BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XE603

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Gustavus Ferry Terminal Improvements Project.

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

ACTION: Notice; Proposed Incidental Harassment Authorization; Request for Comments

SUMMARY:

NMFS has received a request from the Alaska Department of Transportation and Public Facilities (ADOT&PF) for authorization to take marine mammals incidental to reconstructing the existing Gustavus Ferry Terminal located in Gustavus, Alaska. The ADOT&PF requests that the incidental harassment authorization (IHA) be valid for one year from September 1, 2017 through August 31, 2018. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an authorization to the ADOT&PF to incidentally take, by harassment, small numbers of marine mammals for its ferry terminal improvements project in Gustavus, AK.

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments on the application should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries

Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910, and electronic comments should be sent to *ITP.Pauline@noaa.gov.*

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted to the Internet at *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm* without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Robert Pauline, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Availability: An electronic copy of ADOT&PF's application and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting the Internet at: *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*. In case of problems accessing these documents, please call the contact listed above (see **FOR FURTHER INFORMATION CONTACT**).

NATIONAL ENVIRONMENTAL POLICY ACT

NMFS is preparing an Environmental Assessment (EA) in accordance with National Environmental Policy Act (NEPA) and the regulations published by the Council on

Environmental Quality and will consider comments submitted in response to this notice as part of that process. The draft EA will be posted at the foregoing web site once it is finalized.

Background

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

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption

of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Summary of Request

On July 31, 2015, NMFS received an application from the ADOT&PF for the taking of marine mammals incidental to reconstructing the existing ferry terminal at Gustavus, Alaska, referred to as the Gustavus Ferry Terminal. On April 15, 2016, NMFS received a revised application. NMFS determined that the application was adequate and complete on April 20, 2016. ADOT&PF proposes to conduct in-water work that may incidentally harass marine mammals (*i.e.*, pile driving and removal). This IHA would be valid from September 1, 2017 through August 31, 2018.

Proposed activities included as part of the Gustavus Ferry Improvements project with potential to affect marine mammals include vibratory pile driving and pile removal, as well as impact hammer pile driving.

Species with the expected potential to be present during the project timeframe include harbor seal (*Phoca viutlina*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), and minke whale (*Balaenoptera acutorostra*).

Description of the Specified Activity

Overview

The purpose of the project is to improve the vehicle transfer span and dock such that damage during heavy storms is prevented, and to improve the safety of vehicle and pedestrian transfer operations. ADOT&PF requested an IHA for work that includes removal of the existing

steel bridge float and restraint structure and replacing it with two steel/concrete bridge lift towers capable of elevating the relocated steel transfer bridge above the water when not in use. Each tower would be supported by four 30-inch steel piles.

Dates and Duration

Pile installation and extraction associated with the Gustavus Ferry Terminal project will begin no sooner than September 1, 2017 and will be completed no later than August 31, 2018 (one year following IHA issuance). Project activities are proposed to occur during two time periods. The first period will occur in Fall of 2017, with pile driving/removal and in-water work occurring during the period of September through November. The second period is scheduled for Spring of 2018, with pile driving/removal and in-water work occurring during the period of March through May.

Pile driving/removal is estimated to occur for a total of about 114 hours over the course of 16 to 50 days.

Specific Geographic Region

The proposed activities will occur at the Gustavus Ferry Terminal located in Gustavus, Alaska on the Icy Passage water body in Southeast Alaska (See Figures 1 and 2 in the Application).

Detailed Description of Activities

ADOT&PF plans to improve the ferry terminal in Gustavus, Alaska. ADOT&PF will remove the existing steel bridge float and restraint structure and replace it with two steel/concrete bridge lift towers capable of elevating the relocated steel transfer bridge above the water when not in use. Each tower would be supported by four 30-inch steel piles. The project would also

expand the dock by approximately 4,100 square feet, requiring 34 new 24-inch steel piles; construct a new steel six-pile (24-inch) bridge abutment; relocate the steel transfer bridge, vehicle apron, and aluminum pedestrian gangway; extract 16 steel piles; relocate the log float to the end of the existing float structure (requiring installation of three 12.75-inch steel piles); install a new harbor access float (assembled from a portion of the existing bridge float) and a steel six-pile (30-inch) float restraint structure; and provide access gangways and landing platforms for lift towers and an access catwalk to the existing breasting dolphins. Contractors on previous ADOT&PF dock projects have typically driven piles using the following equipment:

- Air Impact Hammers: Vulcan 512/Max Energy 60,000 foot-pounds (ft-lbs); Vulcan 06/Max Energy 19,000 ft-lbs; ICE/Max Energy 19,500 to 60,000 ft-lbs.
- Diesel Impact Hammer: Delmag D30/Max Energy 75,970 ft-lbs.
- Vibratory Hammers: ICE various models/7,930 to 13,000 pounds static weight.

Similar equipment may be used for the proposed project, though each contractor's equipment may vary.

ADOT&PF anticipates driving one to three piles per day, which accounts for setting the pile in place, positioning the barge while working around existing dock and vessel traffic, splicing sections of pile, and driving the piles. Actual pile driving/removal time for nineteen 12.75-inch-, forty 24-inch-, and fourteen 30-inch-diameter steel piles would be approximately 57 hours of impact driving and 114 hours of vibratory driving over the course of 16 to 50 days in 2017. (See Table 1).

Table 1 – Pile-driving Schedule

Description	Project Components							
	Dock Extension	Bridge Abutment	Lift Towers	Access Float	Log Float	Pile Removal	Piles Installed/ Total Piles	Installation/ Removal per Day
# of Piles	34	6		6	3	16	57/73	3 piles/day

			8					(maximum)
Pile Size (Diameter)	24-inch	24-inch	30-inch	30-inch	12.75-inch	12.75- inch	--	--
Total Strikes (Impact)	20,400	3,600	4,800	3,600	1,800	0	34,200	1,800 blows/day
Total Impact Time	34 hrs	6 hrs	8 hrs	6 hrs	3 hrs	0	57 hrs	3 hrs/day
Total Vibratory Time	54 hrs	9 hrs	13 hrs	9 hrs	5 hrs	24 hrs	114 hrs	6 hrs/day

Description of Marine Mammals in the Area of the Specified Activity

Marine waters in Icy Passage support many species of marine mammals, including pinnipeds and cetaceans. There are nine marine mammal species documented in the waters of Icy Passage (Dahlheim *et al.*, 2009; NMFS 2013; and personal communications with Janet Neilson, National Park Service (NPS); Tod Sebens, Cross Sound Express, LLC (CSE); and Stephen Vanderhoff, Spirit Walker Expeditions (SWE)). Two of the species are known to occur near the Gustavus Ferry terminal: the harbor seal and Steller sea lion. The remaining seven species may occur in Icy Passage but less frequently and farther from the ferry terminal: harbor porpoise, Dall's porpoise, Pacific white-sided dolphin, killer whale, gray whale, humpback whale, and minke whale.

Although listed on the NMFS MMPA mapper (NMFS 2014), gray whale sightings in Icy Strait are very rare and there have been only eight sightings since 1997 (Janet Neilson, NPS, personal communication). None of these sightings were in Icy Passage. Therefore, exposure of the gray whale to project impacts is considered unlikely and take is not requested for this species. The range of Pacific white-sided dolphin is also suggested to overlap with the project action area as portrayed on the NMFS MMPA mapper, but no sightings have been documented in the project vicinity (Janet Neilson, NPS, personal communication, Dahlheim *et al*,. 2009). Therefore,

exposure of the Pacific white-sided dolphin to project impacts is considered unlikely and take is not requested for this species. Table 2 presents the species most likely to occur in the area.

Table 2 – Marine Mammal Species Potentially Present in Region of Activity

Common Name	Scientific Name	Stock Abundance Estimate[1]	ESA Status	MMPA Status	Frequency of Occurence[2]
Harbor seal	*Phoca vitulina*	7,210	Not listed	Not Strategic, non-depleted	Likely
Steller sea lion	*Eumetopias jubatus*	49,497 (western distinct population segment in Alaska)/ 60,131 (eastern stock)	Endangered (western Distinct Population Segment)	Strategic, depleted	Likely
Dall's porpoise	*Phocoenoides dalli*	Unknown	Not listed	Not Strategic, non-depleted	Infrequent
Harbor porpoise	*Phocoena phocoena*	11,146	Not listed	Strategic, non-depleted	Likely
Humpback whale	*Megaptera novaeangliae*	10, 252	Endangered	Strategic, depleted	Infrequent
Killer whale	*Orcinus orca*	261 (Northern resident)/587 (Gulf of Alaska transient)/243 (West Coast transient)	Not listed	Strategic, non-depleted	Infrequent
Minke whale	*Balaenoptera acutorostra*	Unknown	Not listed	Not Strategic/non-depleted	Infrequent

[1] NMFS marine mammal stock assessment reports at: http://www.nmfs.noaa.gov/pr/sars/species.htm

[2] Infrequent: confirmed, but irregular sightings
Likely: confirmed and regular sightings of the species in the area year-round.

Although they are documented near the ferry terminal, harbor seal populations in Glacier Bay are declining (Janet Neilson, NPS, personal communication). It is estimated that less than 10 individuals are typically seen near the ferry dock during charter boat operations in the spring and summer (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). Steller sea lions are common in the ferry terminal area during the charter fishing season (May to September) and are known to haul out on the public dock (Bruce Kruger, Alaska Department of Fish and Game (ADF&G), personal communication). The nearest natural Steller sea lion haulout sites are located on Black Rock on the south side of Pleasant Island and Carolus Point west of Point Gustavus (Mathews *et al.,* 2011).

There are confirmed sightings of Dall's porpoise, harbor porpoise, humpback whale, killer whale, and minke whale in Icy Passage (Janet Neilson, NPS, Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). However, sightings are less frequent in Icy Passage than in Icy Strait. Opportunistic sightings of marine mammals by NPS during humpback whale surveys and whale watching tour companies operating out of Gustavus (CSE and WSE operate 100 days of tours in the May to September season), provide the following estimates for each spring/summer season:

- Harbor porpoise are seen in Icy Passage on about 75+ percent of trips.
- Three to four minke whale sightings/season in Icy Strait. One or two in Icy Passage.
- Dall's porpoise have four to 12 sightings/season, mostly in Icy Strait.
- Killer whales have about 12 sightings/season in Icy Strait and one or two sightings a year in Icy Passage.

- Humpback whale sightings in Icy Passage are infrequent but on occasion they are seen between the ferry terminal and Pleasant Island (Stephen Vanderhoff, SWE, personal communication).

By most measures, the populations of marine mammals that utilize Icy Strait are healthy and increasing. Populations of humpback whales using Glacier Bay and surrounding areas are increasing by 5.1 percent per year (Hendrix *et al.* 2012). Steller sea lions have increased in the Glacier Bay region by 8.2 percent per year from the 1970's to 2009, representing the highest rate of growth for this species in Alaska (Mathews *et al.* 2011). In addition, a Steller sea lion rookery and several haulouts have recently been established in the Glacier Bay region (Womble *et al.* 2009).

In the species accounts provided here, we offer a brief introduction to the species and relevant stock that are likely to be taken as well as available information regarding population trends and threats, and describe any information regarding local occurrence.

Harbor Seal

Harbor seals occurring in Icy Passage belong to the Glacier Bay/Icy Strait (GB/IS) harbor seal stock. The current statewide abundance estimate for this stock is 7,210 (Muto and Angliss 2015). The GB/IS harbor seals have been rapidly declining despite stable or slightly increasing trends in nearby populations (Womble and Gende 2013). A suite of recent studies suggest that (1) harbor seals in Glacier Bay are not significantly stressed due to nutritional constraints, (2) the clinical health and disease status of seals within Glacier Bay is not different than seals from other stable or increasing populations, and (3) disturbance by vessels does not appear to be a primary factor driving the decline. Long-term monitoring of harbor seals on glacial ice has occurred in

Glacier Bay since the 1970s and has shown this area to support one of the largest breeding aggregations in Alaska. After a dramatic retreat of Muir Glacier, in the East Arm of Glacier Bay, between 1973 and 1986 (more than 7 kilometers) and the subsequent grounding and cessation of calving in 1993, floating glacial ice was greatly reduced as a haulout substrate for harbor seals and ultimately resulted in the abandonment of upper Muir Inlet by harbor seals.

Steller Sea Lion

Steller sea lions occurring in Icy Passage could belong to either the western or eastern U.S. stock. The current total population estimate for the western stock in Alaska is estimated at 49,497 based on 2014 survey results (Muto and Angliss 2015). To get this estimate, pups were counted during the breeding season, and the number of births is estimated from the pup count. The western stock in Alaska shows a positive population trend estimate of 1.67 percent.
The current total population estimate for the eastern stock of Steller sea lions is estimated at 60,131 based on counts made between 2009 and 2014 (Muto and Angliss 2015). To get this estimate, pups were counted during the breeding season, and the number of births is estimated from the pup count. The best available information indicates the eastern stock of Steller sea lion increased at a rate of 4.18 percent per year (90 percent confidence bounds of 3.71 to 4.62 percent per year) between 1979 and 2010 based on an analysis of pup counts in California, Oregon, British Columbia, and Southeast Alaska.

Dall's Porpoise

There are no reliable abundance data for the Alaska stock of Dall's porpoise. Surveys for the Alaska stock of Dall's porpoise are greater than 21 years old (Allen and Angliss 2014). A population estimate from 1987 to 1991 was 83,400. Since the abundance estimate is based on

data older than eight years, NMFS does not consider the estimate to be valid and the minimum population number is also considered unknown.

Harbor Porpoise

There are three harbor porpoise stocks in Alaska, including the Southeast Alaska stock, Gulf of Alaska stock, and the Bering Sea stock. Only the Southeast Alaska stock occurs in the project vicinity. Harbor porpoise numbers for the Southeast Alaska stock are estimated at 11,146 animals (Allen and Angliss 2014). Abundance estimates for harbor porpoise occupying the inland waters of Southeast Alaska were 1,081 in 2012. However, this number may be biased low due to survey methodology.

Humpback Whale

The central North Pacific stock of humpback whales occurs in the project area. Estimates of this stock are determined by winter surveys in Hawaiian waters. Point estimates of abundance for Hawaii ranged from 7,469 to 10,252; the estimate from the best model was 10,252 (Muto and Angliss 2015). Using the population estimate of 10,252, the minimum estimate for the central North Pacific humpback whale stock is 9,896 (Muto and Angliss 2015).

Since 1985, the NPS has been monitoring humpback whales in both Glacier Bay National Park and Icy Strait and has published annual reports (http://www.nps.gov/glba/naturescience/whale_acoustic_reports.htm). The NPS typically surveys Icy Strait, located south of Icy Passage, once a week between June 1 and August 31, with most survey effort focused in the area east of Point Gustavus and Pleasant Island. In 2013, 202 humpback whales were documented in Icy Strait during the NPS monitoring period; this was a 14 percent increase over the previous high count of 177 whales in 2012 (Neilson *et al*., 2014).

However, in 2014, a 39 percent decrease in abundance was observed, with only 124 whales documented in Icy Strait. The reasons for this decline in local abundance is not known, but NPS speculated that a magnitude 6.1 earthquake centered in Palma Bay that occurred on July 25, 2014, may have caused unfavorable environmental conditions in the Glacier Bay region. The earthquake and aftershocks caused one or more submarine landslides that increased turbidity in the region and may have decreased humpback whale foraging success over a period of several weeks in lower Glacier Bay and Icy Strait. In response, humpback whales may have shifted their distribution to other areas, such as Frederick Sound, seeking better foraging conditions (Neilson *et al*., 2015).

Humpback whales are present in Southeast Alaska in all months of the year, but at substantially lower numbers in the fall and winter. At least 10 individuals were found to over-winter near Sitka, and NMFS researchers have documented one whale that over-wintered near Juneau. It is unknown how common over-wintering behavior is in most areas because there is minimal or no photographic identification effort in the winter in most parts of Southeast Alaska. Late fall and winter whale habitat in Southeast Alaska appears to correlate with areas that have over-wintering herring (lower Lynn Canal, Tenakee Inlet, Whale Bay, Ketchikan, Sitka Sound). In Glacier Bay and Icy Strait, the longest sighting interval recorded by NPS was over a span of 219 days, between April 17 and November 21, 2002, but overwintering in this region is expected to be low (Gabriele *et al.*, 2015).

Killer Whale

Killer whales occurring in Icy Passage could belong to one of three different stocks: Eastern North Pacific Northern residents stock (Northern residents); Gulf of Alaska, Aleutian

Islands, and Bering Sea transient stock (Gulf of Alaska transients); or West Coast transient stock. The Northern resident stock is a transboundary stock, and includes killer whales that frequent British Columbia, Canada, and southeastern Alaska (Allen and Angliss 2014). Photo-identification studies since 1970 have catalogued every individual belonging to the Northern resident stock and in 2010 the population was composed of three clans representing a total of 261 whales.

In recent years, a small number of the Gulf of Alaska transients (identified by genetics and association) have been seen in southeastern Alaska; previously only West Coast transients had been seen in the region (Allen and Angliss 2014). Therefore, the Gulf of Alaska transient stock occupies a range that includes southeastern Alaska. Photo-identification studies have identified 587 individual whales in this stock.

The West Coast transient stock includes animals that occur in California, Oregon, Washington, British Columbia, and southeastern Alaska. Analysis of photographic data identifies 243 individual transient killer whales (Muto and Angliss 2015). The total number of transient killer whales reported above should be considered a minimum count for the West Coast transient stock.

Minke Whale

The Alaska stock of minke whales occurs in Icy Strait and Southeast Alaska. At this time, it is not possible to produce a reliable estimate of minimum abundance for this wide ranging stock. No estimates have been made for the number of minke whales in the entire North Pacific. Surveys of the Bering Sea, and from Kenai Fjords in the Gulf of Alaska to the central Aleutian Islands, estimate 1,003 and 1,233 animals, respectively (Allen and Angliss 2014).

Potential Effects of the Specified Activity on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that stressors, (e.g. pile driving) and potential mitigation activities, associated with the improvements at Gustavus Ferry Terminal may impact marine mammals and their habitat. The *Estimated Take by Incidental Harassment* section later in this document will include an analysis of the number of individuals that are expected to be taken by this activity. The *Negligible Impact Analysis* section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this section, the *Estimated Take by Incidental Harassment* section, and the *Proposed Mitigation* section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks. In the following discussion, we provide general background information on sound and marine mammal hearing before considering potential effects to marine mammals from sound produced by impact and vibratory pile driving.

Description of Sound Sources

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds and attenuate (decrease) more rapidly in shallower water. Amplitude is the height of the sound pressure wave or the loudness of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific

standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), the reference intensity for sound in water is one micropascal (µPa). One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 µPa). The received level is the sound level at the listener's position. Note that all underwater sound levels in this document are referenced to a pressure of 1 µPa and all airborne sound levels in this document are referenced to a pressure of 20 µPa.

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Rms is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and

decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

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

- Wind and waves*:* The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore, with measurements collected at a distance of 8.5 km from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.
- Precipitation: Sound from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.

- Biological: Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- Anthropogenic: Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.*, 1995). Sound from identifiable anthropogenic sources other than the activity of interest (e.g., a passing vessel) is sometimes termed background sound, as opposed to ambient sound. Representative levels of anthropogenic sound are displayed in Table 3.

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise "ambient" or "background" sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its

intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

Table 3—Representative Sound Levels of Anthropogenic Sources

Sound source	Frequency range (Hz)	Underwater sound level	Reference
Small vessels	250-1,000	151 dB rms at 1 m	Richardson *et al.,* 1995.
Tug docking gravel barge	200-1,000	149 dB rms at 100 m	Blackwell and Greene, 2002.
Vibratory driving of 72-in steel pipe pile	10-1,500	180 dB rms at 10 m	Reyff, 2007.
Impact driving of 36-in steel pipe pile	10-1,500	195 dB rms at 10 m	Laughlin, 2007.
Impact driving of 66-in cast-in-steel-shell (CISS) pile	10-1,500	195 dB rms at 10 m	Reviewed in Hastings and Popper, 2005.

High levels of vessel traffic are known to elevate background levels of noise in the marine environment. For example, continuous sounds for tugs pulling barges have been reported to range from 145 to 166 dB re 1 µPa rms at 1 meter from the source (Miles *et al.,* 1987; Richardson *et al.,* 1995; Simmonds *et al.,* 2004). Ambient underwater noise levels in Gustavus Ferry Terminal project area are both variable and relatively high, and are expected to mask some sounds of pile installation and pile extraction.

In-water construction activities associated with the project include impact and vibratory pile driving and removal. There are two general categories of sound types: Impulse and non-pulse (defined in the following). Vibratory pile driving is considered to be continuous or non-pulsed while impact pile driving is considered to be an impulse or pulsed sound type. The

distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (e.g., Ward, 1997 in Southall *et al.*, 2007). Please see Southall *et al.* (2007) for an in-depth discussion of these concepts. Note that information related to impact hammers is included here for comparison.

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

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

The likely or possible impacts of the proposed pile driving program at the Gustavus Ferry Terminal on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel.

Any impacts to marine mammals are expected to primarily be acoustic in nature. Acoustic stressors could include effects of heavy equipment operation and pile installation and pile removal at the Ferry Terminal.

Marine Mammal Hearing

When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms have been derived using auditory evoked potentials, anatomical modeling, and other data, Southall *et al.*, (2007) designate "functional hearing groups" for marine mammals and estimate the lower and upper frequencies of functional hearing of the groups. The functional groups and the associated frequencies are indicated below (though animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range):

- Low-frequency cetaceans (mysticetes): Functional hearing is estimated to occur between approximately 7 Hz and 25 kHz (extended from 22 kHz; Watkins, 1986; Au *et al.*, 2006; Lucifredi and Stein, 2007; Ketten and Mountain, 2009; Tubelli *et al.*, 2012);
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera *Kogia* and *Cephalorhynchus;* now considered to include two members of the genus *Lagenorhynchus* on the basis of recent echolocation data and genetic data [May-Collado and Agnarsson, 2006; Kyhn *et al.*, 2009, 2010; Tougaard *et al.*, 2010]):

Functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and

- Pinnipeds in water: Functional hearing is estimated to occur between approximately 75 Hz to 100 kHz for Phocidae (true seals) and between 100 Hz and 48 kHz for Otariidae (eared seals), with the greatest sensitivity between approximately 700 Hz and 20 kHz. The pinniped functional hearing group was modified from Southall *et al.,* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.,* 2006; Kastelein *et al.,* 2009; Reichmuth *et al.,* 2013).

As mentioned previously in this document, seven marine mammal species (five cetacean and two pinniped) may occur in the project area. Of the seven species likely to occur in the proposed project area, two are classified as low frequency cetaceans (i.e., humpback whale, minke whale), one is classified as a mid-frequency cetacean (i.e., killer whale), and two are classified as high-frequency cetaceans (i.e., harbor porpoise, Dall's porpoise) (Southall *et al.*, 2007). Additionally, harbor seals are classified as members of the phocid pinnipeds in water functional hearing group, while Steller sea lions are grouped under the Otariid pinnipeds in water functional hearing group. A species' functional hearing group is a consideration when we analyze the effects of exposure to sound on marine mammals.

Acoustic Impacts

Potential Effects of Pile Driving Sound—The effects of sounds from pile driving might result in one or more of the following: temporary or permanent hearing impairment; non-

auditory physical or physiological effects; behavioral disturbance; and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007). The effects of pile driving on marine mammals are dependent on several factors, including: the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (e.g., sand) would absorb or attenuate the sound more readily than hard substrates (e.g., rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

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

behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.*, 1973).

Hearing Impairment and Other Physical Effects—Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak *et al.,* 1999; Schlundt *et al.,* 2000; Finneran *et al.,* 2002, 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Marine mammals depend on acoustic cues for vital biological functions, (e.g., orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs. TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Repeated sound exposure that leads to TTS could cause PTS. PTS constitutes injury, but TTS does not (Southall *et al.,* 2007). The following subsections discuss in somewhat more detail the possibilities of TTS, PTS, and non-auditory physical effects.

Temporary Threshold Shift—TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data on sound levels and durations

necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall *et al.* (2007).

Given the available data, the received level of a single pulse (with no frequency weighting) might need to be approximately 186 dB re 1 μPa^2-s (i.e., 186 dB sound exposure level (SEL) or approximately 221-226 dB p-p (peak)) in order to produce brief, mild TTS. Exposure to several strong pulses that each have received levels near 190 dB rms (175-180 dB SEL) might result in cumulative exposure of approximately 186 dB SEL and thus slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy.

The above TTS information for odontocetes is derived from studies on the bottlenose dolphin (*Tursiops truncatus*) and beluga whale (*Delphinapterus leucas*). There is no published TTS information for other species of cetaceans. However, preliminary evidence from a harbor porpoise exposed to pulsed sound suggests that its TTS threshold may have been lower (Lucke *et al.*, 2009). As summarized above, data that are now available imply that TTS is unlikely to occur unless odontocetes are exposed to pile driving pulses stronger than 180 dB re 1 µPa (rms).

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

are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS.

PTS is considered auditory injury (Southall *et al.,* 2007). Irreparable damage to the inner or outer cochlear hair cells may cause PTS, however, other mechanisms are also involved, such as exceeding the elastic limits of certain tissues and membranes in the middle and inner ears and resultant changes in the chemical composition of the inner ear fluids (Southall *et al.,* 2007).

Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals, based on anatomical similarities. PTS might occur at a received sound level at least several dB above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise time. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as pile driving pulses as received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis and probably greater than 6 dB (Southall *et al.,* 2007). On an SEL basis, Southall *et al.,* (2007) estimated that received levels would need to exceed the TTS threshold by at least 15 dB for there to be risk of PTS. Thus, for cetaceans, Southall *et al.,* (2007) estimate that the PTS threshold might be an M-weighted SEL (for the sequence of received pulses) of approximately 198 dB re 1 μPa^2-s (15 dB higher than the TTS threshold for an impulse). Given the higher level of sound necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Measured source levels from impact pile driving can be as high as 214 dB rms. Although no marine mammals have been shown to experience TTS or PTS as a result of being exposed to pile driving activities, captive bottlenose dolphins and beluga whales exhibited changes in

behavior when exposed to strong pulsed sounds (Finneran *et al.*, 2000, 2002, 2005). The animals tolerated high received levels of sound before exhibiting aversive behaviors. Experiments on a beluga whale showed that exposure to a single watergun impulse at a received level of 207 kPa (30 psi) p-p, which is equivalent to 228 dB p-p, resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within four minutes of the exposure (Finneran *et al.*, 2002). Although the source level of pile driving from one hammer strike is expected to be much lower than the single watergun impulse cited here, animals being exposed for a prolonged period to repeated hammer strikes could receive more sound exposure in terms of SEL than from the single watergun impulse (estimated at 188 dB re 1 μPa^2-s) in the aforementioned experiment (Finneran *et al.*, 2002). However, in order for marine mammals to experience TTS or PTS, the animals have to be close enough to be exposed to high intensity sound levels for a prolonged period of time. Based on the best scientific information available, these SPLs are far below the thresholds that could cause TTS or the onset of PTS.

Non-auditory Physiological Effects—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.*, 2006; Southall *et al.*, 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific

exposure level above which non-auditory effects can be expected (Southall *et al.,* 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of pile driving, including some odontocetes and some pinnipeds, are especially unlikely to incur auditory impairment or non-auditory physical effects.

Disturbance Reactions

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

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.,* 1995; NRC, 2003; Wartzok *et al.,* 2003).

Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically

seismic guns or acoustic harassment devices, but also including pile driving) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; Thorson and Reyff, 2006; see also Gordon *et al.*, 2004; Wartzok *et al.*, 2003; Nowacek *et al.*, 2007). Responses to continuous sound, such as vibratory pile installation, have not been documented as well as responses to pulsed sounds.

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

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

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

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

Auditory Masking - Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs only during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

Masking occurs at specific frequency bands, so understanding the frequencies that the animals utilize is important in determining any potential behavioral impacts. Because sound generated from in-water vibratory pile driving is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds made by porpoises. However, lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds, such as surf and prey sound. It may also affect communication signals when they occur near the sound band and thus reduce the communication

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

Masking has the potential to impact species at the population or community levels as well as at individual levels. Masking affects both senders and receivers of the signals and can potentially in certain circumstances have long-term chronic effects on marine mammal species and populations. Recent research suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, and that most of these increases are from distant shipping (Hildebrand, 2009). All anthropogenic sound sources, such as those from vessel traffic, pile driving, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking.

Vibratory pile driving may potentially mask acoustic signals important to marine mammal species. However, the short-term duration and limited affected area would result in insignificant impacts from masking.

Acoustic Effects, Airborne – Pinnipeds that occur near the project site could be exposed to airborne sounds associated with pile driving that have the potential to cause behavioral harassment, depending on their distance from pile driving activities. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

Airborne noise will primarily be an issue for pinnipeds that are swimming at the surface or hauled out near the project site within the range of noise levels elevated above the acoustic criteria in Table 4 below. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in

relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon the area and move further from the source. However, these animals would previously have been taken as a result of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Multiple incidents of exposure to sound above NMFS' thresholds for behavioral harassment are not believed to result in increased behavioral disturbance, in either nature or intensity of disturbance reaction. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Vessel Interaction

Besides being susceptible to vessel strikes, cetacean and pinniped responses to vessels may result in behavioral changes, including: greater variability in the dive, surfacing, and respiration patterns; changes in vocalizations; and changes in swimming speed or direction (NRC, 2003). There will be a temporary and localized increase in vessel traffic during construction.

Potential Effects on Marine Mammal Habitat

The primary potential 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.

Potential Pile Driving Effects on Prey – Construction activities would produce continuous (i.e., vibratory pile driving, down-hole drilling) 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.

Effects to Foraging Habitat - Pile installation may temporarily increase turbidity resulting from suspended sediments. Any increases would be temporary, localized, and minimal. ADOT&PF 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.

Proposed Mitigation Measures

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, "and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking" for certain subsistence uses. NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat. 50 CFR 216.104(a)(11). For the proposed project, ADOT&PF worked with NMFS and proposed the following mitigation measures to minimize the potential impacts to marine mammals in the project vicinity. The primary purposes of these mitigation measures are to minimize sound levels from the activities, and to shut down operations and monitor marine mammals within designated zones of influence corresponding to NMFS' current Level A and B harassment thresholds, which are depicted in Table 5 found later in the *Estimated Take by Incidental Harassment* section.

In addition to the measures described later in this section, ADOT&PF would employ the following standard mitigation measures:

(a) Conduct briefings between construction supervisors and crews, and marine mammal monitoring team, prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

(b) For in-water heavy machinery work other than pile driving (*e.g.* standard barges, tug boats, barge-mounted excavators, or clamshell equipment used to place or remove material), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include the following activities: (1) Movement of the barge to the pile location; or (2) positioning of the pile on the substrate via a crane (*i.e.*, stabbing the pile).

(c) To limit the amount of waterborne noise, a vibratory hammer will be used for initial driving, followed by an impact hammer to proof the pile to required load-bearing capacity.

Establishment of Shutdown Zone— For all pile driving activities, ADOT&PF will establish a shutdown zone. Shutdown zones are intended to contain the area in which SPLs equal or exceed the 180/190 dB (rms) acoustic injury threshold, with the purpose being to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury of marine mammals. Nominal radial distances for shutdown zones are shown in Table 5.

Establishment of Disturbance Zone or Zone of Influence—Disturbance zones or zones of influence (ZOI) are the areas in which SPLs equal or exceed 160 dB rms for impact driving and

120 dB rms for vibratory driving. Disturbance zones provide utility for monitoring by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see "Proposed Monitoring and Reporting"). Nominal radial distances for disturbance zones are shown in Table 5. We discuss monitoring objectives and protocols in greater depth in "Proposed Monitoring and Reporting."

Soft Start—The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. Soft-start techniques for impact pile driving will be conducted in accordance with the Anchorage Fish and Wildlife Field Office (AFWFO, 2012) Observer Protocols. For impact pile driving, contractors will be required to provide an initial set of strikes from the hammer at 40 percent energy, each strike followed by no less than a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins.

Mitigation Conclusions

We have carefully evaluated ADOT&PF's proposed mitigation measures and considered their effectiveness in past implementation to determine whether they are likely to effect the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to

one another: (1) the manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals, (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

Any mitigation measure(s) we prescribe should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

(1) Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal).

(2) A reduction in the number (total number or number at biologically important time or location) of individual marine mammals exposed to stimuli expected to result in incidental take (this goal may contribute to 1 above).

(3) A reduction in the number (total number or number at biologically important time or location) of times any individual marine mammal would be exposed to stimuli expected to result in incidental take (this goal may contribute to 1 above).

(4) A reduction in the intensity of exposure to stimuli expected to result in incidental take (this goal may contribute to 1 above).

(5) Avoidance or minimization of adverse effects to marine mammal habitat, paying particular attention to the prey base, blockage or limitation of passage to or from biologically important areas, permanent destruction of habitat, or temporary disturbance of habitat during a biologically important time.

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

Based on our evaluation of ADOT&PF's proposed measures, including information from monitoring of implementation of mitigation measures very similar to those described here under previous IHAs from other marine construction projects, we have determined that the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for incidental take authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. ADOT&PF submitted a marine mammal monitoring plan as part of the IHA application. It can be found in Appendix B of the Application. The plan may be modified or supplemented based on comments or new information received from the public during the public comment period.

Any monitoring requirement we prescribe should improve our understanding of one or more of the following:

- Occurrence of marine mammal species in action area (*e.g.*,presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) Affected species (*e.g.*, life history, dive patterns); (3) Co-occurrence of marine mammal species with the action; or (4) Biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual responses to acute stressors, or impacts of chronic exposures (behavioral or physiological).
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of an individual; or (2) Population, species, or stock.
- Effects on marine mammal habitat and resultant impacts to marine mammals.
- Mitigation and monitoring effectiveness.

Proposed Monitoring Measures

Monitoring Protocols – Monitoring will be conducted by qualified marine mammal observers (MMO), who are trained biologists, with the following minimum qualifications:

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

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

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

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

(e) Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction; dates and times when observations were conducted; dates and times when in-water construction activities were conducted; dates and times when marine mammals were present at or within the defined disturbance or injury zones; dates and times when in-water construction activities were suspended to avoid injury from construction noise; etc.

(f) Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.

In order to effectively monitor the pile driving monitoring zones, the MMO will be positioned at the best practical vantage point. The monitoring position may vary based on pile driving activities and the locations of the piles and driving equipment. These may include the catwalk at the ferry terminal, the contractor barge, or another location deemed to be more advantageous. The monitoring location will be identified with the following characteristics: 1. Unobstructed view of pile being driven; 2. Unobstructed view of all water within a 1.9 km (vibratory driving) and 1.6 km (impact driving) radius of each pile; 3. Clear view of pile-driving operator or construction foreman in the event of radio failure; and 4. Safe distance from pile driving activities in the construction area.

A single MMO will be situated on the Ferry Terminal to monitor the appropriate injury and behavioral disturbance zones during all pile driving activities. Because the action area for vibratory driving disturbance extends for 1.9 kilometers from the Gustavus Ferry Terminal into Icy Strait/Passage, it would be difficult to monitor this area effectively with only terminal-based MMOs. Due to potentially severe and highly unpredictable weather conditions, ADOT&PF has concluded that the use of Pleasant Island-based, mainland-based, or vessel-based MMOs would be infeasible and, in many circumstances, unsafe. However, when possible, ADOT&PF will augment land-based monitoring with information from boats in Icy Strait/Passage. Specifically, the MMO will coordinate with the NPS and whale-watching charters for recent observations of marine mammals within Icy Strait/Passage. This will help inform the MMO of marine mammals in the area. NPS and whale-watching charters could also inform monitoring personnel of any marine mammals seen approaching the disturbance zone. The MMO will conduct telephone checks with NPS and whale-watching charters to monitor the locations of humpback whales and Steller sea lions, which are listed under the Endangered Species Act, within Icy Strait/Passage. Checks will begin three days before pile-driving operations to ascertain the location and movements of these listed species in relation to the disturbance zones. Once construction has begun, checks will be made in the evening after the completion of pile driving activities, in preparation of the next day's monitoring. Use of the organizations identified above to augment monitoring efforts will depend on their observation schedules and locations within the Glacier Bay region. It is expected that these organizations will only be active in May and September during the pile-driving season.

The following additional measures apply to visual monitoring:

- Monitoring will begin 30 minutes prior to pile driving. This will ensure that all marine mammals in the monitoring zone are documented and that no marine mammals are present in the injury zone;
- If a marine mammal comes within or approaches the shutdown zone, such operations shall cease. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals. Their behavior will be monitored and documented. The shutdown zone may only be declared clear, and pile driving started, when the entire shutdown zone is visible (i.e., when not obscured by dark, rain, fog, etc.);
- When a marine mammal is observed, its location will be determined using a rangefinder to verify distance and a GPS or compass to verify heading;
- If any cetaceans or pinnipeds are observed approaching injury zones, impact pile-driving activities will be immediately halted. The MMO will immediately radio to alert the contractor and raise a red flag, requiring an immediate "all-stop." Impact pile-driving activities will resume when the animal is no longer proximal to the injury zone or 30 minutes have passed without re-sighting the animal near the zone. The observer will continue to monitor the animal until it has left the larger disturbance zones;
- The MMOs will record any cetacean or pinniped present in the disturbance zone;
- MMOs will record all harbor seals present in the in-air disturbance zone. This applies to animals that are hauled out and those that have surfaced while swimming;
- At the end of the pile-driving day, post-construction monitoring will be conducted for 30 minutes beyond the cessation of pile driving;
- If any cetaceans or pinnipeds are observed approaching the 10-meter exclusion zone, heavy equipment activities will be immediately halted. The observer will immediately radio to alert the

contractor and raise a red flag, requiring an immediate "all-stop." Observers will continue to monitor the animal after it has left the injury zone, if visible;

- If any marine mammal species are encountered during activities that are not listed in Table 1 for authorized taking and are likely to be exposed to SPLs greater than or equal to 160 dB re 1 µPa (rms) for impact driving and 120 dB re 1 µPa (rms), then the Holder of this Authorization must stop pile driving activities and report observations to NMFS' Office of Protected Resources;
- If waters exceed a sea-state which restricts the observers' ability to make observations within the marine mammal shutdown zone (*e.g.*, excessive wind or fog), pile installation will cease. Pile driving will not be initiated until the entire shutdown zone is visible;
- Work would occur only during daylight hours, when visual monitoring of marine mammals can be conducted; and
- Pile driving in September or May will end by approximately 5:00 p.m. local time to avoid the late afternoon period when most fishing charters return to the public dock adjacent to the Ferry Terminal. This is also the time of day when most sea lions are attracted to the Ferry Terminal, due to fish processing activities; therefore, shutting down construction operations at this time will help to avoid take of sea lions.

Data Collection

Observers are required to use approved data forms. Among other pieces of information, ADOT&PF will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, the ADOT&PF will attempt to distinguish between the number of individual animals taken and the number of incidents of take. At a minimum, the following information will be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (e.g., percent cover, visibility);
- Water conditions (e.g., sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

Reporting

ADOT&PF will notify NMFS prior to the initiation of the pile driving activities and will provide NMFS with a draft monitoring report within 90 days of the conclusion of the proposed construction work. This report will detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed. If no comments are received from NMFS within 30 days of submission of the draft final report, the

draft final report will constitute the final report. If comments are received, a final report must be submitted within 30 days after receipt of comments.

Estimated Take by Incidental Harassment

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

All anticipated takes would be by Level B harassment resulting from vibratory and impact pile driving and involving temporary changes in behavior. The proposed mitigation and monitoring measures are expected to minimize the possibility of injurious or lethal takes such that take by Level A harassment, serious injury, or mortality is considered discountable. However, it is unlikely that injurious or lethal takes would occur even in the absence of the planned mitigation and monitoring measures.

Given the many uncertainties in predicting the quantity and types of impacts of sound on marine mammals, it is common practice to estimate how many animals are likely to be present within a particular distance of a given activity, or exposed to a particular level of sound.

ADOT&PF has requested authorization for the incidental taking of small numbers of marine mammals near the Gustavus Ferry Terminal that may result from impact pile driving, vibratory pile driving and vibratory pile removal. In order to estimate the potential incidents of take that may occur incidental to the specified activity, we must first estimate the extent of the

sound field that may be produced by the activity and then consider in combination with information about marine mammal density or abundance in the project area. We first provide information on applicable sound thresholds for determining effects to marine mammals before describing the information used in estimating the sound fields, the available marine mammal density or abundance information, and the method of estimating potential incidences of take.

Sound Thresholds

We use the generic sound exposure thresholds shown in Table 4 to determine when an activity that produces underwater sound might result in impacts to a marine mammal such that a take by harassment might occur.

Table 4. Underwater Injury and Disturbance Threshold Decibel Levels for Marine Mammals

Criterion	Criterion Definition	Threshold*
Level A harassment	PTS (injury) conservatively based on TTS**	190 dB rms for pinnipeds 180 dB rms for cetaceans
Level B harassment	Behavioral disruption for impulse noise (e.g., impact pile driving)	160 dB rms
Level B harassment	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120 dB rms

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

Distance to Sound Thresholds

The sound field in the project area is the existing ambient noise plus additional construction noise from the proposed project. The primary components of the project expected to affect marine mammals are the sounds generated by impact pile driving, vibratory pile driving, and vibratory pile removal.

In order to calculate the Level A and Level B sound thresholds, ADOT&PF used acoustic monitoring data for this project that had been collected at the Kake Ferry Terminal, located approximately 115 miles south of the project area (MacGillvray *et al.,* 2015; Appendix A). ADOT&PF provided a comprehensive analysis describing how the Kake Ferry Terminal data provides a more accurate representation of underwater noise than the California-based dataset that NMFS usually recommends.

The Gustavus Ferry Terminal improvement project proposes to use 24- and 30-inch-diameter steel piles for most project support components. According to data collected from the Kake Ferry Terminal (MacGillvray *et al.,* 2015; Appendix A) and WSDOT (Laughlin 2010; WSDOT 2014), piles of this size generate similar levels of waterborne noise. The sound levels selected to calculate impact zones are as follows:

- Waterborne noise: 193.2 dB rms for impact driving and 154.3 dB rms for vibratory driving

The formula below is used to calculate underwater sound propagation. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$TL = B * \log_{10} (R_1/R_2)$, where

TL = transmission loss in dB

B = wave mode coefficient; for practical spreading equals 15

R_1= the distance of the modeled SPL from the driven pile, and

R_2= the distance from the driven pile of the initial measurement

NMFS typically recommends a default practical spreading loss of 15 dB per tenfold increase in distance. ADOT&PF analyzed the available underwater acoustic data utilizing the practical spreading loss model.

The practical spreading loss model estimates small injury zones for whales (76 m) and pinnipeds (16 m) for pulsed sound generated by piles driven by an impact pile driver within the project area. The disturbance zone for impact pile driving is larger, at approximately 1.6 km from the driven pile for all marine mammals. The disturbance zone for continuous noise generated by a vibratory hammer is similar, predicted to extend for 1.9 km from the pile to an ambient background level of 120 dB. For airborne sound, the Level B disturbance threshold is calculated at 163 m for harbor seals and 51 m for other pinnipeds during impact driving and 36 m for harbor seals during vibratory driving. The selected sound level of 97 dB for vibratory driving is below the 100 dB disturbance threshold for other pinnipeds, so there is no disturbance zone for other pinniped species.

Table 5 – Impact Zones of Marine Mammals

Pile Driver Type	Distance to Criterion (meters)			
	Waterborne Noise			
	Marine Mammal Disturbance (160 dB)/Level B	Cetacean Injury (180 dB)/Level A	Pinniped Injury (190 dB)/Level A	Continuous Noise Disturbance (120 dB)/Level B
Impact	1,634	76	16	--
Vibratory	--	--	--	1,935

Note that the actual area ensonified by pile driving activities is significantly constrained by local topography relative to the total threshold radius. The actual ensonified area was determined using a straight line-of-sight projection from the anticipated pile driving locations.

Distances to the underwater sound isopleths for Level B and Level A are illustrated respectively in Figure 2 and Figure 3 in the Application.

The method used for calculating potential exposures to impact and vibratory pile driving noise for each threshold uses local marine mammal data sets and data from IHA estimates on similar projects with similar actions. All estimates are conservative and include the following assumptions:

- All pilings installed at each site would have an underwater noise disturbance equal to the piling that causes the greatest noise disturbance (i.e., the piling furthest from shore) installed with the method that has the largest ZOI. The largest underwater disturbance ZOI would be produced by vibratory driving steel and timber piles. The ZOIs for each threshold are not spherical and are truncated by land masses on either side of the channel which would dissipate sound pressure waves; and
- Exposures were based on estimated work days. Between 16 and 50 work days of pile driving and removal will be required for the proposed project. NMFS will assume that a full 50 days are required to complete pile driving and removal activities.

The calculation for marine mammal exposures, except for Dall's porpoise and killer whales, was estimated using the following:

Exposure estimate = N (number of animals exposed above disturbance threshold) × no. of days of pile driving/removal activity.

The methods for the calculation of exposures for Dall's porpoise and killer whales is described under those respective species below.

Harbor Seal

There are no documented haulout sites for harbor seals in the vicinity of the project. The

nearest haulouts, rookeries, and pupping grounds occur in Glacier Bay over 20 miles from the ferry terminal. However, occasionally an individual will haul out on rocks on the north side of Pleasant Island (Stephen Vanderhoff, SWE, personal communication). A recent study of post-breeding harbor seal migrations from Glacier Bay demonstrates that some harbor seals traveled extensively beyond the boundaries of Glacier Bay during the post-breeding season (Womble and Gende 2013). Strong fidelity of individuals for haulout sites during the breeding season was documented in this study as well.

Harbor seals have declined dramatically in Glacier Bay region over the past few decades which may be a reason why there are few observations at the Gustavus Ferry Terminal. Sightings of harbor seals around the ferry terminal used to be more common (Stephen Vanderhoff, SWE, personal communication). NPS has documented one harbor seal observation near the terminal. It is estimated that less than 10 individuals are seen near the ferry dock during charter boat operations from mid- to late-May through September (Tod Sebens, CSE, Stephen Vanderhoff, SWE, Bruce Kruger, ADF&G, personal communication). Harbor seals are also documented in Icy Passage in the winter and early spring (Womble and Gende 2013).

For this analysis, we take a conservative estimate and assume that four harbor seals could be present on any day of pile driving regardless of when the pile driving is conducted (Spring and Fall 2017). Two seals would be subject would be exposed to underwater noise. Therefore, it is estimated that the following number of harbor seals may be present in the disturbance zone:

- Underwater exposure estimate: 4 animals × 50 days of pile activity = 200

NMFS proposes authorization for 200 Level B acoustical harassment takes of harbor seals. It is likely that one or more animals will be taken on repeated or subsequent days. Therefore, the number of individual animals taken will likely be less than 200.

Steller Sea lion

There are numerous Steller sea lion haulouts in Icy Strait but none occurring in Icy Passage (Mathews *et al.*, 2011; Tod Sebens, CSE, Stephen Vanderhoff, SWE, Janet Neilson, NPS, personal communication). The nearest Steller sea lion haulout sites are located on Black Rock on the south side of Pleasant Island and Point Carolus west across the strait from Point Gustavus (Mathews *et al.*, 2011). Both haulouts are over 16 km from the Gustavus ferry terminal.

Steller sea lions are common in the ferry terminal area during the charter fishing season (May to September) and are known to haul out on the public dock (Tod Sebens, CSE, Stephen Vanderhoff, SWE, Janet Neilson, NPS, personal communication Bruce Kruger, ADF&G, personal communication). During the charter fishing season, Steller sea lions begin arriving at the ferry terminal as early as 2:00 p.m. local time, reaching maximum abundance when the charter boats return at approximately 5:00 p.m. local time. The sea lions forage on the carcasses of the sport fish catch and then vacate the area. For the sake of our analysis we propose at least 10 animals will be present every day during charter fishing season. Outside of the charter fishing season, it is assumed that two Steller sea lions may transit in front of the ferry terminal to and from foraging grounds.

For the purpose of our analysis we conservatively estimate that two Steller sea lions will transit within the disturbance zones each day during the months of October and November of

2017 as well as March and April of 2018. We estimate, conservatively, that up to 10 individuals may be present each day in the months of September 2017 and May 2018 during the charter fishing season.

We also assume that 33 total combined days of pile driving/removal will occur in October and November, 2017 as well as in March and April, 2018. Seventeen combined driving days will occur in September, 2017 and May, 2018. Using these estimates we calculate the following number of Steller sea lions may be present in the disturbance zone:

- October 2017, November 2017, March 2018 and April 2018 underwater exposure estimate: 2 animals × 33 days of pile activity = 66
- September 2017 and May 2018 underwater exposure estimate: 10 animals × 17 days of pile activity = 170

The underwater take estimate for March through November is 236 animals. NMFS proposes authorization for 236 Level B acoustical harassment takes of Steller sea lions. Note that a small number of Steller sea lions (up to five) may have become habituated to human activity and, therefore, it is highly likely that there will be numerous repeated takes of these same animals. (Kruger, ADF&G, personal communication).

Dall's Porpoise

Dall's porpoise are documented in Icy Strait but not Icy Passage. Dahlheim *et al.*, (2009) found Dall's porpoise throughout Southeast Alaska, with concentrations of animals consistently found in Icy Strait, Lynn Canal, Stephens Passage, upper Chatham Strait, Frederick Sound, and Clarence Strait. It is estimated that there are anywhere from four to 12 sightings of Dall's porpoise in Icy Strait per season during the May through September whale watching charter

months (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). NPS documented seven sightings in Icy Strait since 1993 in September, October, November, April, and May. Six of the seven sightings are of pods with less than 10 individuals. The mean group size of Dall's porpoise in Southeast Alaska is estimated at three individuals (Dahlheim *et al.*, 2009).

Based on observations of local marine mammal specialists, Dall's porpoise are uncommon in Icy Passage. However, they do occur in Icy Strait and could potentially transit through the disturbance zone. For this analysis, we take the maximum number of 12 sightings per season between May and September, which equates to 2.4 sightings per month. Using this number it is estimated that the following number of Dall's porpoise may be present in the disturbance zone:

- Underwater exposure estimate: 2.4 group sightings/month x 3 animals/group x 6 months of pile activity = 43.2

NMFS proposes authorizing the Level B take of 43 Dall's porpoise.

Harbor Porpoise

Harbor porpoise are common in Icy Strait. Concentrations of harbor porpoise were consistently found in varying habitats surrounding Zarembo Island and Wrangell Island, and throughout the Glacier Bay and Icy Strait regions (Dahlheim *et al.*, 2009). These concentrations persisted throughout the three seasons sampled. Dahlheim (2015) indicated that 332 resident harbor porpoises occur in the Icy Strait area, though the population has been declining across Southeast Alaska since the early 1990's (Dahlheim *et al.*, 2012). During a 2014 survey, Barlow *et al.* (in press) observed 462 harbor porpoises in the Glacier Bay and Icy Strait area during a three-

month summer survey period. It is estimated that harbor porpoise are observed on at least 75 percent of whale watch excursions (75 of 100 days) during the May through September months (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). While NPS documented numerous sightings in Icy Strait since 1993 in September, October, November, April, and May, none were observed in Icy Passage. The mean group size of harbor porpoise in Southeast Alaska is estimated at two individuals (Dahlheim *et al.,* 2009).

Harbor porpoise could potentially transit through the disturbance zone during pile driving activity. For this analysis we take a conservative estimate and assume that four harbor porpoise (two pods of two per day) could be present on any of the 50 days of pile driving. Using this number it is estimated that the following number of harbor porpoise may be present in the disturbance zone:

Underwater exposure estimate:

- 4 animals × 50 days of pile activity = 200

NMFS is proposing authorization for 200 Level B acoustical harassment takes of harbor porpoise.

Humpback Whale

From May to September, humpback whales congregate and forage in nearby Glacier Bay and in Icy Strait. Since 1985, the NPS has been monitoring humpback whales in both Glacier Bay National Park and Icy Strait and publishing annual reports (http://www.nps.gov/glba/naturescience/whale_acoustic_reports.htm). The NPS typically surveys Icy Strait, located south of Icy Passage, once a week between June 1 and August 31, with most survey effort focused in the area east of Point Gustavus and Pleasant Island (Figure 3).

Several Icy Strait surveys included waters around Pleasant Island, the closest island to the Gustavus Ferry Terminal. Because the NPS is most interested in whales within Glacier Bay and areas where vessel management is a concern, their monitoring data do not represent a true distribution of whales. Their survey locations are also dependent on where the whales are actually distributed (Neilson *et al.*, 2014).

In 2013, 237 humpback whales were documented in Icy Strait during the NPS monitoring period; this was a 14 percent increase over the previous high count of 177 whales in 2012 (Neilson *et al.*, 2014). In 2014, a 39 percent decrease in area abundance was observed (124 whales), which may have been caused by increased turbidity resulting from seismic generated marine landslides (Neilson et al., 2015). The majority of whales observed in Icy Strait in 2013 and 2014 were recorded in the area between the mouth of Glacier Bay and Point Adolphus; there were no whales observed between Pleasant Island and the Gustavus Ferry Terminal (the waterbody known as Icy Passage). While this does not mean that no whales were present between the island and ferry terminal at any time, it does suggest that the number of individual whales present in Icy Passage is relatively low and occurrence is infrequent. In other years, a number of humpback whales have been observed to the south and west of Pleasant Island (Neilson *et al.*, 2014; Figures 4 through 6). The lack of whale observations between Pleasant Island and the ferry terminal likely reflects the fact that Icy Passage is relatively shallow and muddy; for this reason NPS does not consider it a whale "hot spot" (C. Gabriele, NPS, personal communication).

Based on these observations humpback whales appear to be common in Icy Strait and are occasionally seen in Icy Passage. However, NPS believes that whale abundance decreases

substantially in September through November and March through April, but has limited data for these periods. For this analysis, we take a conservative estimate and assume that two humpback whales could be present in the disturbance zone on any day of the 50 days of pile driving. Using this number it is estimated that the following number of humpback whales may be present in the disturbance zone:

Underwater exposure estimate:

- 2 animals × 50 days of pile activity = 100

NMFS is proposing authorization for 100 Level B acoustical harassment takes of humpback whales.

Killer whale

Based on observations of local marine mammal specialists, the probability of killer whales occurring in Icy Passage is low. However, they do occur in Icy Strait and could potentially transit through the disturbance zone in Icy Passage. Since there is no density information available for killer whales in this area, we assumed a pod size of 27 for resident and six for transient killer whales, based on an average of group sizes observed during surveys in Spring and Fall in Southeast Alaska between 1991 and 2007 (Dalheim *et al*., 2008). We also assumed that a pod of resident (27) or transient (6) killer whales may occur in the Level B disturbance zone twice during the course of the project. Therefore, to account for the potential for two resident (54 total) and two transient pods (12 total) to occur in the disturbance zone during the course of the project, ADOT&PF is requesting authorization for 66 Level B acoustical harassment takes of killer whales.

Minke Whale

Based on observations of local marine mammal specialists, the probability of minke whales occurring in Icy Passage is low. However, they have been documented in Icy Strait and could potentially transit through the disturbance zone. For this analysis, we take a conservative estimate and assume that one minke whale could be present on any one day during the 50 days of pile driving. Using this number it is estimated that the following number of minke whales may be present in the disturbance zone:

Underwater exposure estimate:

- 1 animal × 50 days of pile activity = 50

NMFS is therefore proposing authorization for 50 Level B acoustical harassment takes of minke whales.

Analyses and Preliminary Determinations

Negligible Impact Analysis

Negligible impact is "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival" (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number of Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time

or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, effects on habitat, and the status of the species.

To avoid repetition, the discussion of our analyses applies to all the species listed in Table 1. There is little information about the nature of severity of the impacts or the size, status, or structure of any species or stock that would lead to a different analysis for this activity.

Pile driving and pile extraction activities associated with the Gustavus Ferry Terminal improvements project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in Level B harassment (behavioral disturbance) for all species authorized for take, from underwater sound generated from pile driving and removal. Potential takes could occur if individuals of these species are present in the ensonified zone when pile driving or drilling is under way.

The takes from Level B harassment will be due to potential behavioral disturbance and potential TTS. Serious injury or death is unlikely for all authorized species and injury is unlikely for these species, as ADOT&PF will enact several required mitigation measures. Soft start techniques will be employed during pile driving operations to allow marine mammals to vacate the area prior to commencement of full power driving. ADOT&PF will establish and monitor shutdown zones for authorized species, which will prevent injury to these species. ADOT&PF will also record all occurrences of marine mammals and any behavior or behavioral reactions observed, any observed incidents of behavioral harassment, and any required shutdowns, and will submit a report upon completion of the project. We have determined that the required mitigation measures are sufficient to reduce the effects of the specified activities to the level of

effecting the least practicable adverse impact upon the affected species, as required by the MMPA.

The ADOT&PF's proposed activities are localized and of short duration. The entire project area is limited to the Gustavus Ferry Terminal area and its immediate surroundings. Specifically, the use of impact driving will be limited to an estimated maximum of 57 hours over the course of 16 to 50 days of construction. Total vibratory pile driving time is estimated at 114 hours over the same period. While impact driving does have the potential to cause injury to marine mammals, mitigation in the form of shutdown zones should eliminate exposure to Level A thresholds. Vibratory driving does not have significant potential to cause injury to marine mammals due to the relatively low source levels produced and the lack of potentially injurious source characteristics. Additionally, no important feeding and/or reproductive areas for marine mammals are known to be within the ensonified area during the construction time frame.

The project also is not expected to have significant adverse effects on affected marine mammals' habitat. The project activities would not modify existing marine mammal habitat. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such

activity were occurring) (e.g., Thorson and Reyff, 2006; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. In response to vibratory driving, pinnipeds (which may become somewhat habituated to human activity in industrial or urban waterways) have been observed to orient towards and sometimes move towards the sound. The pile extraction and driving activities analyzed here are similar to, or less impactful than, numerous construction activities conducted in other similar locations, which have taken place with no reported serious injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment. Repeated exposures of individuals to levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt foraging behavior. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in fitness for the affected individuals, and thus would not result in any adverse impact to the stock as a whole.

In summary, this negligible impact analysis is founded on the following factors: (1) the possibility of serious injury or mortality to authorized species may reasonably be considered discountable; (2) the anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior and; (3) the presumed efficacy of the planned mitigation measures in reducing the effects of the specified activity to the level of effecting the least practicable adverse impact upon the affected species. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activity will have only short-term effects on individuals. The specified activity is

not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

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 planned monitoring and mitigation measures, NMFS finds that the total marine mammal take from ADOT&PF's Gustavus Ferry terminal improvement project will have a negligible impact on the affected marine mammal species or stocks.

Table 6. Estimated Number of Exposures and Percentage of Stocks That May Be Subject to Level B Harassment

Species	Proposed Authorized Takes	Stock(s) Abundance Estimate	Percentage of Total Stock
Harbor Seal	200	7,210	2.8%
Steller Sea Lion	236	49,497 (western stock in AK) 60,131 (eastern stock)	0.48% 0.39%
Dall's Porpoise	43	Unknown	Unknown
Harbor Porpoise	200	11,146	1.7%
Humpback Whale	100	10,252	0.98%
Killer whale	66	261 (Northern resident) 587 (Gulf of Alaska transient) 243 (West Coast transient)	25.3% 11.2% 27.1%
Minke Whale	50	Unknown	Unknown

Small Numbers Analysis

Table 6 demonstrates the number of animals that could be exposed to received noise levels that could cause Level B behavioral harassment for the proposed work at the Gustavus Ferry Terminal project. The analyses provided above represents between 0.39 – 27.1 percent of the populations of these stocks that could be affected by harassment, except for Minke whales

and Dall's porpoise, since their population numbers are unknown. While the proposed West Coast transient and Northern resident killer whale takes and percentages of stock affected appears high (27.1 percent and 25.3 percent), in reality only 66 transient killer whale individuals are not likely to be harassed. Instead, it is more likely that there will be multiple takes of a smaller number of individuals. Both the West coast transient stock and the Northern Resident stock range from southeastern Alaska, through British Columbia, and into northern Washington. It is unlikely that such a large portion of either stock with ranges of this size would be concentrated in and around Icy Passage.

Furthermore, though there is not a current abundance estimate, the proposed take of 43 Dall's porpoise and 50 Minke whale are also considered small numbers. Population data on these species is dated. Surveys conducted between 1987 and 1991 put the population of the Alaska stock of Dall's porpoise at between 83,400 and 417,000 (Allen and Angliss, 2012). As such, the 14 proposed authorized takes represent <0.01 percent of the population. A visual survey for cetaceans was conducted in the central-eastern Bering Sea in July-August 1999, and in the southeastern Bering Sea in 2000. Results of the surveys in 1999 and 2000 provide provisional abundance estimates of 810 and 1,003 minke whales in the central-eastern and southeastern Bering Sea, respectively (Moore *et al.*, 2002). Additionally, line-transect surveys were conducted in shelf and nearshore waters in 2001-2003 from the Kenai Fjords in the Gulf of Alaska to the central Aleutian Islands. Minke whale abundance was estimated to be 1,233 for this area (Zerbini *et al.*, 2006). However, these estimates cannot be used as an estimate of the entire Alaska stock of minke whales because only a portion of the stock's range was surveyed. (Allen and Anglis 2012). Clearly, 50 authorized takes should be considered a small number, as it

constitutes only 6.1 percent of the smallest abundance estimate generated during the surveys just described and each of these surveys represented only a portion of the minke whale range.

Note that the numbers of animals authorized to be taken for all species, with the exception of resident killer whales, 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.

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.

Impact on Availability of Affected Species for Taking for Subsistence Use

The proposed Gustavus Ferry Terminal Improvements 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 Steller sea lion subsistence harvest in Alaska. Since proposed work at the Gustavus Ferry Terminal will only cause temporary, nonlethal disturbance of marine mammals, we anticipate no impacts to subsistence harvest of marine mammals in the region.

Endangered Species Act (ESA)

There are two marine mammal species that are listed as endangered under the ESA with confirmed or possible occurrence in the study area: humpback whale and Steller sea lion (Western DPS). NMFS' Permits and Conservation Division has initiated consultation with NMFS' Protected Resources Division under section 7 of the ESA on the issuance of an IHA to ADOT&PF under section 101(a)(5)(D) of the MMPA for this activity. Consultation will be concluded prior to a determination on the issuance of an IHA.

National Environmental Policy Act (NEPA)

NMFS is preparing an EA in accordance with the NEPA and will consider comments submitted in response to this notice as part of that process. The draft EA will be posted at *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm* once it is finalized.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to ADOT&PF for reconstructing the existing Gustavus Ferry Terminal located in Gustavus, Alaska, Alaska, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The proposed IHA language is provided next.

1. This Incidental Harassment Authorization (IHA) is valid from September 1, 2017 through August 31, 2018.

2. This Authorization is valid only for in-water construction work associated with the reconstruction of the existing Gustavus Ferry Terminal located in Gustavus, Alaska

3. General Conditions

(a) A copy of this IHA must be in the possession of the Alaska Department of Transportation & Public Facilities (ADOT&PF), its designees, and work crew personnel operating under the authority of this IHA.

(b) The species authorized for taking are harbor seal (*Phoca vitulina*), Steller sea lion (*Eumatopius jubatus*), Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), humpback whale (*Megaptera novaeangliae*), killer whale (*Orcinus orca*), and minke whale (*Balaenoptera acutorostrata*).

(c) The taking, by Level B harassment only, is limited to the species listed in condition 3(b).

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

4. Mitigation Measures

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

(a) Time Restriction: For all in-water pile driving activities, ADOT&PF shall operate only during daylight hours when visual monitoring of marine mammals can be conducted;

(b) To limit the amount of waterborne noise, a vibratory hammer will be used for initial driving, followed by an impact hammer to proof the pile to required load-bearing capacity;

(c) Establishment of Level B Harassment Zones of Influence (ZOIs):

(i) Before the commencement of in-water pile driving activities, ADOT&PF shall establish Level B behavioral harassment ZOIs where received underwater sound pressure levels (SPLs) are higher than 160 dB (rms) and 120 dB (rms) re 1 µPa for impulse noise

sources (impact pile driving) and non-pulse sources (vibratory hammer), respectively; and

(ii) The ZOIs delineate where Level B harassment would occur. For impact driving, the area within the Level B harassment threshold is between approximately 76 m and 1.6 km. For vibratory driving, the level B harassment area is between 10 m and 1.9 km.

(d) Establishment of shutdown zone - Implement a minimum shutdown zone around the pile of 76 m radius during impact pile driving and 10 m during vibratory driving activities. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease.

(e) Use of Soft-start:

(i) The project will utilize soft start techniques for impact pile driving. Contractors shall be required to provide an initial set of three strikes from the impact hammer at 40 percent reduced energy, followed by a thirty-second waiting period, then two subsequent three strike sets. Soft start will be required at the beginning of each day's pile driving work and at any time following a cessation of pile driving of thirty minutes or longer (specific to either vibratory or impact driving); and

(ii) Whenever there has been downtime of 20 minutes or more without vibratory or impact driving, the contractor will initiate the driving with soft-start procedures described above.

(f) Standard mitigation measures:

(i) (e) ADOT&PF shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, and staff prior to the start of all in-water pile

driving, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures; and

(ii) For in-water heavy machinery work other than pile driving (using, *e.g.*, standard barges, tug boats, barge-mounted excavators, or clamshell equipment used to place or remove material), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions.

5. Monitoring and Reporting

The holder of this Authorization is required to report all monitoring conducted under the IHA within 90 calendar days of the completion of the marine mammal monitoring. This report shall detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed. If no comments are received from NMFS within 30 days of submission of the draft final report, the draft final report will constitute the final report. If comments are received, a final report must be submitted within 30 days after receipt of comments:

(a) Marine Mammal Observers (MMOs) must have the following qualifications:

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

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

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

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

(v) Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction; dates and times when observations were conducted; dates and times when in-water construction activities were conducted; dates and times when marine mammals were present at or within the defined disturbance or injury zones; dates and times when in-water construction activities were suspended to avoid injury from construction noise; etc; and

(vi) Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.

(b) Visual Marine Mammal Monitoring and Observation:

(i) During impact pile driving, one MMO shall monitor the 1.6-kilometer disturbance zone from the Gustavus Ferry Terminal . The smaller injury zone of 76 meters for whales and 16 meters for pinnipeds will also be monitored by a MMO during impact pile driving. During vibratory driving, one MMO shall monitor the 1.9 km disturbance zone from the Gustavus Ferry Terminal;

(ii) At the beginning of each day, the observer shall determine their vantage positions using a handheld GPS unit. If a MMO changes position throughout the day, each new position will also be determined using a hand-held GPS unit;

(iii) Monitoring shall begin 30 minutes prior to impact pile driving;

(iv) If all marine mammals in the disturbance zone have been documented and no marine mammals are in the injury zone, the coordinator shall instruct the contractor to initiate the soft-start procedure for any impact pile driving;

(v) When a marine mammal is observed, its location shall be determined using a rangefinder to verify distance and a GPS or compass to verify heading;

(vi) If marine mammals listed in 3(b) are observed nearing their respective injury zones, pile-driving activities shall be immediately shut down. Operations shall continue after the animal has been spotted out of the zone or 30 minutes have passed without re-sighting the animal in the zones;

(vii) The MMO shall record all cetaceans and pinnipeds present in the disturbance zones;

(ix) The observer will use their naked eye with the aid of binoculars and a spotting scope to search continuously for marine mammals;

(x) During the in-water operation of heavy machinery (e.g., barge movements), a 10-meter shutdown zone for all marine mammals will be implemented;

(xi) At the end of the pile-driving day, post-construction monitoring will be conducted for 30 minutes beyond the cessation of pile driving; and

(xii) If waters exceed a sea-state which restricts the MMO's ability to make observations within the marine mammal shutdown zone (*e.g.* excessive wind or fog), pile installation will cease. Pile driving will not be initiated until the entire shutdown zone is visible.

(c) During pile driving, one MMO shall be positioned at the best practical vantage point. The monitoring position will be on the ferry terminal, but may vary based on pile driving activities and the locations of the piles and driving equipment. The monitoring location will be identified with the following characteristics:

(i) Unobstructed view of pile being driven;

(ii) Unobstructed view of all water within a 1.6 km (impact driving) or 1.9 km (vibratory driving) radius of each pile;

(iii) Clear view of pile-driving operator or construction foreman in the event of radio failure; and

(iv) Safe distance from pile-driving activities in the construction area.

(d) When possible, ADOT&PF shall augment land-based monitoring with information from boats in Icy Strait/Passage by coordinating with the NPS and whale-watching charters. The MMO shall conduct telephone checks with NPS and whale-watching charters to monitor the locations of humpback whales and Steller sea lions within Icy Strait/Passage.

(e) Data Collection:

Observers are required to use approved data forms. Among other pieces of information, ADOT&PF will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, ADOT&PF will attempt to distinguish between the number of individual animals taken and the number of incidents of take. At a minimum, the following information shall be recorded on the sighting forms:

1. Date and time that monitored activity begins or ends;

2. Construction activities occurring during each observation period;

3. Weather parameters (*e.g.*, percent cover, visibility);

4. Water conditions (*e.g.*, sea state, tide state);

5. Species, numbers, and, if possible, sex and age class of marine mammals;

6. Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;

7. Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;

8. Locations of all marine mammal observations; and

9. Other human activity in the area.

(f) Reporting Measures:

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as an injury (Level A harassment), serious injury or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), ADOT&PF would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report would include the following information:

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

2. Name and type of vessel involved;

3. Vessel's speed during and leading up to the incident;

4. Description of the incident;

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

6. Water depth;

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

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

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

10. Fate of the animal(s); and

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

(ii) Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with ADOT&PF to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. ADOT&PF would not be able to resume their activities until notified by NMFS via letter, email, or telephone;

(iii) In the event that ADOT&PF discovers an injured or dead marine mammal, and the lead MMO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), ADOT&PF would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the

NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with ADOT&PF to determine whether modifications in the activities are appropriate;

(iv) In the event that ADOT&PF discovers an injured or dead marine mammal, and the lead MMO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), ADOT&PF would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, within 24 hours of the discovery. ADOT&PF would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

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

Request for Public Comments

NMFS requests comment on our analysis, the draft authorization, and any other aspect of the Notice of Proposed IHA for ADOT&PF's reconstruction of the existing Gustavus Ferry Terminal located in Gustavus, Alaska. Please include with your comments any supporting data

or literature citations to help inform our final decision on ADOT&PF's request for an MMPA authorization.

Dated: June 20, 2016

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Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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