last abundance estimate for this stock of Dall's porpoise was from 1991, which is greater than 8 years old and therefore out of date and not used. However, the estimated abundance was 83,400 animals. Forty five takes of this stock would be less than 0.01% of the stock

4.2. Effects of Alternative 2 – No Action Alternative

Under the No Action Alternative, we would not issue an Authorization to MOS. As a result, MOS would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

The impacts to elements of the human environment resulting from the No Action alternative – conducting construction of the ore terminal in the absence of required protective measures for marine mammals under the MMPA – would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

4.2.1. Impacts to Marine Mammal Habitat

Under the No Action Alternative, the effects on the physical environment or on components of the biological environment that function as marine mammal habitat would result from MOS's planned construction activities, are similar to those described in Section 1.4.2. These impacts include sediment disturbance and a temporary increase in turbidity. Even without mitigation measures, however, impacts to marine mammal habitat (including prey species) would be minimal and temporary for the following reasons:

- Vibratory driving will be the preferred method of pile installation. Impact driving will be utilized only when vibratory driving is not tenable due to local geotechnical conditions.
- The area of potential effect is limited in both space and time ; and
- There are no rookeries or major haul-out sites nearby or ocean bottom structure of significant biological importance to marine mammals that may be present in the ensonified area.

The most likely impact to marine mammal habitat would be minor impacts to the immediate substrate during installation of piles and removal of falsework during the project or temporary avoidance by prey species of the immediate area. This Alternative would result in similar effects on the physical environment and components of the biological environment that function as marine mammal habitat as Alternative 1.

4.2.2. Impacts to Marine Mammals

Under the No Action Alternative, MOS's planned construction activities could result in increased amounts of Level B harassment to marine mammals, although no takes by injury (Level A harassment), serious injury, or mortality would be expected even in the absence of mitigation and monitoring measures. While it is difficult to provide an exact number of takes that might occur under the No Action Alternative, the numbers would be expected to be larger than those presented in Table 6 above because MOS would not be required to implement mitigation measures designed to warn marine mammals of the impending increased underwater sound levels, and additional species may be incidentally taken because MOS would not be required to shut down activity if any marine mammals occurred in the project vicinity.

If the activities proceeded without the protective measures and reporting requirements required by Alternative 1, the direct, indirect, and cumulative effects on the human or natural environment of not issuing the Authorization would include the following:

- Increases in the number of behavioral responses and potential takes to additional species, because of the lack of mitigation measures required in the Authorization. Thus, the incidental take of

marine mammals would likely occur at higher levels than we have already identified and evaluated in our *Federal Register* notice on the proposed Authorization; and

- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock; and increased knowledge of the species as required under the MMPA.

4.3. Unavoidable Adverse Impacts

MOS's application, our notice of a proposed Authorization, and other environmental analyses identified previously summarize unavoidable adverse impacts to marine mammals or the populations to which they belong or on their habitats occurring in the proposed project area. We incorporate those documents by reference.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts including marine mammal behavioral responses and alterations in the distribution of local populations. However, we do not expect MOS's activities to have adverse consequences on the annual rates of recruitment or survival of marine mammal species or stocks in Southeast Alaska waters, and we do not expect the marine mammal populations in that area to experience reductions in reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving and recovering in the wild. We expect that the numbers of individuals of all species taken by harassment would be small (relative to species or stock abundance), that the proposed project and the take resulting from the proposed project activities would have a negligible impact on the affected species or stocks of marine mammals.

4.4. Cumulative Effects

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

This cumulative effects analysis focuses on activities that may temporally or geographically overlap with MOS's activities and would most likely impact the marine mammals present in the proposed areas. We consider the impact of MOS's presence and effects of conducting activities in the proposed action areas to be insignificant when compared to other human activities in the area.

Past, present, and reasonably foreseeable impacts to marine mammal populations include the following: climate change; coastal development; marine pollution; disease; increased vessel traffic, and marine mammal whale watching. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of which are a small fraction of their former abundance. However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative impacts in the marine environment and assessing cumulative effects on marine mammals (Clark *et al*., 2009). Despite these regional and global anthropogenic and natural pressures, available trend information indicates that most local populations of marine mammals in the Pacific Ocean are stable or increasing (Carretta *et al*., 2013).

The proposed project would add another, albeit temporary, activity in the waters of Southeast Alaska. This activity would be limited to a small area at the Skagway Ore Terminal for a relatively short period of time. This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

4.4.1. Climate Change

Global climate change could significantly affect the marine resources of Southeast Alaska region. Possible impacts include temperature and rainfall changes and potentially rising sea levels and changes to ocean conditions. These changes may affect the coastal marine ecosystem in the proposed action area by increasing the vertical stratification of the water column and changing the intensity and rhythms of coastal winds and upwelling. Such modifications could cause ecosystem regime shifts as the productivity of the regional ecosystem undergoes various changes related to nutrients input and coastal ocean process (USFWS, 2011).

The precise effects of global climate change on the action area, however, cannot be predicted at this time because the coastal marine ecosystem is highly variable in its spatial and temporal scales.

4.4.2. Coastal Development

Urban and coastal development encompasses housing, businesses, transportation infrastructure, streets and parking lots, domestic wastewater effluent, floating structures, and mixing zones. Coastal development is one of the highest sources of nonpoint source pollution in Southeastern Alaska (Baker *et al.*, 2011). Coastal development not only displaces organisms that once used a particular site but also indirectly affects a much broader area through non-point source and point source pollution. However, MOS's proposed project consists largely of the re-development of an area that already supports a built environment. Therefore, the proposed MOS project will have a very limited cumulative effect on coastal development in Southeast Alaska.

4.4.3. Marine Pollution

Marine mammals are exposed to contaminants via the food they consume, the water in which they swim, and the air they breathe. Point and non-point source pollutants from coastal runoff, offshore mineral and gravel mining, at-sea disposal of dredged materials and sewage effluent, marine debris, and organic compounds from aquaculture are all lasting threats to marine mammals in the project area. The long-term impacts of these pollutants, however, are difficult to measure.

The persistent organic pollutants (POPs) tend to bioaccumulate through the food chain; therefore, the chronic exposure of POPs in the environment is perhaps of the most concern to high trophic level predators such as California sea lions, harbor seals, and Steller sea lions.

MOS's activities associated with the Skagway ore terminal construction project are not expected to cause increased exposure of POPs to marine mammals in the project vicinity due to the small scale and localized nature of the activities.

4.4.4. Disease

Disease is common in many marine mammal populations and has been responsible for major die-offs worldwide, but such events are usually relatively short-lived. MOS's construction activities are not expected to affect the disease rate among marine mammals in the project vicinity.

4.4.5. Increased vessel traffic

The construction activities are designed to upgrade and enhance current shipping needs and increase the capacity and efficiency of the existing terminal for shipment and export. It is intended to attract new international business from cruise ships, container traffic, mining resources, and energy production, revitalizing investment in Skagway, the Port, and the Region. With an increase in vessel traffic to Skagway Harbor, there is a potential for increased noise and ship strikes.

New vessels that may use Skagway harbor may add to the acoustic environment. However, because Skagway is already an industrial area with an increased acoustic environment, additional vessels may not increase sound levels to a measurable degree. The potential for increased ship strikes may be a possibility; however, it is unlikely due to vessels moving slowly and following established, common navigation lanes. Therefore, there is limited potential that incremental effects associated with Skagway Ore Terminal construction activities that may lead to increased vessel traffic would measurably affect marine mammals in the project area.

4.4.6. Commercial and Private Marine Mammal Watching

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al*., 1993; Laist *et al*., 2001; Jensen and Silber, 2004). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. Several recent research efforts have monitored and evaluated the impacts of people closely approaching, swimming, touching and feeding marine mammals and has suggested that marine mammals are at risk of being disturbed ("harassed"), displaced or injured by such close interactions. Researchers investigating the adverse impacts of marine mammal viewing activities have reported boat strikes, disturbance of vital behaviors and social groups, separation of mothers and young, abandonment of resting areas, and habituation to humans (Nowacek *et al*., 2001, Bejder et al 2006, Higham et al 2009).

While marine mammal watching operations do occur in the vicinity of the proposed project area, MOS's authorized pile driving activities are of short duration encompassing a relatively small area, Therefore, the cumulative adverse effects of the proposed action on the affected populations when added to the effects of marine mammal watching are not expected to be significant.

4.4.7 Conclusion

Based on the summation of activity in the area provided in this section, NMFS determined that the incremental impact of an Authorization for the proposed project at the Skagway Ore Terminal would not be expected to result in a cumulative significant impact to the human environment from past, present, and reasonably forseeable future activities. The potential impacts to marine mammals, their habitats, and the human environment in general are expected to be minimal based on the limited and temporary footprint and mitigation and monitoring requirements of the Authorization.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted

No other persons or agencies were consulted in preparation of this EA.

Prepared By

Laura McCue
Fishery Biologist
Permits and Conservation Division
Office of Protected Resources, NOAA/National Marine Fisheries Service

Chapter 6 Literature Cited

ADF&G (Alaska Department of Fish and Game). 2014. Petition to designate the Central North Pacific stock of humpback whale (Megaptera novaeangliae) as a Distinct Population Segment and remove the DPS from the List of Endangered and Threatened Species under the Endangered Species Act. February 26, 2014. https://www.adfg.alaska.gov/static/home/news/pressreleases/pdfs/cnp_humpback_petition_2-26-2014.pdf

AIDEA. 2008. Skagway Ore Terminal Information Sheet. April 2008. http://www.mxak.org/ports/southeast/skagway/Skagway_Ore_Terminal.pdf

Ainslie, M. A., De Jong, C. A. F., Dol, H. S., Blacquière, G., & Marasini, C. 2009. *Assessment of natural and anthropogenic sound sources and acoustic propagation in the North Sea*. Den Haag: TNO.

Allen, B.M. and R.P. Angliss. 2010. Alaska Marine Mammal Stock Assessments, 2010. NOAA Technical Memorandum NMFS_AFSC-223, 292 p.

Allen, B.M. and R.P. Angliss. 2013. Editors. Alaska marine mammal stock assessments, 2012. National Marine Fisheries Service.

Allen, B.M. and R.P. Angliss. 2014. Alaska marine mammal stock assessments, 2013. NOAA Technical Memorandum NMFS-AFSC-277, National Marine Fisheries Service: 304.

Angliss, R.P. and R.B. Outlaw. 2005. Alaska Marine Mammal Stock Assessments, 2005. NOAA Technical Memorandum NMFS-AFSC-161, 250 p.

Bejder, L., Samuels, A.M.Y., Whitehead, H.A.L., Gales, N., Mann, J., Connor, R., Heithaus, M., Watson-Capps, J.A.N.A., Flaherty, C. and Kruetzen, M., 2006. Decline in relative abundance of bottlenose dolphins exposed to long-term disturbance. *Conservation Biology*, *20*(6), pp.1791-1798

Boveng, P. L., J. M. London, and J.M. Ver Hoef. 2012. Distribution and Abundance of Harbor Seals in Cook Inlet, Alaska. Task III: Movements, Marine Habitat Use, Diving Behavior, and Population Structure, 2004-2006. Final Report. BOEM Report 2012-065. Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region, Anchorage, Alaska, USA. 58 pp.

Buckland, S. T., Anderson, D. R., Burnham, K. P., and Laake, J. L. (1993). Distance Sampling: Estimating Abundance of Biological Populations. London: Chapman and Hall.

Burkanov, V. N., & Loughlin, T. R. (2005). Distribution and abundance of Steller sea lions, Eumetopias jubatus, on the Asian coast, 1720's-2005.*Marine Fisheries Review*, *67*(2), 1.

Carretta, J.V., E. Oleson, D.W. Weller, A.R. Lang, K.A. Forney, J. Baker, et al. 2014. U.S. Pacific marine mammal stock assessments: 2013. NOAA Technical Memorandum NMFS-SWFSC-532, National Marine Fisheries Service: 414.

Dahlheim, M. E., Ellifrit, D. K., & Swenson, J. D. 1997. Killer whales of Southeast Alaska: a catalogue of photoidentified individuals.

Dahlheim, M.D., J.M. Waite, and P.A. White. 2009. Cetaceans of Southeast Alaska: Distribution and Seasonal Occurrence. *Journal of Biogeography* 36.3 (2009): 410-426

Dahlheim, M.D., A.N. Zerbini, J.M. Waite, and A.S. Kennedy. 2015. Temporal changes in abundance of harbor porpoise (Phocoena phocoena) inhabiting the inland waters of Southeast Alaska. *Fishery Bulletin*, *113*(3), 242-256.

Dahlheim, M.E., A. Schulman-Janiger, N. Black, R. Ternullo, D. Ellifrit, and K.C. Balcomb. 2008. Eastern temperate North Pacific offshore killer whales (*Orcinus orca*): Occurrence, movements, and insights into feeding ecology. Marine Mammal Science **24** (3):719-729.

Donovan, G. P. 1991. Distribution of sightings of minke whales in the North Atlantic. Appendix 5. *Report of the International Whaling Commission*, *41*, 150-151.

Ellis, G. M., Towers, J. R., & Ford, J. K. 2011. *Northern resident killer whales of British Columbia: photo-identification catalogue and population status to 2010*. Fisheries and Oceans Canada, Science Branch, Pacific Region.

Everitt, R.D., C.H. Fiscus, and R.L. DeLong. 1980. Northern Puget Sound marine mammals. Interagency Energy/Environment R&D Program Report EPA-600/7-80-139, Prepared by National Marine Fisheries Service for Environmental Protection Agency: 150.

Ford, J. K., Ellis, G. M., & Balcomb, K. C. (2000). *Killer whales: the natural history and genealogy of Orcinus orca in British Columbia and Washington*. UBC Press.

Fritz, L., K. Sweeney, M. Lynn, T. Gelatt, J. Gilpatrick, and R. Towell, 2015. Counts of Alaska Steller sea lion adult and juvenile (non-pup) conducted on rookeries and haul-outs in Alaska Aleutian Islands, Bering Sea, and others from 1904-01-01 to 2014-07-09 (NCEI Accession 0128190). NOAA National Centers for Environmental Information. Dataset.

Halpin, P. N., A.J. Read, E. Fujioka, E.R.I.N. Labracque, and L.B. Crowder. 2009. oBis-seamaP. *Oceanography*, *22*(2), 104.

Hastings, M.C. and A.N. Popper. 2005. Effects of sound on fish. Prepared by Jones & Stokes for the California Department of Transportation: 82.

Hauser, D.D.W. and M Holst. 2009. Marine mammal monitoring during Lamont- Doherty Earth Observatory's marine seismic program in the Gulf of Alaska, September–October 2008. LGL Rep. TA4412-3. Rep. from LGL Ltd., St. John's, Nfld., and King City., Ont., for Lamont-Doherty Earth Observatory of Columbia Univ., Palisades, NY, and Nat. Mar. Fish. Serv., Silver Spring, MD. 78 p.

Higham, J.E.S., L. Bejder, and D. Lusseau. 2009. An integrated and adaptive management model to address the long-term sustainability of tourist interactions with cetaceans. Environmental Conservation, 35 (4): 294-302.

Hobbs, R. C. and J M. Waite. 2010. Abundance of harbor porpoise (*Phocoena phocoena*) in three Alaskan regions, corrected for observer errors due to perception bias and species misidentification, and corrected for animals submerged from view. Fish. Bull., U.S. 108(3):251-267.

Jemison, L. A., Pendleton, G. W., Wilson, C. A., & Small, R. J. 2006. Long-term trends in harbor seal numbers at Tugidak Island and Nanvak Bay, Alaska. *Marine Mammal Science*, *22*(2), 339-360.

Jemison, L. A., G. W. Pendleton, L. W. Fritz, K. K. Hastings, J. M. Maniscalco, A. W. Trites, and T. S. Gelatt. 2013. Inter-population movements of Steller sea lions in Alaska, with implications for population separation. PLoOS ONEne 8(8):e70167.

Jensen, A., and G.K. Silber. 2004. Large Whale Ship Strike Database. NOAA Technical Memorandum NMFS-OPR-25. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, MD.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. Marine Mammal Science 17(1):35-75.

Loughlin, T.R., D.J. Rugh, and C.H. Fiscus. 1984. Northern sea lion distribution and abundance: 1956-80. Journal of Wildlife Management **48** (3):729-740.

Loughlin, T. R., & York, A. E. 2000. An accounting of the sources of Steller sea lion, *Eumetopias jubatus*, mortality. *Marine Fisheries Review*, *62*(4), 40-45.

Lowry, L. F., Frost, K. J., Hoep, J. M., & Delong, R. A. 2001. Movements of satellite-tagged subadult and adult harbor seals in Prince William Sound, Alaska. *Marine Mammal Science*, *17*(4), 835-861.

MacLean, S. A., & Koski, W. R. (2005). Marine mammal monitoring during Lamont-Doherty Earth Observatory's seismic program in the Gulf of Alaska, August–September 2004. *LGL Rep. TA2822-28. Rep. from LGL Ltd., King City, Ont., for Lamont-Doherty Earth Observatory of Columbia Univ., Palisades, NY, and Nat. Mar. Fish. Serv., Silver Spring, MD*.

Muto, M.M. and R.P. Angliss. 2015. Alaska Marine Mammal Stock Assessments, 2015. National Marine Fisheries Service, National Marine Mammal Laboratory, Alaska Fisheries Science Center, Seattle, Washington

Nedwell, J. R., Ward, P. D., Lambert, D., Watson, D., Goold, J., Englund, A., ... & Barlow, K. 2008. *Assessment of potential for significant disturbance/disruption to cetaceans present in and around Broadhaven Bay, Co. Mayo, from pipeline construction operations* (No. 824R0113). Subacoustech Report.

NMFS (National Marine Fisheries Service). 1991. Recovery Plan for the Humpback Whale (*Megaptera novaeangliae*). Prepared by the Humpback Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland.

NMFS. 1993. Designated Crititcal Habitat; Steller Sea Lion. 50 CFR Part 226. Federal Register 58 (3). August 27, 1993, p.45269-45285.

NMFS. 2013. Status review of the eastern distinct population segment of Steller sea lion (*Eumetopias jubatus*). National Marine Fisheries Service: 236.

Nowacek, S. M., R. S. Wells and A. R. Solow. 2001. Short-term effects of boat traffic on bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, FL. Marine Mammal Science 17(4):673-688.

NRC (National Research Council). 2003. Ocean noise and marine mammals. National Academy of Sciences: 220.

Parvin, S. J., Nedwell, J. R., Kynoch, J., Lovell, J., & Brooker, A. G. 2008. Assessment of underwater noise from dredging operations on the Hastings shingle bank. *Report No. Subacoustech 758R0137*.

Pearson, W.H., J.R. Skalski, and C.I. Malme. 1992. Effects of sounds from a geophysical survey device on behavior of captive rockfish (*Sebastes* spp.). Canadian Journal of Fisheries and Aquatic Sciences **49**:1343-1356.

Perrin, W.F. & R.L. Brownell, Jr (2002). Minke Whales *Balaenoptera acutorostrata* and *B. bonaerensis*. **In:** Perrin W.F., Würsig B. & H.G.M. Thewissen, eds. *Encyclopedia of Marine Mammals*. Page(s) 750-754. Academic Press.

Popper, A.N. and M.C. Hastings. 2009. The effects of anthropogenic sources of sound on fishes. Journal of Fish Biology **75** (3):455-489.

Richardson, W.J., C.R. Greene, C.I. Malme, and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, Inc., San Diego, California.

Robinson, S. P., Theobald, P. D., Hayman, G., Wang, L. S., Lepper, P. A., Humphrey, V. F., & Mumford, S. 2011. Measurement of underwater noise arising from marine aggregate dredging operations.

Scholik, A.R. and H.Y. Yan. 2001. The effects of underwater noise on auditory sensitivity of fish. Proceedings of the Institute of Acoustics **23** (4):27.

Scholik, A.R. and H.Y. Yan. 2002. The effects of noise on the auditory sensitivity of the bluegill sunfish, *Lepomis macrochirus*. Comparative Biochemistry and Physiology - Part A: Molecular & Integrative Physiology **133** (1):43-52.

Skalski, J.R., W.H. Pearson, and C.I. Malme. 1992. Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes* spp.). Canadian Journal of Fisheries and Aquatic Sciences **49**:1357-1365.

Straley, J.M., T.J. Quinn II, and C.M. Gabriele, 2002. Estimate of the Abundance of Humpback Whales in Southeastern Alaska 1994 to 2000. Final Report Submitted to the National Marine Fisheries Service, National Marine Mammal Laboratory, 7600 Sand Point Way N.E., Seattle, WA 98115, 23 pp.

Swain, U., Lewis, J., Pendleton, G., & Pitcher, K. 1996. Movements, haulout, and diving behavior of harbor seals in southeast Alaska and Kodiak Island. *Annual Report: Harbor seal investigations in*

Alaska. NOAA Grant NA57FX0367. Alaska Dep. Fish and Game, Division of Wildlife Conservation. Douglas, AK, 59-144.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. Marine Mammal Science 9:309-315.

Winans, G.A., and L.L. Jones. 1988. Electrophoretic variability in Dall's porpoise (*Phocoenoides dalli*) in the North Pacific Ocean and Bering Sea. J. Mammal. 69(1):14-21.

Wing, B.L. and K. Krieger, 1983. Humpback Whale Prey Studies in Southeast Alaska, Summer 1982. NWAFC Auke Bay Laboratory, Auke Bay, Alaska.