DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XC705]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Whittier Head of the Bay Cruise Dock Project in Whittier, Alaska

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

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from Turnagain Marine Construction (TMC) for authorization to take marine mammals incidental to the cruise dock construction project in Whittier, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-time, 1 year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than [*INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.harlacher@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, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* 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: Jenna Harlacher, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities#active-authorizations*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) 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 proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review. We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On September 16, 2022, NMFS received a request from TMC for an IHA to take marine mammals incidental to the construction of the cruise ship dock in Whittier, Alaska. Following NMFS' review of the application, TMC provided further information on October 26, 2022, a revised application on January 9, 2023, and the application was deemed adequate and complete on January 10, 2023. Subsequently, TMC submitted an additional update to its application on February 3, 2023. TMC's request is for take of five species of marine mammals by Level B harassment and, for a subset of two species, Level A harassment. Neither TMC nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

TMC proposes to construct the Whittier Head of the Bay cruise ship dock project in the Passage Canal in Whittier, Alaska. The proposed project will cover a 12-month window during which approximately 129 days of pile-installation and -removal activity will occur. This project involves installation and removal of 72 36-inch (in) (0.91 meter (m)) temporary steel pile guides and installation of 36 36-in, 16 42-in (1.1-m), and 20 48-in (1.2-m) permanent steel piles. Three different installation methods will be used including vibratory installation of piles into dense material, impact pile driving to drive piling to tip elevation, and the Down-the-Hole (DTH) hammer to drill pile into the bedrock. TMC will deploy a bubble curtain to the 60-foot (ft.) (18.3-m) isobath. This would be used during all activities that fall below the 60-ft. isobath. Sounds resulting from pile installation, removal, and drilling may result in the incidental take of marine mammals by Level A and Level B harassment in the form of auditory injury or behavioral harassment.

Dates and Duration

The proposed IHA would be effective from April 1, 2023 through March 31, 2024. The total expected work duration would be approximately 321 hours over 129 nonconsecutive days (an estimated 45 days of DTH, 59 days of vibratory pile installation, and 24.5 days of impact pile driving). An estimated 156 hours over 58.5 days would use a bubble curtain, and 165 hours over 70 days would be unattenuated. The construction timeline takes into account the mobilization of materials and potential delays due to delayed material deliveries, equipment maintenance, inclement weather, and shutdowns. TMC plans to conduct all work during daylight hours.

Specific Geographic Region

The proposed activity will occur in the head of Passage Canal, a bay of Prince William Sound in South Central Alaska in Whittier, Alaska (Figure 1-2). This proposed cruise ship dock would be approximately one kilometer (0.75 miles) northwest of downtown Whittier. Passage Canal is an approximately 12-mile-long (19.3 kilometer (km)) fjord that measures less than 2 miles (3.2-km) across from shore to shore at its widest point and reaches depths over 1,000-ft (304.8-m) at its entrance near Decision Point and Blackstone Bay. Depths at the head of Passage Canal are shallower, approximately 100 to 200-ft (30.48 to 60.96-m).

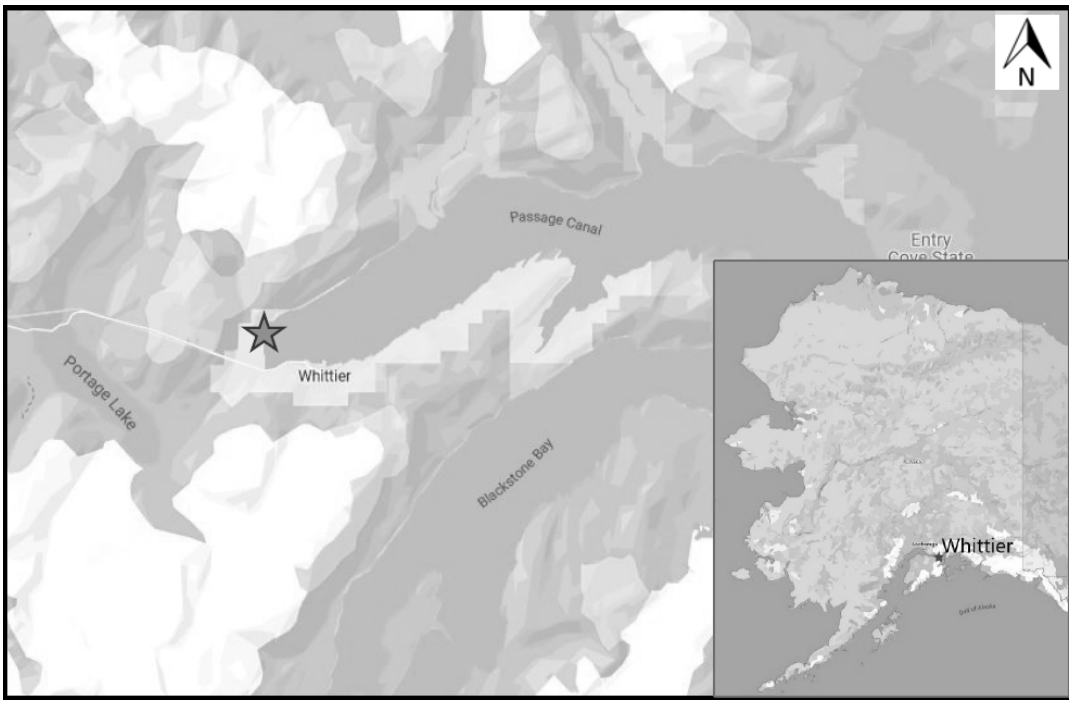

Figure 1. Map illustrating the proposed project location in Whittier, Alaska

Detailed Description of the Specified Activity

TMC proposes to install and remove 72 steel piles to guide the 72 permanent piles into place to support the cruise ship berth and floating dock. The piles would be installed using three methods over 129 days, which incorporated buffer days to account for unforeseen interruptions. These methods include vibratory pile installation and removal, impact pile driving, and DTH drilling (see Table 1).

Pile templates would be constructed using temporary pilings vibrated into position. Three or four temporary 36-in diameter pilings may be needed for each template. Most temporary piles would be vibrated into place; however, up to 36 of these may need to make use of a DTH drill in locations where the bedrock is shallow. For each 36-in temporary pile, an estimated 2 cubic yards (CY) (1.53 cubic meter) of drill cuttings would be produced. Using the templates as guides to position the permanent piling, the piling would be vibrated into dense material. The piling would then be driven to tip elevation using an impact hammer. Once the piles achieve the tip elevation, a DTH hammer would be placed inside the piling and a shaft would be drilled into the bedrock. The rock shaft would be filled with concrete to anchor the pile to the bedrock. The 36 permanent 36-in diameter steel piles supporting the approach trestle would be vibrated to at least 24 feet (7.31-m) below the mudline. If the soil depth is less than 24 feet, the piles would then be drilled at least 10 feet (3.05-m) deep into bedrock with a DTH hammer and bit. For each 36-in permanent pile, an estimated 10 CY (7.65 cubic meter) of drill cuttings would be produced. The 16 permanent 42-in diameter and 20 permanent 48-in diameter steel piles would be vibrated through the soil layer to bedrock to support other dock components. A 38-in diameter shaft would be drilled through the 42- and 48- in diameter into the bedrock with the DTH hammer and bit, and then filled with concrete to a depth of at least 25 feet (7.62-m) to anchor the piles.

TMC divides the work into two areas by depth; activities occurring within the 60-ft. isobath or shallower and, those occurring in depths greater than the 60-ft. isobath. The

36 36-in permanent piles supporting the approach trestle and the 36 36-inch temporary piles used as template guides for them would fall within the 60-ft. isobath. The 16 42-inch and 20 48-inch for the mooring trestle and dolphins (and the 36 36-inch temporary piles used as template guides for these) would fall within waters deeper than the 60-ft. isobath. A bubble curtain would be deployed at a depth of 60 feet (18.3-m) and would be used during all activities that fall within the 60-ft. isobath.

Additional actions occurring under the proposed action that are not anticipated to generate in-water noise resulting in marine mammal harassment include vessels to support construction and out of water dock components. NMFS does not expect, that these ancillary activities will harm or harass marine mammals and no incidental takes are expected as a result of these activities. Therefore, these activities are not discussed further in this document.

Table 1 – Pile Installation Methods and Durations

Pile size, Method	Number of piles	Duration/Impacts per pile	Piles Drive/Day	Estimated Days
36-in steel pile, Vibratory Installation (temporary)	72	10 min	4	18
36-in steel pile, Vibratory Removal (temporary)	72	10 min	4	18
36-in steel pile, Vibratory Installation (permanent)	36	15 min	4	9
42-in steel pile, Vibratory Installation	16	15 min	4	4
48-in steel pile, Vibratory Installation	20	15 min	2	10
36-in steel pile, Impact Installation (permanent)	36	1800 strikes	4	9
42-in steel pile, Impact Installation	16	2400 strikes	3	5.5
48-in steel pile, Impact Installation	20	2400 strikes	2	10
36-in steel pile, DTH Installation (temporary)	36	60 min	4	9
36-in steel pile, DTH Installation (permanent)	36	150 min	2	18

42-in steel pile, DTH Installation	16	150 min	2	8
48-in steel pile, DTH Installation	20	150 min	2	10

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 2 lists all species or stocks for which take is expected and proposed to be authorized for this activity, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is expected to occur, PBR and annual serious injury and mortality from

anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All stocks managed under the MMPA in this region are assessed in NMFS' U.S. 2021 SARs (*e.g.*, Muto et al., 2021) and the draft 2022 SARs (*e.g.,* Young *et al.,* 2022). All values presented in Table 2 are the most recent available at the time of publication and are available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*).

Table 2 - Species Likely Impacted by the Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, Nmin, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeanglinae*	Central North Pacific Stock	-,D,Y	10,103 (0.3, 7,890, 2006)	83	26
		Western North Pacific	E,D,Y	1,107 (0.3, 865, 2006)	3	2.8
		California/Oregon/Washington	T,D,Y	4,973 (0.05, 4,776, 2018)	28.7	48.3
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer whale	*Orca orcinus*	Alaska Resident	-,-,N	1,920 (N/A, 1,920, 2019)	19	1.3
		Gulf of Alaska/Aleutian Islands/Bering Sea Transient	-,-,N	587 (N/A, 587, 2012)	5.9	0.8
		AT1 Transient	-,D,Y	7 (N/A, 7, 2019)	0.01	1
Family Phocoenidae (porpoises)						
Dall's porpoise[4]	*Phocoenoides dalli*	Alaska Stock	-,-,N	15,432 (0.097, 13, 110, 2021)	131	37
Order Carnivora – Superfamily Pinnipedia						

Family Otariidae (eared seals and sea lions)						
Steller sea lion	*Eumetopias jubatus*	Western Stock	E,D,Y	52,932 (N/A, 52,932, 2019)	318	254
Family Phocidae (earless seals)						
Harbor seal	*Phoca vituline richardii*	Clarence Strait Stock	-,-,N	27,659 (N/A, 24,854, 2015)	746	40

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2 - NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports* CV is coefficient of variation; Nmin is the minimum estimate of stock abundance.

3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.
[4] – Previous abundance estimates covering the entire stock's range are no longer considered reliable and the current estimates presented in the SARs and reported here only cover a portion of the stock's range. Therefore, the calculated Nmin and PBR is based on the 2015 survey of only a small portion of the stock's range. PBR is considered to be biased low since it is based on the whole stock whereas the estimate of mortality and serious injury is for the entire stock's range.

On January 24, 2023, NMFS published the draft 2022 SARs (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region*). The Alaska and Pacific Ocean SARs include a proposed update to the humpback whale stock structure. The new structure, if finalized, would modify the MMPA-designated stocks to align more closely with the ESA-designated DPSs. Please refer to the draft 2022 Alaska and Pacific Ocean SARs for additional information.

NMFS Office of Protected Resources, Permits and Conservation Division has generally considered peer-reviewed data in draft SARs (relative to data provided in the most recent final SARs), when available, as the best available science, and has done so here for all species and stocks, with the exception of a new proposal to revise humpback whale stock structure. Given that the proposed changes to the humpback whale stock structure involve application of NMFS's Guidance for Assessing Marine Mammals Stocks and could be revised following consideration of public comments, it is more appropriate to conduct our analysis in this proposed authorization based on the status quo stock structure identified in the most recent final SARs (2021; Muto *et al.,* 2022).

As indicated above, all five species (with eight managed stocks) in Table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it. All species that could potentially occur in the proposed survey areas are included in Table 5 of the IHA application. While some species have been reported in or near the area, it is very rare, and the temporal and/or spatial occurrence of these species is more likely outside of the Passage Canal and outside of the harassment zones. Therefore, given this information take is not expected to occur and they are not discussed further beyond the explanation provided here.

In addition, the northern sea otter (*Enhydra lutris kenyoni)* may be found in the Passage Canal. However, northern sea otters are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

Humpback Whale

The humpback whale is found worldwide in all oceans. Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al.,* 2015), NMFS established 14 Distinct Population Segments (DPS) with different listing statuses (81 FR 62259; September 8, 2016) pursuant to the ESA. Humpback whales found in the project area are predominantly from the three DPSs that are present in Alaska.

Whales from the Western North Pacific (WNP), Mexico, and Hawaii DPSs overlap on feeding grounds off Alaska and are not visually distinguishable. Members of different DPSs are known to intermix on feeding grounds; therefore, all waters off the coast of Alaska should be considered to have ESA-listed humpback whales. Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade (2021) concluded that the humpback whales feeding in Alaskan waters belong primarily to the recovered Hawaii DPS (89 percent), with small

contributions from the threatened Mexico DPS (11 percent) and the endangered WNP DPS (0.4 percent; rounded to 1 percent in NMFS 2021a).

The DPSs of humpback whales that were identified through the ESA listing process do not equate to the existing MMPA stocks. The updated stock delineations for humpback whales under the MMPA are currently out for public review in the draft 2022 SAR's, as mentioned above. Until this review is complete, NMFS considers humpback whales in Southeast Alaska to be part of the Central North Pacific stock (Muto *et al*., 2021).

Humpback whales are found throughout Southcentral Alaska in a variety of marine environments, including open-ocean, near-shore waters, and areas within strong tidal currents (Dahlheim *et al.,* 2009). Humpback whales generally arrive in Southeast Alaska in March and return to their wintering grounds in November. Some humpback whales depart late or arrive early to feeding grounds, and therefore the species can occur in the Southeast Alaska region year-round (Straley, 1990, Straley *et al.,* 2018). Across the region, there have been no recent estimates of humpback whale density.

NMFS identified a portion of Prince William Sound as a Biologically Important Area (BIA) for humpback whales for feeding during the months of September through December; however, the proposed action area is northwest of the boundaries of the BIA (NMFS 2022c). BIAs are spatial and temporal boundaries identified for certain marine mammal species where populations are known to concentrate for specific behaviors such as migration, feeding, or breeding. This BIA was identified due to boat-based surveys that observed high number of humpback whales feeding (mainly on Pacific herring) in the area (Ferguson *et al.,* 2015). Humpback whale BIAs helped to inform the critical habitat designation finalized by NMFS in 2021 (86 FR 21082, April 21, 2021). Much of Prince William Sound is also within humpback whale critical habitat, and material and equipment barges' routes would transit through critical habitat on the way to the project

site. However, the proposed project is approximately 17 km west of the boundaries of the critical habitat, and the ensonified action area extends through Passage Canal, but ends about 3.5 kilometers west of the critical habitat boundary.

In Prince William Sound and Passage Canal, humpback whales are traditionally observed during seasons of high prey concentration, May through September (Witteveen *et al.,* 2011; SolsticeAK 2022). However, feeding humpback whales' presence in the Gulf of Alaska has also been correlated closely with peak herring abundance, which occurs in the late fall and early winter. It has been suggested that some whales remain longer in northern waters to maximize food consumption prior to migrating south to breeding grounds in the winter, and a few may skip migration altogether (Straley *et al.,* 2018). Therefore, humpbacks may be present year-round in Prince William Sound, but are less common during the late winter and early spring.

While sightings of humpbacks are fairly common in Prince William Sound, they are less common in Passage Canal (SolsticeAK 2022). No humpback whales were observed within Passage Canal during the Whittier Ferry Terminal Modification Project in April 2020 (Leonard and Wisdom 2020).

Dall's Porpoise

All Dall's porpoises in Alaska are members of the Alaska stock. This species can be found in offshore, inshore, and nearshore habitats. Dall's porpoises are widely distributed across the North Pacific Ocean and are one of the most common cetaceans in the Gulf of Alaska (Rone *et al.,* 2017). Surveys conducted in the Gulf of Alaska from 2009 to 2015 indicate that Dall's porpoises inhabit all strata on the continental shelf, slope, and pelagic waters with the greatest densities occurring in deeper inshore and slope habitats (Rone *et al.,* 2017).

From data collected during surveys conducted from 2007 to 2015, Dall's porpoise presence in Prince William Sound varied based on season. They were most dispersed

throughout Prince William Sound in the summer months but tended towards deeper waters in the middle of the Sound, away from shorelines. In the fall and winter, they were more often observed in the periphery of Prince William Sound with concentrations in bay areas, likely following herring shoals towards their overwintering areas. Their distribution was most concentrated in the spring, with one major activity center in eastern Prince William Sound. These porpoises were not typically found in shallow habitats or confined fjords like that of Passage Canal, preferring open water escape routes where they are able to use quick swimming techniques to evade predators such as killer whales (Moran *et al.,* 2018).

Dall's porpoises are frequently observed near the entrance of Passage Canal but not often seen far down the canal near Whittier (DOT&PF 2019). Correspondence with local tour boat captains confirmed there are occasional sightings of Dall's porpoise in Passage Canal, but they are more often seen farther out towards Prince William Sound in Well's Passage (SolsticeAK 2022). The Whittier Ferry Terminal Modification Project Marine Mammal Monitoring Report indicated that there was one sighting of a group of six Dall's porpoises in Passage Canal during construction work in April 2020 (Leonard and Wisdom 2020).

Killer Whale

Killer whales occur along the entire Alaska coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS, 2016). The three stocks that are most likely to occur in Prince William Sound are the southern Alaska Resident stock, Gulf of Alaska/Aleutian Islands/Bering Sea Transient stock, and the AT1 Transient stock (Muto *et al.,* 2022).

There are three distinct ecotypes, or forms, of killer whales recognized: Resident, Transient, and Offshore. The three ecotypes differ morphologically, ecologically, behaviorally, and genetically. Both residents and transients are common in a variety of

habitats and all major waterways, including protected bays and inlets. There does not appear to be strong seasonal variation in abundance or distribution of killer whales, but there was substantial variability between years (Dahlheim *et al.,* 2009). Spatial distribution has been shown to vary among the different ecotypes, with resident and, to a lesser extent, transient killer whales more commonly observed along the continental shelf, and offshore killer whales more commonly observed in pelagic waters (Rice *et al.,* 2017).

In the Gulf of Alaska, the offshore killer whale ecotype is found in pelagic waters off the Aleutian Islands to California and mainly prey on sharks; the resident ecotype (southern Alaska residents) ranges from Kodiak Island to Southeast Alaska and prefer to eat fish; and two different transient populations (Gulf of Alaska transients and AT1 transients) prefer marine mammals are most often found near the Hinchinbrook Entrance and Montague Strait (Myers *et al.,* 2021). A tagging study focused on resident killer whale movements in Prince William Sound found that killer whales' favored use areas were highly-seasonal and pod specific, likely timed with seasonal salmon returns to spawning streams (Olsen *et al.,* 2018).

With the exception of the AT1 Transient stock, the populations that are known to occur in Prince William Sound are not strategic or depleted under the MMPA. Long-term studies of pods belonging to the southern Alaska resident stock in the Gulf of Alaska indicate these populations are increasing at an estimated growth rate of approximately 3.4 percent (Matkin *et al.,* 2014). However, both resident and transient killer whales were significantly impacted by the 1989 Exxon Valdez Oil spill. Prior to the spill, the resident AB pod consisted of 36 members and from 1989 to 1990, 14 whales disappeared from the pod. The AB pod is considered recovering; however, due to slow reproduction rates only 28 individuals were observed in 2005 (Exxon Valdez Oil Spill Trustee Council 2021). The AT1 Transient stock also experienced high mortality following the oil spill, as 11 of

the original 22 individuals disappeared between 1989 and 1992. The AT1 stock currently numbers only seven individuals (Muto *et al*., 2021).

Results from the Olsen *et al.,* (2018) satellite tagging surveys in Prince William Sound from 2006 to 2014 revealed several core use areas for resident killer whales based on pod and season. Most resident pods primarily concentrated at the southern end of Prince William Sound in Hinchinbrook Entrance during the summer and Montague Strait in the late summer and fall. A few of the pods were observed making trips to deeper glacial fjords including Passage Canal, but these areas did not appear to be an important focus area for the pods. The AD16 pod (estimated 9 animals) and AK pod (estimated 19 animals) were the most frequently observed in the northern glacial fjords of the sound (Muto *et al.,* 2022; Olsen *et al.*, 2018).

Additionally, a 27-year photo identification study in Prince William Sound and Kenai Fjords surveyed both populations of transient killer whales. The study found that the AT1 transients had higher site fidelity to the area, while the Gulf of Alaska transients had a higher exchange of individuals (Matkin *et al*., 2012). Resighting data indicated that the AT1 population are resident to the area and the Gulf of Alaska transients are part of a larger population with a more extensive range. Throughout the study, survival estimates for both populations was generally high, but there was significant population reduction in the AT1 transient after the Exxon Valdez oil spill (Matkin *et al*., 2012). There was no detectable decline in the larger Gulf of Alaska transient population after the oil spill (Matkin *et al*., 2012).

Consultation with marine wildlife tour operators confirmed that killer whales are often observed in Prince William Sound, but less commonly seen in Passage Canal (SolsticeAK 2022). There are prey resources (marine mammals, salmon, etc.) present that may draw killer whales to the area, particularly during salmon runs from June through October, but concentration of prey is not likely large enough to keep killer whales in the

area for long. During the Whittier Ferry Terminal Modification Project in April 2020, there were no observations of killer whales in the action area (Leonard and Wisdom 2020).

Harbor Seal

Harbor seals inhabit coastal and estuarine waters off Alaska and are one of the most common marine mammals in Alaska. They haul out on rocks, reefs, beaches, and drifting glacial ice. They are opportunistic feeders and often adjust their distribution to take advantage of locally and seasonally abundant prey, feeding in marine, estuarine, and occasionally fresh waters (Womble *et al.,* 2009, Allen and Angliss, 2015). Harbor seals are generally non-migratory and, with local movements associated with such factors as tide, weather, season, food availability and reproduction. They deviate from other pinniped species in that pupping may occur on a wide variety of haul-out sites rather than particular major rookeries (ADF&G 2022).

Distribution of the Prince William Sound stock, the only stock considered in this application, range from Elizabeth Island off the southwest tip of the Kenai Peninsula to Cape Fairweather, including Prince William Sound, the Copper River Delta, Icy Bay, and Yakutat Bay (Muto *et al.,* 2022). The Prince William Sound stock of harbor seals are commonly sighted residents and can occur on any given day in the action area, although they tend to be more abundant during the fall months (Womble and Gende 2013).

Communication with Whittier tour operators indicated that harbor seals are often seen in Passage Canal, but generally do not gather near Whittier in large numbers (SolsticeAK 2022). They sometimes haul out at the Whittier Public Boat Harbor around 1,500 meters away (DOT&PF 2019). The Marine Mammal Monitoring Report from the Whittier Ferry Terminal Modification reported 10 sightings of 13 harbor seals during the April 2020 construction period, which agrees with the tour operators' accounts

(commonly seen, generally individual animals rather than groups) (Leonard and Wisdom 2020).

Steller Sea Lion

Steller sea lions were listed as threatened range-wide under the ESA on November 26, 1990 (55 FR 49204). Steller sea lions were subsequently partitioned into the western and eastern Distinct Population Segments (DPSs; western and eastern stocks) in 1997 (62 FR 24345; May 5, 1997). The eastern DPS remained classified as threatened until it was delisted in November 2013. The western DPS (those individuals west of the 144 ◦W longitude or Cape Suckling, Alaska) was upgraded to endangered status following separation of the DPSs, and it remains endangered today. There is regular movement of both DPSs across this 144◦W longitude boundary (Jemison *et al.,* 2013) however, due to the distance from this DPS boundary, it is likely that only western DPS Steller sea lions are present in the project area. Therefore, animals potentially affected by the project are assumed to be part of the western DPS. Sea lions from the eastern DPS, are not likely to be affected by the proposed activity and are not discussed further.

Steller sea lions do not follow traditional migration patterns, but will move from offshore rookeries in the summer to more protected haulouts closer to shore in the winter. They use rookeries and haulouts as resting spots as they follow prey movements and take foraging trips for days, usually within a few miles of their rookery or haulout. They are generalist marine predators and opportunistic feeders based on seasonal abundance and location of prey. Steller sea lions forage in nearshore as well as offshore areas, following prey resources. They are highly social and are often observed in large groups while hauled out but alone or in small groups when at sea (NMFS 2022f).

Steller sea lions are distributed throughout Southcentral Alaska, with patterns loosely correlated to aggregations of spawning and migrating prey species (Sinclair and Zeppelin 2002; Sinclair *et al.,* 2013). Haulout sites in Southcentral Alaska, at and west of

Cape Suckling, were documented through aerial surveys (Fritz *et al.,* 2013). Although there are no documented haulouts or rookeries within Passage Canal, a small number of Steller sea lions have been reported hauling out year-round on a mooring buoy in Shotgun Cove (SolsticeAK 2022; DOT&PF 2019).

Steller sea lions occur year-round in the program action area. Steller sea lions are drawn to fish processing plants and high forage value areas such as anadromous streams. Passage Canal has several anadromous streams that support salmon species and one fish processing plant with an Alaska Department of Environmental Conservation (ADEC) permitted outfall that also attracts Steller sea lions (ADF&G 2022a). There were 9 Steller sea lion groups (representing about 27 individuals) sighted during marine mammal monitoring of the Whittier Ferry Terminal Modification Project in April 2020. Groups ranged from one to seven animals. Steller sea lions were most often observed floating and/or swimming at the surface. Sightings occurred over a period of 6 days and approximately 86 hours of monitoring time (Leonard and Wisdom 2020).

Critical habitat for Steller sea lions was designated by NMFS in 1993 based on the following essential physical and biological habitat features: terrestrial habitat (including rookeries and haulouts important for rest, reproduction, growth, social interactions) and aquatic habitat (including nearshore waters around rookeries and haulouts, free passage for migration, prey resources, and foraging habitats) (58 FR 45269).

The nearest rookery is Seal Rocks located in the Hinchinbrook Entrance between Hinchinbrook and Montague Islands, 124 kilometers (67 nautical miles) southeast of the proposed berth site. The nearest major haulouts are Perry, approximately 44 kilometers (24 nautical miles) southeast of the proposed berth site and Dutch Group, approximately 52 kilometers (28 nautical miles) east (Alaska Fisheries Science Center 2022). Since the ensonified action area encompasses most of Passage Canal, it would intersect Steller sea

lion designated critical habitat. Additionally, since most of Prince William Sound is within Steller sea lion critical habitat, material and equipment barges' routes would transit through critical habitat on the way to the project site.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, etc.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

Table 3 - Marine Mammal Hearing Groups (NMFS, 2018).

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

***** Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

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*., 2005; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The **Estimated Take** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated Take** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and whether those impacts are reasonably expected to, or reasonably likely to,

adversely affect the species or stock through effects on annual rates of recruitment or survival.

Acoustic effects on marine mammals during the specified activity can occur from impact pile driving, vibratory driving, and DTH. The effects of underwater noise from TMC's proposed activities have the potential to result in Level A or Level B harassment of marine mammals in the action area.

Description of Sound Source

The marine soundscape is comprised of both ambient and anthropogenic sounds. Ambient sound is defined as the all-encompassing sound in a given place and is usually a composite of sound from many sources both near and far. The sound level of an area is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, waves, wind, precipitation, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.*, vessels, dredging, aircraft, construction).

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.

In-water construction activities associated with the project would include vibratory pile removal, impact and vibratory pile driving, and drilling. The sounds produced by these activities fall into one of two general sound types: Impulsive and non-impulsive. Impulsive sounds (*e.g.*, explosions, gunshots, sonic booms, impact pile driving) are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI 1986; NIOSH 1998; ANSI 2005; NMFS 2018a). Non-impulsive sounds (*e.g.* aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems) can be broadband, narrowband or tonal, brief or prolonged (continuous or intermittent), and typically do not have the high peak sound pressure with raid rise/decay time that impulsive sounds do (ANSI 1995; NIOSH 1998; NMFS 2018a). 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).

Three types of hammers would be used on this project: impact, vibratory, and DTH. Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak sound pressure levels (SPLs) may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.,* 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards 2002; Carlson *et al.,* 2005).

A DTH hammer is essentially a drill bit that drills through the bedrock using a rotating function like a normal drill, in concert with a hammering mechanism operated by

a pneumatic (or sometimes hydraulic) component integrated into the DTH hammer to increase speed of progress through the substrate (*i.e.,* it is similar to a "hammer drill" hand tool). The sounds produced by the DTH method contain both a continuous non-impulsive component from the drilling action and an impulsive component from the hammering effect. Therefore, we treat DTH systems as both impulsive and non-impulsive sound source types simultaneously.

The likely or possible impacts of TMC's proposed activity on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of equipment and personnel; however, any impacts to marine mammals are expected to be primarily acoustic in nature. Acoustic stressors include effects of heavy equipment operation during pile driving and drilling.

Acoustic Impacts

The introduction of anthropogenic noise into the aquatic environment from pile driving or drilling is the primary means by which marine mammals may be harassed from the TMC's specified activity. In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al.,* 2007). In general, exposure to pile driving or drilling noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.*, avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). Exposure to anthropogenic noise can also lead to non-observable physiological responses such an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection. The effects of pile driving or drilling noise on marine mammals are dependent on several factors, including, but not limited to, sound type (*e.g.*, impulsive vs. non-impulsive), the species, age and sex class (*e.g.*, adult male vs. mom with calf), duration of exposure, the distance between the pile and the

animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok *et al.,* 2004; Southall *et al.,* 2007). Here we discuss physical auditory effects (threshold shifts) followed by behavioral effects and potential impacts on habitat.

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018). The amount of threshold shift is customarily expressed in decibels (dB). A TS can be permanent or temporary. As described in NMFS (2018), there are numerous factors to consider when examining the consequence of TS, including, but not limited to, the signal temporal pattern (*e.g.*, impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.*, spectral content), the hearing and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.*, how an animal uses sound within the frequency band of the signal; *e.g.*, Kastelein *et al.,* 2014), and the overlap between the animal and the source (*e.g.*, spatial, temporal, and spectral).

Permanent Threshold Shift (PTS)—NMFS defines PTS as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018). Available data from humans and other terrestrial mammals indicate that a 40 dB threshold shift approximates PTS onset (see Ward *et al.,* 1958, 1959; Ward 1960; Kryter *et al.,* 1966; Miller 1974; Ahroon *et al.,* 1996; Henderson *et al.,* 2008). PTS levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (Kastak *et al.,* 2008), there are no empirical data measuring PTS in marine mammals largely due to the fact that, for various ethical reasons,

experiments involving anthropogenic noise exposure at levels inducing PTS are not typically pursued or authorized (NMFS 2018).

Temporary Threshold Shift (TTS)—TTS is a temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018). Based on data from cetacean TTS measurements (see Southall *et al.,* 2007), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Schlundt *et al.,* 2000; Finneran *et al.,* 2000, 2002). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with cumulative sound exposure level (SELcum) in an accelerating fashion: At low exposures with lower SELcum, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SELcum, the growth curves become steeper and approach linear relationships with the noise SEL.

Depending on the degree (elevation of threshold in dB), duration (*i.e.*, recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that takes place during a time when the animal is traveling through the open ocean, where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during a time when communication is critical for successful mother/calf interactions could have more serious impacts. We note that reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.,* 2007), so

we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Many studies have examined noise-induced hearing loss in marine mammals (see Finneran (2015) and Southall *et al.* (2019) for summaries). For cetaceans, published data on the onset of TTS are limited to the captive bottlenose dolphin (*Tursiops truncatus*), beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*), and for pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), and California sea lions (*Zalophus californianus*). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense sounds. The difference between the pre-exposure and post-exposure thresholds can be used to determine the amount of threshold shift at various post-exposure times. The amount and onset of TTS depends on the exposure frequency. Sounds at low frequencies, well below the region of best sensitivity, are less hazardous than those at higher frequencies, near the region of best sensitivity (Finneran and Schlundt, 2013). At low frequencies, onset-TTS exposure levels are higher compared to those in the region of best sensitivity (*i.e.,* a low frequency noise would need to be louder to cause TTS onset when TTS exposure level is higher), as shown for harbor porpoises and harbor seals (Kastelein *et al.,* 2019a, 2019b). In addition, TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same SEL (Finneran *et al.,* 2010; Kastelein *et al.,* 2014; Kastelein *et al.,* 2015a; Mooney *et al.,* 2009). This means that TTS predictions based on the total, cumulative SEL will overestimate the amount of TTS from intermittent exposures such as sonars and impulsive sources. Nachtigall *et al.,* (2018) describe the measurements of hearing sensitivity of multiple odontocete species (bottlenose dolphin, harbor porpoise, beluga, and false killer whale (*Pseudorca crassidens*)) when a relatively loud sound was preceded by a warning sound. These

captive animals were shown to reduce hearing sensitivity when warned of an impending intense sound. Based on these experimental observations of captive animals, the authors suggest that wild animals may dampen their hearing during prolonged exposures or if conditioned to anticipate intense sounds. Another study showed that echolocating animals (including odontocetes) might have anatomical specializations that might allow for conditioned hearing reduction and filtering of low-frequency ambient noise, including increased stiffness and control of middle ear structures and placement of inner ear structures (Ketten *et al.,* 2021). Data available on noise-induced hearing loss for mysticetes are currently lacking (NMFS, 2018).

Behavioral Harassment—Exposure to noise from pile driving and removal also has the potential to behaviorally disturb marine mammals. Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.*, Lusseau and Bejder 2007; Weilgart 2007).

Disturbance may result in 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. Pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff 2006). Behavioral responses to sound are highly variable and context-specific and any reactions depend on

numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al.,* 1995; Wartzok *et al.,* 2003; Southall *et al.,* 2007; Weilgart 2007). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.,* 2012), and can vary depending on characteristics associated with the sound source (*e.g.*, whether it is moving or stationary, number of sources, distance from the source). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see Appendices B-C of Southall *et al.,* (2007) for a review of studies involving marine mammal behavioral responses to sound.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.*, bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.*, Croll *et al.,* 2001; Nowacek *et al.,* 2004; Madsen *et al.,* 2006; Yazvenko *et al.,* 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Stress responses – An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.*, Seyle

1950; Moberg 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress – including immune competence, reproduction, metabolism, and behavior – are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.*, Moberg 1987; Blecha 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.,* 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.*, Holberton *et al.,* 1996; Hood *et al.,* 1998; Jessop *et al.,* 2003; Lankford *et al.,* 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed **(**Fair and Becker 2000; Romano *et al.,* 2002b) and, more rarely, studied in

wild populations (*e.g.*, Romano *et al.,* 2002a). For example, Rolland *et al.,* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003), however distress is an unlikely result of this project based on observations of marine mammals during previous, similar projects in the area.

Masking—Sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.*, those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.,* 1995). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.*, snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.*, pile driving, shipping, sonar, seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.*, signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.*, sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions. Masking of natural sounds can result when human activities produce high levels of background sound at frequencies important to marine mammals. Conversely, if the background level of underwater sound is high (*e.g.* on a day with strong wind and high waves), an

anthropogenic sound source would not be detectable as far away as would be possible under quieter conditions and would itself be masked.

Airborne Acoustic Effects—Although pinnipeds are known to haul-out regularly on man-made objects, we believe that incidents of take resulting solely from airborne sound are unlikely due to the sheltered proximity between the proposed project area and these haulout sites (outside of Passage Canal). There is a possibility that an animal could surface in-water, but with head out, within the area in which airborne sound exceeds relevant thresholds and thereby be exposed to levels of airborne sound that we associate with harassment, but any such occurrence would likely be accounted for in our estimation of incidental take from underwater sound. Therefore, authorization of incidental take resulting from airborne sound for pinnipeds is not warranted, and airborne sound is not discussed further here. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

Marine Mammal Habitat Effects

The TMC's construction activities could have localized, temporary impacts on marine mammal habitat and their prey by increasing in-water sound pressure levels and slightly decreasing water quality. However, since the proposed location is not heavily used by marine mammals and is in close proximity to an area currently used by large passenger and shipping vessels, and two active harbors. Construction activities are of short duration and would likely have temporary impacts on marine mammal habitat through increases in underwater and airborne sound. Increased noise levels may affect acoustic habitat (see masking discussion above) and adversely affect marine mammal prey in the vicinity of the project area (see discussion below). During DTH, impact, and vibratory pile driving, elevated levels of underwater noise would ensonify the project area where both fish and mammals occur and could affect foraging success. Additionally, marine mammals may avoid the area during construction, however, displacement due to

noise is expected to be temporary and is not expected to result in long-term effects to the individuals or populations.

Temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are installed or removed. In general, turbidity associated with pile installation is localized to about a 25-ft (7.6 m) radius around the pile (Everitt *et al.,* 1980). The sediments of the project site will settle out rapidly when disturbed. Cetaceans are not expected to be close enough to the pile driving areas to experience effects of turbidity, and any pinnipeds could avoid localized areas of turbidity. Local strong currents are anticipated to disburse any additional suspended sediments produced by project activities at moderate to rapid rates depending on tidal stage. Therefore, we expect the impact from increased turbidity levels to be discountable to marine mammals and do not discuss it further.

In-Water Construction Effects on Potential Foraging Habitat

The proposed activities would not result in permanent impacts to habitats used directly by marine mammals except for the actual footprint of the floating dock for the cruise ship dock. The total seafloor area likely impacted by the project is relatively small compared to the available habitat in Southcentral Alaska and does not include any Biologically Important Areas or other habitat of known importance. The area is highly influenced by anthropogenic activities. Additionally, the total seafloor area affected by pile installation and removal is a small area compared to the vast foraging area available to marine mammals in the area. At best, the impact area provides marginal foraging habitat for marine mammals and fishes. Furthermore, pile driving at the project site would not obstruct movements or migration of marine mammals.

Avoidance by potential prey (*i.e.,* fish) of the immediate area due to the temporary loss of this foraging habitat is also possible. 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. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

Effects on Potential Prey

Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* crustaceans, cephalopods, fish, zooplankton, etc.). Marine mammal prey varies by species, season, and location. Here, we describe studies regarding the effects of noise on known marine mammal prey.

Fish utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.,* Zelick and Mann, 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al.,* 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds which are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.*, feeding, spawning, migration), and other environmental factors. 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). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.*, Fewtrell and McCauley, 2012; Pearson *et al.,* 1992; Skalski *et al.,* 1992; Santulli *et al.,* 1999; Paxton *et al.,* 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.*, Wardle *et al.,* 2001; Jorgenson and Gyselman, 2009).

SPLs of sufficient strength have been known to cause injury to fish and fish mortality. However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.,* (2012a) showed that a TTS of 4-6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.,* 2012b; Casper *et al.,* 2013), and can be mitigated by the use of a bubble curtain (Caltrans 2020).

The most likely impact to fish from pile driving activities at the project areas would be temporary behavioral avoidance of the area. The duration of fish avoidance of an area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated.

Construction activities, in the form of increased turbidity, have the potential to adversely affect forage fish in the project area. Forage fish form a significant prey base for many marine mammal species that occur in the project area. Increased turbidity is expected to occur in the immediate vicinity (on the order of 10 ft (3 m) or less) of construction activities. However, suspended sediments and particulates are expected to

dissipate quickly within a single tidal cycle. Given the limited area affected and high tidal dilution rates, any effects on forage fish are expected to be minor or negligible. Finally, exposure to turbid waters from construction activities is not expected to be different from the current exposure; fish and marine mammals in the Passage Canal are routinely exposed to substantial levels of suspended sediment from natural and anthropogenic sources.

In summary, given the short daily duration of sound associated with individual pile driving events and the relatively small areas being affected, pile driving activities associated with the proposed action are not likely to have a permanent adverse effect on any fish habitat, or populations of fish species. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. Thus, we conclude that impacts of the specified activity are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS' consideration of "small numbers," and the negligible impact determinations.

Harassment is the only type of take expected to result from these activities. 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).

Authorized takes would primarily be by Level B harassment, as use of the acoustic sources (*i.e.*, vibratory or impact pile driving and DTH) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result for Dall's porpoise and harbor seals, due to the cryptic nature of these species in context of larger predicted auditory injury zones. Auditory injury is unlikely to occur for low- and mid-frequency species and otariids, based on the likelihood of the species in the action area, the ability to monitor the entire smaller shutdown zone, and because of the expected ease of detection for the former groups. The proposed mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment). Thresholds have also been developed identifying the received level of in-air sound above which exposed pinnipeds would likely be behaviorally harassed.

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB referenced to 1 micropascal (re 1 µPa) for continuous (*e.g.,* vibratory pile-driving, DTH drilling) and above RMS SPL 160 dB re 1 µPa for non-explosive impulsive (*e.g.*, impact pile driving and DTH hammering) or intermittent (*e.g.*, scientific sonar) sources.

TMC's proposed activity includes the use of continuous (vibratory hammer and DTH) and impulsive (DTH and impact pile-driving) sources, and therefore the 120 and 160 dB re 1 µPa (rms) thresholds are applicable.

Level A harassment – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). TMC's proposed activity includes the use of impulsive (impact pile-driving and DTH) and non-impulsive (vibratory hammer and DTH) sources.

These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Table 4. Thresholds Identifying the Onset of Permanent Threshold Shift.

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1μPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.,* impact pile driving, vibratory pile driving and removal, and DTH).

In order to calculate distances to the Level A harassment and Level B harassment thresholds for the methods and piles being used in this project, NMFS used acoustic monitoring data from other locations to develop source levels for the various pile types, sizes and methods (Table 5). Additionally, a bubble curtain would be deployed at a depth of 60 feet and would be used during all activities that fall within the 60-ft. isobath. Therefore, a 5dB reduction is applies to the estimated sound source levels for driving these piles only.

Table 5 – Observed Source Levels for Pile Installation and Removal

Pile size, Method	**SPL (dB)**	**SEL (dB)**	**Reference**
Bubble Curtain in use (depths of 60-ft or less)			

36-in steel pile, Vibratory Installation (temporary)	161 RMS		U.S. Navy 2015
36-in steel pile, Vibratory Removal (temporary)	161 RMS**		U.S. Navy 2015
36-in steel pile, DTH Installation (temporary)	174 RMS	164 SEL	Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021
36-in steel pile, Vibratory Installation (permanent)	161 RMS**		U.S. Navy 2015
36-in steel pile, Impact Installation (permanent)	187 RMS**	179 SEL**	U.S. Navy 2015
36-in steel pile, DTH Installation (permanent)*	169 RMS**	159 SEL**	Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021
No Bubble Curtain (depths greater than 60-ft)			
36-in steel pile, Vibratory Installation (temporary)	166 RMS		U.S. Navy 2015
36-in steel pile, Vibratory Removal (temporary)	166 RMS		U.S. Navy 2015
42-in steel pile, Vibratory Installation	168.2 RMS		Austin et al. 2016
48-in steel pile, Vibratory Installation	168.2 RMS		Austin et al. 2016
42-in steel pile, Impact Installation	198.6 RMS	186.7 SEL	Austin et al. 2016
48-in steel pile, Impact Installation	198.6 RMS	186.7 SEL	Austin et al. 2016
36-in steel pile, DTH Installation (temporary)	169 RMS**	159 SEL**	Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021
42-in steel pile, DTH Installation*	174 RMS	164 SEL	Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021
48-in steel pile, DTH Installation*	174 RMS	171 SEL	Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021

Note: SELss = single strike sound exposure level; RMS = root mean square

*Source levels proposed here differ from those used in TMC's application as NMFS has updated their acoustic guidance on DTH, resulting in larger Level B harassment SPLs

(*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance#other-nmfs-acoustic-thresholds-and-tools*).
**Attenuated source levels with 5dB reduction due to use of a bubble curtain during these activities (Caltrans, 2015; Austin *et al.,* 2016).

NMFS recommends treating DTH systems as both impulsive and continuous, non-impulsive sound source types simultaneously. Thus, impulsive thresholds are used to evaluate Level A harassment, and continuous thresholds are used to evaluate Level B harassment. With regards to DTH mono-hammers, NMFS recommends proxy levels for Level A harassment based on available data regarding DTH systems of similar sized piles and holes (Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021) (Table 1 includes number of piles and duration; Table 5 includes sound pressure and sound exposure levels for each pile type).

Level B Harassment Zones

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 = transmission loss 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.

The recommended TL coefficient for most nearshore environments is the practical spreading value of 15. This value results in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions, which is the most

appropriate assumption for TMC's proposed activities. The Level B harassment zones and areas of zones of influence (ZOIs) for the proposed activities are shown in Table 6.

Level A Harassment Zones

The ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the Technical Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources, such as pile installation or removal, the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur PTS. The isopleths generated by the User Spreadsheet used the same TL coefficient as the Level B harassment zone calculations (*i.e.,* the practical spreading value of 15). Inputs used in the User Spreadsheet (*e.g.,* number of piles per day, duration and/or strikes per pile) are presented in Table 1. The maximum RMS SPL, SEL, and resulting isopleths are reported in Table 5 and 6.

Table 6. Level A and Level B Harassment Isopleths for Pile Driving Activities

Activity	**Level A harassment zone (m)**					**Level B harassment zone (m)**
	LF cetacean	MF cetacean	HF cetacean	Phocids	Otariids	
Bubble Curtain in use (depths of 60 ft or less)						

36-in steel pile, Vibratory Installation (temporary)	5.2	0.5	7.7	3.2	0.2	5,412
36-in steel pile, Vibratory Removal (temporary)	5.2	0.5	7.7	3.2	0.2	5,412
36-in steel pile, DTH Installation (temporary)	681.1	24.5	820.9	368.8	26.9	6,310
36-in steel pile, Vibratory Installation (permanent)	6.8	0.6	10.1	4.2	0.3	5,412
36-in steel pile, Impact Installation (permanent)	2,015.1	71.7	2,400.3	1,078.4	78.5	631
36-in steel pile, DTH Installation (permanent)*	799.7	28.4	952.6	428	31.2	6,310
No Bubble Curtain (depths greater than 60 ft)						
36-in steel pile, Vibratory Installation (temporary)	11.2	1	16.6	6.8	.05	11,659
36-in steel pile, Vibratory Removal (temporary)	11.2	1	16.6	6.8	.05	11,659
42-in steel pile, Vibratory Installation	20.6	1.8	30.5	12.5	0.9	16,343
48-in steel pile, Vibratory Installation	13	1.2	19.2	7.9	0.6	16,343
42-in steel pile, Impact Installation	6,570.9	233.7	7,827	3,516.4	256	3,744

48-in steel pile, Impact Installation	5,014.6	178.4	5,973.1	2,683.6	195.4	3,744
36-in steel pile, DTH Installation (temporary)	1,484.7	52.8	1,768.5	794.6	57.9	39,811*
42-in steel pile, DTH Installation*	1,722.9	61.3	2,052.2	922	67.1	39,811*
48-in steel pile, DTH Installation*	5,045.7	179.5	6,010.2	2,700.2	196.6	39,811*

*Differs from TMC's application due to difference in source level use. See Table 5.

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including presence, local knowledge, group dynamics, or other relevant information, that will inform the take calculations. We also describe how the information provided above is brought together to produce a quantitative take estimate.

Available information regarding marine mammal occurrence and abundance in the vicinity of Passage Canal includes local knowledge, previous marine construction projects in the Whittier area, and available scientific literature. A summary of proposed take is in Table 7. To accurately describe species occurrence near the action area, marine mammals were described as either common or infrequent.

To obtain more accurate estimates of potential take by Level B harassment, TMC estimated an hourly occurrence probability of each marine mammal species in the action area rather than a weekly or daily estimation, since pile driving activities would not occur over an entire day, but rather over a certain number of hours. Occurrence probability estimates are based on conservative density approximations for each species and factor in historic data of occurrence, seasonality, and group size in the Passage Canal and/or nearby Prince William Sound.

Assumptions for these hourly estimations were that common species (Steller sea lion, harbor seal) would have two group sightings per day in Passage Canal, and infrequent species would have three group sightings per week in Passage Canal, or slightly fewer than one group sighting every two days (Table 7). In these estimations, a sighting does not equal one animal; a sighting equals one group of each particular species. To standardize observation estimates across species, these numbers were distilled down to obtain the hourly occurrence probability for each species. Additionally, one day was equated to 12 hours rather than 24 hours to obtain a rough estimate of observations during daylight hours when pile driving and project activities would be occurring, and to obtain more conservative estimates of species occurrence. TMC states that this hourly estimate provides a more accurate representation of actual possible takes in Passage Bay. For more detailed breakdown of each species occurrence information, see Table 7 in TMC's application.

Table 7 – Estimated Occurrence of Group Sighting of Marine Mammals

Species Occurrence in the Action Area	Group Sighting Occurrence Estimate		
	Weekly	Daily	Hourly
Common (Steller sea lion, harbor seal)	14	2	0.17
Infrequent (humpback whale, Dall's porpoise, killer whale)	3	0.5	0.04

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization.

Using the hourly occurrence probability for a species, this was multiplied by the estimated group size and by the number of hours of each type of pile driving activity for total take estimate.

Estimated take= Hourly occurrence estimate x average group size x hours of pile driving activity

For species infrequently seen in the Passage Canal (humpback whale, Dall's porpoise, and killer whale) and rarely seen close to the project location, only hours of pile driving with the largest resulting isopleths (DTH and vibratory driving) were used to calculate these species take estimates. Impact pile driving was excluded from these analyses because the Level A harassment isopleth was larger than the Level B harassment isopleth, and therefore construction would be shut down before they approach the Level B harassment zone.

Take by Level A harassment is also requested for Dall's porpoise and harbor seals given their frequency in the action area, the large Level A harassment zones for HF cetaceans and phocids, the possibility they may not be seen in the water before pile driving could be shut down, and the fact that Level A harassment isopleths for certain pile driving activities extend to Whittier Seafood's outfall, a known marine mammal foraging area.

The take calculations for Level A harassment are based on the occurrence estimate for the species in the largest Level B harassment zone (16,343 meters) reduced by a factor for each smaller Level A harassment isopleth. While NMFS updated the DTH source levels, resulting in DTH having the largest Level B harassment isopleth, the shoreline is limited in Passage Canal and the largest practical Level B harassment isopleth is the one used by TMC for the original calculation of take by Level A harassment. Therefore, the updated DTH values do not impact the take calculation. The Level A harassment isopleth for each species and specific activity was divided by the

largest Level B harassment isopleth (16,343 m), giving a species multiplier per hour for occurrence in the smaller Level A harassment isopleth. This was multiplied by the number of hours of the specific activity type, giving the estimate for take by Level A harassment during that activity. For example, the Level A harassment isopleth for phocid pinnipeds during impact pile driving of 36-in steel piles is 2,323 meters, so Level B harassment estimates are multiplied by a factor of 0.14 (2,323/16,343 = 0.14) to estimate take in the Level A harassment zone. All take Level A harassment was conservatively calculated using isopleths from unattenuated source levels. Take by Level B harassment was calculated based on occurrence estimates for the area encompassed by the largest isopleth generated by unattenuated source levels (*i.e.,* all of Passage Canal).

Additionally, the shutdown zone for phocid pinnipeds was decreased compared to the calculated zone for pile driving activities that encompassed the public boat harbor approximately 1,500 meters away due to the possibility of harbor seals using the area as a haulout. The shutdown zone was reduced to 1,360-m for impact pile driving 42- and 48-in pile sizes and DTH drilling of 48-in piles and the calculated take by Level A harassment has been doubled for this species.

Table 8 – Proposed Authorized Amount of Taking and Percent of Stock

Species	Stock	Average Group Size	Take by Level A harassment	Take by Level B harassment	Total Take	Percent of Stock
Humpback whale	Hawaii DPS	2.4	0	22	22	<1
	WNP DPS		0	1	1	<1
	Mexico DPS		0	2	2	<1
Dall's Porpoise	Alaska	4.3	9	36	45	<1
	Alaska Resident	14	0	116	116	6

Killer Whale*	GOA/Aleutian Islands/Bering Sea Transient		0	29	29	4.9
Harbor Seal	Prince William Sound	3.5	40	170	210	<1
Steller Sea Lion	Western US	4	0	218	218	<1

*AT1 transient stock take calculation resulted in 0 takes, therefor no takes were requested or are proposed for authorization.

Proposed Mitigation

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 the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the 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 the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat, as well as subsistence uses. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of

accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, and impact on operations.

NMFS proposed the following mitigation measures be implemented for TMC's pile installation and removal activities.

Mitigation Measures

TMC must follow mitigation measures as specified below:

- Ensure that construction supervisors and crews, the monitoring team, and relevant TMC staff are trained prior to the start of all pile driving and DTH activity, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work;
- Employ Protected Species Observers (PSOs) and establish monitoring locations as described in the application, the Marine Mammal Monitoring Plan, and the IHA. The Holder must monitor the project area to the maximum extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions. For all pile driving and removal at least one PSO must be used. The PSO will be stationed as close to the activity as possible;
- The placement of the PSOs during all pile driving and removal and DTH activities will ensure that the entire shutdown zone is visible during pile installation. Should environmental conditions deteriorate such that marine mammals within the entire shutdown zone will not be visible (*e.g.,* fog, heavy rain), pile driving and removal must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected;

- Monitoring must take place from 30 minutes prior to initiation of pile driving or DTH activity (*i.e.,* pre-clearance monitoring) through 30 minutes post-completion of pile driving or DTH activity;
- Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones indicated in Table 9 are clear of marine mammals. Pile driving and DTH may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals;
- TMC must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of three strikes at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer; and
- If a marine mammal is observed entering or within the shutdown zones indicated in Table 9, pile driving and DTH must be delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone (Table 9) or 15 minutes have passed without re-detection of the animal (30 minutes for large cetaceans);
- As proposed by the applicant, in water activities will take place only between civil dawn and civil dusk when PSOs can effectively monitor for the presence of marine mammals; during conditions with a Beaufort Sea State of 4 or less; when the entire shutdown zone and adjacent waters are visible (*e.g.,* monitoring effectiveness in not reduced due to rain, fog, snow, etc.). Pile

driving may continue for up to 30 minutes after sunset during evening civil twilight, as necessary to secure a pile for safety prior to demobilization during this time. The length of the post- activity monitoring period may be reduced if darkness precludes visibility of the shutdown and monitoring zones.

Shutdown Zones

TMC will establish shutdown zones for all pile driving activities. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Shutdown zones would be based upon the Level A harassment zone for each pile size/type and driving method where applicable, as shown in Table 9.

A minimum shutdown zone of 35 m would be applied for all in-water construction activities if the Level A harassment zone is less than 35 m (*i.e.,* vibratory pile driving). A 10 m shutdown zone would also serve to protect marine mammals from collisions with project vessels during pile driving and other construction activities, such as barge positioning or drilling. If an activity is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone indicated in Table 9 or 15 minutes have passed without re-detection of the animal. Construction activities must be halted upon observation of a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met entering or within the harassment zone.

All marine mammals will be monitored in the Level B harassment zones and throughout the area as far as visual monitoring can take place. If a marine mammal enters the Level B harassment zone, in-water activities will continue and the animal's presence within the estimated harassment zone will be documented.

TMC would also establish shutdown zones for all marine mammals for which take has not been authorized or for which incidental take has been authorized but the authorized number of takes has been met. These zones are equivalent to the Level B harassment zones for each activity. If a marine mammal species not covered under this IHA enters the shutdown zone, all in-water activities will cease until the animal leaves the zone or has not been observed for at least 1 hour, and NMFS will be notified about species and precautions taken. Pile removal will proceed if the non-IHA species is observed to leave the Level B harassment zone or if 1 hour has passed since the last observation.

If shutdown and/or clearance procedures would result in an imminent safety concern, as determined by TMC or its designated officials, the in-water activity will be allowed to continue until the safety concern has been addressed, and the animal will be continuously monitored.

Table 9 – Proposed Shutdown Zones and Monitoring Zones

Activity	**Minimum shutdown zone**					**Harassment Zone**
	Low-Frequency (LF) Cetaceans	**Mid-Frequency (MF) Cetaceans**	**High-Frequency (HF) Cetaceans**	**Phocid**	**Otariid**	
Barge movements, pile positioning, etc.[1]	10	10	10	10	10	--
Bubble Curtain in use (depths of 60-ft or less)						
36-in steel pile, Vibratory Installation (temporary)	10	10	10	10	10	5,415
36-in steel pile, Vibratory Removal (temporary)	10	10	10	10	10	5,415

36-in steel pile, DTH Installation (temporary)	700	35	825	370	35	6,310
36-in steel pile, Vibratory Installation (permanent)	10	10	10	10	10	5,415
36-in steel pile, Impact Installation (permanent)	2,055	80	2,400	1,100	80	635
36-in steel pile, DTH Installation (permanent)	800	35	1,000	430	35	6,310
No Bubble Curtain (depths greater than 60-ft)						
36-in steel pile, Vibratory Installation (temporary)	35	35	35	15	15	11,660
36-in steel pile, Vibratory Removal (temporary)	35	35	35	15	15	11,660
42-in steel pile, Vibratory Installation	35	35	35	15	15	16,345
48-in steel pile, Vibratory Installation	35	35	35	15	15	16,345
42-in steel pile, Impact Installation	6,575	260	7,830	1,360*	260	3,745
48-in steel pile, Impact Installation	5,015	200	5,975	1,360*	200	3,745
36-in steel pile, DTH Installation (temporary)	1,485	70	1,770	795	70	16,345**
42-in steel pile, DTH Installation	1,770	70	2,055	925	70	16,345**

48-in steel pile, DTH Installation	5,050	200	6,015	1,360*	200	16,345**

* For phocids (harbor seals) only, the Level A shutdown zone would be reduced to 1,360 m for impact pile driving of 42- and 48-in piles and DTH drilling of 48-in piles to exclude the Whittier Public Boat Harbor.
**Differs from Table 5 Level B harassment zone for DTH because 39,811 m extends longer than Passage Canal, so land masses would block sound transmission and distances would be truncated. It would also be impractical to monitor this whole zone outside of Passage Canal. Instead, DTH monitoring zone would be the entirety of the Passage Canal and equivalent to the largest Level B harassment zone.

Protected Species Observers

The placement of PSOs during all construction activities (described in the **Proposed Monitoring and Reporting** section) would ensure that the entire shutdown zone is visible. Should environmental conditions deteriorate such that the entire shutdown zone would not be visible (*e.g.,* fog, heavy rain), pile driving would be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.

PSOs would monitor the full shutdown zones and the remaining Level A harassment and the Level B harassment zones to the extent practicable. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project areas outside the shutdown zones and thus prepare for a potential cessation of activity should the animal enter the shutdown zone.

Pre-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs would observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone would be considered cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zones listed in Table 10, pile driving activity would be delayed or halted. If work ceases for more than 30 minutes, the pre-activity monitoring of the shutdown zones would commence. A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.,* the entire shutdown zone and surrounding waters must be visible to the naked eye).

Soft-Start Procedures

Soft-start procedures 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. For impact pile driving, contractors would be required to provide an initial set of three strikes from the hammer at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. Soft-start would be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer.

Bubble Curtain

A bubble curtain must be employed during all pile installation and removal in depths of 60 ft. or less. The bubble curtain must be deployed in manner guaranteed to distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column. The lowest bubble ring must be in contact with the mudline for the full circumference of the ring. The weights attached to the bottom ring must ensure 100 percent mudline contact. No parts of the ring or other objects may prevent full mudline contact. Air flow to the bubblers must be balanced around the circumference of the pile.

Based on our evaluation of the applicant’s proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected 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 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 while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*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 marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

Visual Monitoring

Marine mammal monitoring must be conducted in accordance with the conditions in this section, the Monitoring Plan, and this IHA. Marine mammal monitoring during pile driving activities would be conducted by PSOs meeting NMFS' the following requirements:

- Independent PSOs (*i.e.,* not construction personnel) who have no other assigned tasks during monitoring periods would be used;
- At least one PSO would have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization;
- Other PSOs may substitute education (degree in biological science or related field) or training for experience; and
- Where a team of three or more PSOs is required, a lead observer or monitoring coordinator would be designated. The lead observer would be required to have prior experience working as a marine mammal observer during construction.

PSOs must have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times and reason for

implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and

- 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;
- TMC must employ up to four PSOs during all pile driving and DTH activities. A minimum of two PSOs (including the lead PSO) must be assigned to the active pile driving or DTH location to monitor the shutdown zones and as much of the Level B harassment zones as possible.
- TMC must establish the following monitoring locations with the best views of monitoring zones as described in the IHA and Marine Mammal Monitoring Plan.
- Two to four PSOs will be onsite during in-water activities associated with the Whittier Head of the Bay Cruise Ship Dock Project, likely stationed in the following locations PSOs would likely be located at Station 1: stationed just to the south of the site on the shore, Station 2: stationed off Depot Road near the freight loading dock, Station 3: stationed along the shoreline northeast of the Emerald Cove Trailhead, and Station 4: stationed on a boat triangulating an area between Emerald Island, the north shore of Passage Canal, southeast towards Gradual Point, and back southwest toward Trinity Point and Emerald Island as shown in Figure 8 of the Marine Mammal Monitoring Plan. All PSOs would have access to high-quality binoculars, range finders to monitor distances, and a compass to record bearing to animals as well as radios or cells phones for maintaining contact with work crews.

Monitoring would be conducted 30 minutes before, during, and 30 minutes after all in water construction activities. In addition, PSOs would record all incidents of marine mammal occurrence, regardless of distance from activity, and would document any

behavioral reactions in concert with distance from piles being driven or removed. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

TMC shall conduct briefings between construction supervisors and crews, PSOs, TMC staff prior to the start of all pile driving activities and when new personnel join the work. These briefings would explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

Acoustic Monitoring

Acoustic monitoring must be conducted in accordance with the Acoustic Monitoring Plan. TMC must conduct hydroacoustic monitoring of two (one 36-in and one 48-in) piles each from different locations during DTH drilling.

Reporting

A draft marine mammal monitoring report will be submitted to NMFS within 90 days after the completion of pile driving and removal activities, or 60 days prior to a requested date of issuance from any future IHAs for projects at the same location, whichever comes first. The report will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report must include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including the number and type of piles driven or removed and by what method (*i.e.,* impact, vibratory, or DTH) and the total equipment duration for vibratory removal or DTH for each pile or hole or total number of strikes for each pile (impact driving);
- PSO locations during marine mammal monitoring;

- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;
- Upon observation of a marine mammal, the following information:
    - Name of PSO who sighted the animal(s) and PSO location and activity at the time of sighting;
    - Time of sighting;
    - Identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentifiable), PSO confidence in identification, and the composition of the group if there is a mix of species;
    - Distance and bearing of each marine mammal observed relative to the pile being driven for each sightings (if pile driving was occurring at time of sighting);
    - Estimated number of animals (min/max/best estimate);
    - Estimated number of animals by cohort (adults, juveniles, neonates, group composition, sex class, etc.);
    - Animal's closest point of approach and estimated time spent within the harassment zone;
    - Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);
- Number of marine mammals detected within the harassment zones and shutdown zones; by species;

- Detailed information about any implementation of any mitigation triggered (*e.g.,* shutdowns and delays), a description of specific actions that ensured, and resulting changes in behavior of the animal(s), if any; and
- If visibility degrades to where PSO(s) cannot view the entire harassment zones, additional PSOs may be positioned so that the entire width is visible, or work will be halted until the entire width is visible to ensure that any humpback whales entering or within the harassment zone are detected by PSOs.

If no comments are received from NMFS within 30 days, the draft final report will constitute the final report. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments.

Acoustic Monitoring plan

The report must include:

- Type and size of pile being driven, substrate type, method of driving during recordings (e.g., hammer model, energy), and total pile driving duration;
- Whether a sound attenuation device is used and, if so, a detailed description of the device and the duration of its use per pile;
- DTH: Number of strikes and strike rate, depth of substrate to penetrate; pulse duration and mean, median, and maximum sound levels (dB re: 1 µPa); root mean square sound pressure level (SPLrms), cumulative sound exposure level (SELcum), peak sound pressure level (SPLpeak), and single strike exposure sound level (SEL s-s);
- One-third octave band spectrum and power spectral density plot.
- Evaluation of acoustic sound record levels for pile driving activities (DTH).
- Environmental data, including but not limited to, the following: wind speed and direction, air temperature, humidity, surface water temperature, water depth, wave

height, weather conditions, and other factors that could contribute to influencing the airborne and underwater sound levels (e.g., aircraft, boats, etc.)

Reporting Injured or Dead Marine Mammals

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the IHA-holder must immediately cease the specified activities and report the incident to the Office of Protected Resources (OPR) (*PR.ITP.MonitoringReports@noaa.gov*), NMFS and to the Alaska Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, TMC must immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the IHA. The IHA-holder must not resume their activities until notified by NMFS. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact 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 (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 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 harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all species listed in Table 2 for which take could occur, given that NMFS expects the anticipated effects of the proposed pile driving/removal and DTH on different marine mammal stocks to be similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, NMFS has identified species-specific factors to inform the analysis.

Pile driving and DTH activities associated with the project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment and, for some species, Level A harassment from underwater sounds generated by pile driving. Potential takes could occur if individuals are present in the ensonified zone when these activities are underway.

No serious injury or mortality would be expected, even in the absence of required mitigation measures, given the nature of the activities. Further, no take by Level A harassment is anticipated for humpback whales, killer whales, or Steller sea lion due to the application of planned mitigation measures, such as shutdown zones that encompass the Level A harassment zones for these species and the rarity of these species near the action area. The potential for harassment would be minimized through the construction method and the implementation of the planned mitigation measures (see Proposed Mitigation section).

Take by Level A harassment is proposed for two species (Dall's porpoise and harbor seal) as the Level A harassment zones exceed the size of the shutdown zones for specific construction scenarios. Additionally these species could be found more often near the action area and are cryptic in nature. Therefore, there is the possibility that an animal could enter a Level A harassment zone without being detected, and remain within that zone for a duration long enough to incur PTS. Level A harassment of these species is proposed to be conservative. Any take by Level A harassment is expected to arise from, at most, a small degree of PTS (*i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by impact pile driving such as the low-frequency region below 2 kHz), not severe hearing impairment or impairment within the ranges of greatest hearing sensitivity. Animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of PTS.

Further, the amount of take proposed for authorization by Level A harassment is very low for both marine mammal stocks and species. If hearing impairment occurs, it is most likely that the affected animal would lose only a few decibels in its hearing sensitivity. Due to the small degree anticipated, any PTS potential incurred would not be

expected to affect the reproductive success or survival of any individuals, much less result in adverse impacts on the species or stock.

Additionally, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. However, since the hearing sensitivity of individuals that incur TTS is expected to recover completely within minutes to hours, it is unlikely that the brief hearing impairment would affect the individual's long-term ability to forage and communicate with conspecifics, and would therefore not likely impact reproduction or survival of any individual marine mammal, let alone adversely affect rates of recruitment or survival of the species or stock.

The Level A harassment zones identified in Table 6 are based upon an animal exposed to pile driving or DTH up to four piles per day. Given the short duration to impact drive or vibratory install or extract, or use DTH drilling, each pile and break between pile installations (to reset equipment and move piles into place), an animal would have to remain within the area estimated to be ensonified above the Level A harassment threshold for multiple hours. This is highly unlikely give marine mammal movement in the area. If an animal was exposed to accumulated sound energy, the resulting PTS would likely be small (*e.g.,* PTS onset) at lower frequencies where pile driving energy is concentrated, and unlikely to result in impacts to individual fitness, reproduction, or survival.

The nature of the pile driving project precludes the likelihood of serious injury or mortality. For all species and stocks, take would occur within a limited, confined area (adjacent to the project site) of the stock's range. Level A and Level B harassment will be reduced to the level of least practicable adverse impact through use of mitigation measures described herein. Further, the amount of take proposed to be authorized is extremely small when compared to stock abundance.

Behavioral responses of marine mammals to pile driving, pile removals, and DTH at the sites in the Passage Canal are expected to be mild, short term, and temporary. Marine mammals within the Level B harassment zones may not show any visual cues they are disturbed by activities or they could become alert, avoid the area, leave the area, or display other mild responses that are not observable such as changes in vocalization patterns. Given that pile driving, pile removal, and DTH would occur for only a portion of the project's duration, any harassment occurring would be temporary. Additionally, many of the species present in region would only be present temporarily based on seasonal patterns or during transit between other habitats. These temporary present species would be exposed to even smaller periods of noise-generating activity, further decreasing the impacts.

For all species, there are no known Biologically Important Areas (BIAs) near the project area that would be impacted by TMC's planned activities. While southcentral Alaska is considered an important area for feeding humpback whales between March and May (Ellison *et al.,* 2012), it is not currently designated as critical habitat for humpback whales (86 FR 21082; April 21, 2021).

In addition, it is unlikely that minor noise effects in a small, localized area of habitat would have any effect on each stock's ability to recover. 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 activities will have only minor, short-term effects on individuals. The specified activities are not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to

adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized.
- Authorized Level A harassment would be very small amounts and of low degree;
- Level A harassment takes of only Dall's porpoise and harbor seals;
- For all species, the Passage Canal is a very small and peripheral part of their range;

- The intensity of anticipated takes by Level B harassment is relatively low for all stocks. Level B harassment would be primarily in the form of behavioral disturbance, resulting in avoidance of the project areas around where impact or vibratory pile driving is occurring, with some low-level TTS that may limit the detection of acoustic cues for relatively brief amounts of time in relatively confined footprints of the activities;

- Effects on species that serve as prey for marine mammals from the activities are expected to be short-term and, therefore, any associated impacts on marine mammal feeding are not expected to result in significant or long-term consequences for individuals, or to accrue to adverse impacts on their populations;
- The ensonified areas are very small relative to the overall habitat ranges of all species and stocks, and would not adversely affect ESA-designated critical habitat for any species or any areas of known biological importance;

- The lack of anticipated significant or long-term negative effects to marine mammal habitat; and
- TMC would implement mitigation measures including soft-starts and shutdown zones to minimize the numbers of marine mammals exposed to injurious levels of sound, and to ensure that take by Level A harassment is, at most, a small degree of PTS;

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 proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The amount of take NMFS proposes to authorize is below one third of the estimated stock abundance for all species (in fact, take of individuals is less than five percent of the abundance of the affected stocks, see Table 7). This is likely a conservative estimate because we assume all takes are of different individual animals, which is likely

not the case. Some individuals may return multiple times in a day, but PSOs would count them as separate takes if they cannot be individually identified.

The most recent estimate for the Alaska stock of Dall's porpoise was 13,110 animals however this number just accounts for a portion of the stock's range. Therefore, the 45 takes of this stock proposed for authorization is believed to be an even smaller portion of the overall stock abundance.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

In order to issue an IHA, NMFS must find that the specified activity will not have an "unmitigable adverse impact" on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

The Alutiiq and Eyak people of Prince William Sound traditionally harvested marine mammals, however the last recorded harvest of marine mammals in Whittier was in 1990, where it was reported that 7 marine mammals were harvested (ADF&G 2022b). Other Prince William Sound coastal communities such as Cordova, Chenega, and Tatitlek report recent subsistence harvest or use of marine mammals. Harvest of harbor

seals and Steller sea lions was reported in Tatitlek in 2014, the latest year for which data is available from ADF&G's Community Subsistence Information System (ADF&G 2022b).

Subsistence hunters in Prince William Sound report having to travel farther from their home communities to be successful when harvesting marine mammals (Keating et al. 2020). However, their range was not reported to extend into Passage Canal, as all three communities are located at least 60 miles away by boat (Fall and Zimpelman 2016). The proposed project is not likely to adversely impact the availability of any marine mammal species or stocks that are commonly used for subsistence purposes or to impact subsistence harvest of marine mammals in the region because:

- there is no recent recorded subsistence harvest of marine mammals in the area;
- construction activities are localized and temporary;
- mitigation measures will be implemented to minimize disturbance of marine mammals in the action area; and,
- the project will not result in significant changes to availability of subsistence resources.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the proposed mitigation and monitoring measures, NMFS has preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from TMC's proposed activities.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated

critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the Alaska Regional Office.

NMFS is proposing to authorize take of Western US Steller Sea Lion, Western North Pacific Humpback whale, and the California/Oregon/Washington Humpback whale, which are listed under the ESA.

The Permits and Conservation Division has requested initiation of section 7 consultation with the Alaska Region for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to TMC for conducting Whittier head of the Bay Cruise Ship Dock project in Whittier, Alaska, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities#active-authorizations*.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed construction. We also request comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, 1 year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the

Description of Proposed Activities section of this notice is planned or (2) the activities as described in the **Description of Proposed Activities** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA).
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: February 8, 2023.

Kimberly Damon-Randall,
Director, Office of Protected Resources,
National Marine Fisheries Service.

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