



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XF080]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Ketchikan Dock Company, LLC's Ketchikan Berth IV Expansion Project in the East Tongass Narrows, 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 the Ketchikan Dock Company, LLC for authorization to take marine mammals incidental to construction work for the Ketchikan Berth IV Expansion Project in Ketchikan, Alaska in the East Tongass Narrows. 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 Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be

submitted via email to ITP.Potlock@noaa.gov. 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>. In case of problems accessing these documents, please call the contact listed below.

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 <https://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: Kelsey Potlock, Office of Protected Resources, NMFS, (301) 427-8401.

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 (collectively referred to as “mitigation”); and requirements pertaining to the monitoring and reporting of the takings. The definitions of all applicable MMPA statutory terms used above are included in the relevant sections below and can be found in section 3 of the MMPA (16 U.S.C. 1362) and NMFS regulations at 50 CFR 216.103.

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 NAO 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.

Summary of Request

On June 10, 2025, NMFS received a request from the Ketchikan Dock Company, LLC (KDC), for an IHA to take marine mammals incidental to construction activities using pile driving and Down-the-Hole (DTH) drilling in Ketchikan, Alaska in the East

Tongass Narrows. Following NMFS' review of the application(s), KDC submitted a revised version on August 1, 2025. The application was deemed adequate and complete on September 2, 2025. KDC's request is for take of 8 species of marine mammals (consisting of 11 stocks) by Level B harassment and, for a subset of these species (*i.e.*, 7 species (8 stocks)), by Level A harassment. Neither KDC nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

KDC has requested an IHA to authorize marine mammal take incidental to removing and subsequently installing new piles that are necessary in the expansion of Berth IV to accommodate larger cruise ships in the Port of Ketchikan. Since the 2007 construction of Berth IV, the capacity of cruise vessels and larger boats has increased where the current Berth cannot accommodate larger and more modern vessels. This expansion is necessary to support the local economy in Ketchikan as it continues to grow with the cruise and tourism industries.

This proposed project entails only coastal construction activities. Presently, several in-water structures exist that require replacement, including floats, several groups of older piles (referred to as a "dolphin") (consisting of several different sized piles), float restraints, and catwalks that connect the dolphins. These structures would all be removed at Berth IV and new permanent structures would be installed, including new dolphins (of varying pile sizes), a new pontoon, a new boat float, a new ladder/platform to allow access to dolphins, and new mooring points to aid in the expanded boat capacity of the Berth.

Given the use of vibratory pile driving, impact pile driving, and DTH drilling, there is the potential for marine mammals to be taken by Level A harassment and/or Level B harassment.

Dates and Duration

The proposed IHA would be valid for the statutory maximum of 1 year from the date of effectiveness. It will become effective upon written notification from the applicant to NMFS, but not beginning later than 1 year from the date of issuance or extending beyond 2 years from the date of issuance. Currently, construction is planned to occur starting on January 2, 2026 and continue for 3 to 4 months (ending sometime around May 2026). Pile removal and installation activities are expected to necessitate approximately 305 hours over 64 (not necessarily consecutive) days. Overall, the proposed project is not expected to last more than 6 months as the current project schedule does consider the mobilization of materials and any potential delays to do the delayed delivery of necessary materials, equipment maintenance, inclement weather, and shutdowns necessary to prevent impacts to any protected species.

Specific Geographic Region

The proposed project is located within the City of Ketchikan (Township 75 south, Range 90 east, Section 25 of the Copper River Meridian, U.S. Geological Survey Quadrangle KET B5), which is found in Southeast Alaska on the western coast of Revillagigedo Island, near the southernmost boundary of Alaska (Latitude: 55.344°; Longitude: -131.656°). Ketchikan encompasses approximately 3 square miles (mi² (7.7 square kilometers (km²))) of land and 1 mi² (2.6 km²) of water. The site is located on the east side of Tongass Narrows, a marine channel between Revillagigedo and Gravina Islands, consisting of a long, narrow water body approximately 11 miles (mi (17.7 kilometers (km))) (see figure 1). Ketchikan itself is a small commercial fishing hub, tourist destination, and the headquarters of the Tongass National Forest. The resident population is estimated at 13,948 citizens, per the United States 2020 decennial census. Berth IV is part of the Port of Ketchikan, an active marine commercial and industrial

area, and is located adjacent to downtown Ketchikan on the shore of east Tongass Narrows.

Per the Ketchikan Marine Industry Council, the project site has an approximate mean low low water (MLLW) depth ranging from -40 ft (-12.2 m) to -100 feet (-30.5 m). Tidal currents generally range from 0.3 mi (0.5 km) to 1.6 mi (2.6 km) per hour during flood and ebb tides. At the project site where piles would be driven, water depths range between approximately 60 feet (ft) (18.3 meters (m)) to 160 ft (48.8 m) (Peratovich and Nottingham Engineers, Inc. (PND), 2006). Tidal currents generally range from 0.3 miles (0.5 km) to 1.6 miles (2.6 km) per hour during flood and ebb tides (PND, 2006). Water depths in Tongass Narrows that would be ensonified are generally 160 ft (48.8 m) or shallower, but they get deeper past the southern end of Pennock Island, reaching depths up to 625 ft (190.5 m) (NOAA, 2015). Major waterbodies near the area include the Clarence Strait to the north, the Revillagigedo Channel to the south, Nichols Passage to the west, and George Inlet to the east. Berth IV's expansion would take place at the existing dock facility.

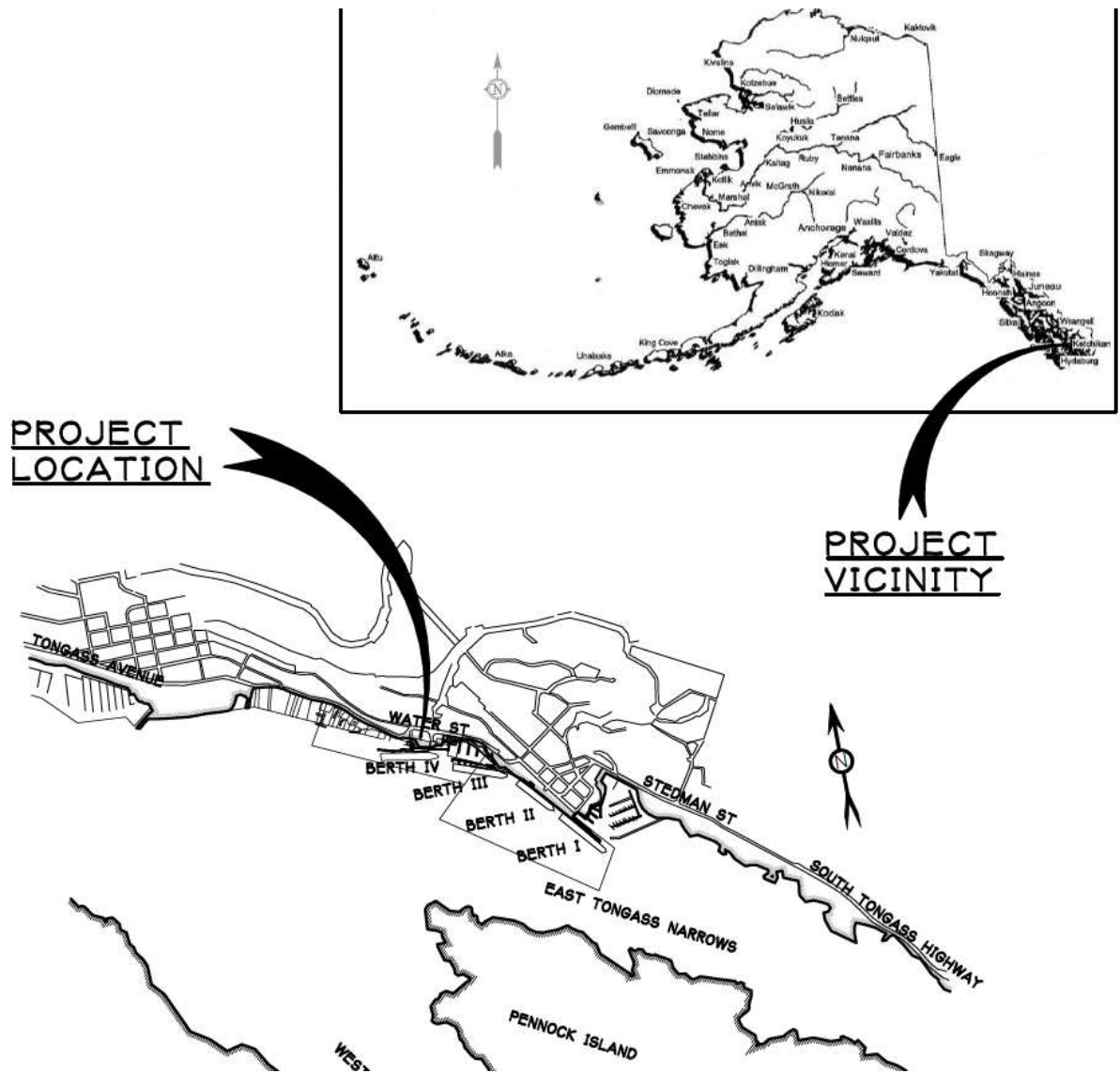


Figure 1 – Proposed Project Location and Vicinity Map for the Ketchikan Berth IV Expansion Project

Detailed Description of the Specified Activity

KDC has proposed to remove and subsequently install piles on the existing Berth IV to expand its capabilities for larger cruise vessels. All piles would be removed, temporarily installed and then subsequently removed, or permanently installed using vibratory pile driving (ICE 44B), impact pile driving (Delmag D46), or using DTH (Holte 100,000 feet-pounds (ft-lbs.) top drive with a DTH hammer and bit). Piles would also be “stabbed” using the crane to position them on the substrate prior to installation. Specifically, the proposed project would require the removal of the following in-water components:

- The existing barge float;
- The existing north float;
- The existing 60-ft (18.3-m) gangway to the north float;
- The floating barge dolphin #1 (consisting of two 30-inch (76.2-centimeter (cm))) piles and one 36-in (91.4-cm) pile);
- The floating barge dolphin #2 (consisting of two 30-in (76.2-cm) piles);
- The breasting dolphin #2 (consisting of three 36-in (91.4-cm) piles and two 30-in (76.2-cm) piles);
- The small float restraint (consisting of two 24-in (61-cm) piles); and
- The existing catwalk that connects breasting dolphin #2 and breasting dolphin #1.

In their place, new piles and in-water structures would be installed, including:

- The mooring dolphin #1 (consisting of four 36-in (91.4-cm) steel batter piles);
- The shoreline dolphin #2 (consisting of two 48-in (121.9-cm) steel batter piles and two 48-in (121.9-cm) steel plumb piles);
- The pontoon dolphin #1 (consisting of two 48-in (121.9-cm) steel batter piles and three 48-in (121.9-cm) steel plumb piles);

- The pontoon dolphin #2 (consisting of two 48-in (121.9-cm) steel batter piles, and three 48-in (121.9-cm) steel plumb piles);
- One 50-ft x 285-ft (15.2-m x 86.9-m) floating pontoon; and
- One 12-ft x 220-ft (3.7-m x 67.1-m) small boat float.

Between the removal of the existing piles and the installation of new piles, KDC would also need to temporarily install and remove piles using vibratory pile driving for both installation and removal. These would consist of 20 30-inch (76.2-cm) steel piles installed and removed across approximately 10 days (5 days for installation, 5 days for removal). These are necessary to guide and accurately place the pile templates ahead of the installation of permanent piles.

Section 1.2.4.7 of the application includes the detailed construction sequence, which NMFS refers to but does not reiterate here.

Additionally, KDC would also install several out of water components, including a ladder/platform to allow for access to the existing breasting dolphin and two new mooring points on each of the existing mooring dolphins #1 and #2 ($n=4$).

For these construction activities, KDC would utilize several barges for the in-water activities. Two or three material barges (measuring approximately 250 ft x 76 ft x 15.5 ft (76.2 m x 23.2 m x 4.7 m)) would be used to transport materials from Seattle, Washington to the project site and then to be used on-site as a staging area during construction activities. Traveling from Juneau, Alaska to Ketchikan, one construction barge (either the *Brightwater* or the *Swiftwater*), which are both crane barges measuring approximately 280 ft x 76 ft x 16 ft (85.3 m x 23.1 m x 4.9 m) or 230 ft x 60 ft x 15.5 ft (70.1 m x 18.3 m x 4.7 m), respectively, would be located onsite to support construction. Lastly, two 20-ft (6.1-m) skiffs, each with a single 90 horsepower (67,113 watts) onboard motor, would be transported to the project site on either the *Brightwater* or the *Swiftwater* to support construction, transport the crew and workers, and to support marine mammal

monitoring efforts. At the construction site, all barges would be secured in place in-water and on-shore, either using spuds or four 15,500-pound (lbs (7,030 kilogram (kg))) anchors. The two on-shore anchors would be placed near the existing rip rap slope while the two in-water anchors would be placed about 1,500 to 2,000 m (4,921.3 to 6,561.7 ft) from the mooring dolphins. When transiting, all vessels would travel under 8 knots (8 nautical miles per hour), depending on the type of vessel.

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, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; <https://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 anticipated or proposed to be authorized here, PBR and annual serious injury and mortality (M/SI) 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 managed stocks in this region are assessed in NMFS’ draft 2024 Alaska and Pacific SARs. All values presented in table 2 are the most recent available at the time of publication (including from the draft 2024 SARs) and are available online at:

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>.

Table 2 – Species^a With Estimated Take from the Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) ^b	Stock abundance (CV; N _{min} ; most recent abundance survey) ^c	PBR	Annual M/SI ^d
<i>Order Artiodactyla—Infraorder Cetacea—Mysticeti (baleen whales)</i>						
<i>Family Balaenopteridae (rorquals):</i>						
Humpback whale	<i>Megaptera novaeangliae</i>	Hawai’i ^e	-, -, N	11,278 (0.56, 7,265, 2020)	127	27.09
		Mexico-North Pacific	T, D, Y	N/A (N/A, N/A, 2006) ^f	UND	0.57
Minke whale	<i>Balaenoptera acutorostrata</i>	Alaska	-, -, N	N/A (N/A, N/A, N/A) ^g	UND	0
<i>Odontoceti (toothed whales, dolphins, and porpoises)</i>						
<i>Family Delphinidae:</i>						
Killer whale	<i>Orcinus orca</i>	Eastern North Pacific Alaska Resident	-, -, N	1,920, (N/A, 1,920, 2019) ^h	19	1.3
		Eastern North Pacific Northern Resident	-, -, N	302 (N/A, 302, 2018)	2.2	0.2

		West Coast Transient	-, -, N	439 (N/A, 349, 2018)	3.5	0.4
<i>Family Phocoenidae (porpoises):</i>						
Dall's porpoise	<i>Phocoenoides dalli</i>	Alaska	-, -, N	UND (UND, UND, 2015) ⁱ	UND	37
Harbor porpoise	<i>Phocoena phocoena</i>	Southern Southeast Alaska Inland Waters ^j	-, -, Y	890 (0.37, 610, 2019)	6.1	7.4
<i>Order - Carnivora - Pinnipedia</i>						
<i>Family Otariidae (eared seals and sea lions)</i>						
Steller sea lion	<i>Eumetopias jubatus</i>	Eastern	-, -, N	36,308 (N/A, 36,308, 2022) ^k	2,178	93.2
<i>Family Phocidae (earless seals)</i>						
Harbor seal	<i>Phoca vitulina</i>	Clarence Strait	-, -, N	27,659 (N/A, 24,854, 2015)	746	40
Northern elephant seal	<i>Mirounga angustirostris</i>	CA Breeding	-, -, N	187,386 (N/A, 85,369, 2013)	5,122	13.7

a – Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (<https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies/>).

b – 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 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.

c – NMFS marine mammal stock assessment reports online at www.nmfs.noaa.gov/pr/sars/. CV is the coefficient of variation; N_{\min} is the minimum estimate of stock abundance. In some cases, a CV is not applicable. N/A indicates data are unknown. UND (undetermined) PBR indicates data are available to calculate a PBR level but a determination has been made that calculating a PBR level using those data is inappropriate (see the SAR for details).

d – 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 strikes). Annual M/SI often cannot be determined precisely and is sometimes presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

e – New SAR in 2022 following North Pacific humpback whale stock structure changes.

f – Abundance estimates are based upon data collected more than 8 years ago and, therefore, current estimates are considered unknown.

g – Reliable population estimates are not available for this stock. Please see Friday *et al.* (2013) and Zerbin *et al.* (2006) for additional information on numbers of minke whales in Alaska.

h – N_{est} or the best estimate of abundance, is based upon counts of individuals identified from photo-ID catalogs.

i – The best available abundance estimate is likely an underestimate for the entire stock because it is based upon a survey that covered only a small portion of the stock's range.

j – New stock split from Southeast Alaska stock.

k – N_{est} is best estimate of counts, which have not been corrected for animals at sea during abundance surveys. Estimates provided are for the U.S. only.

As indicated above, all eight species (with 11 managed stocks) in table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur.

For all species except humpback whales, there are no known biologically important areas (BIA) near the project site that KDC's proposed activity would impact. For humpback whales, the inland waters of Southeast Alaska are a seasonal feeding BIA from May through September (Wild *et al.*, 2023). However, due to development and human presence, the Tongass Narrows are not essential portions of this habitat. The Tongass Narrows are also a small passageway representing a tiny portion of the available habitat for humpback whales.

In addition, sea otters (*Enhydra lutris*) may be found in both Ketchikan and the Tongass Narrows. However, this species is managed by the U.S. Fish and Wildlife Service (see <https://www.fws.gov/species/sea-otter-enhydra-lutris>) and therefore not discussed further in this document.

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 or hear over the same frequency range (*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.*). Subsequently, NMFS (2018, 2024) 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. On May 3, 2024, NMFS published (89 FR 36762) and solicited public comment on its draft Updated Technical Guidance, which includes updated thresholds and weighting functions to inform auditory injury estimates, and is intended to replace the 2018 Technical Guidance referenced above, once finalized. The public comment period ended on June 17, 2024, and although the Guidance is not final, we expect the Guidance to represent the best available science once it is. In order to support consideration of the best available science, we have conducted basic comparative calculations using the draft Guidance for the purposes of understanding the number of takes by Level A harassment under the updated Guidance. Marine mammal hearing groups and their associated hearing ranges are provided in table 3. Of the species potentially present in the action area, two are considered low-frequency (LF) cetaceans, one is considered high-frequency (HF) cetaceans, two are considered very high-frequency (VHF) cetaceans, one is an otariid pinniped (OW), and two are phocid pinnipeds (PW).

Table 3 – Marine Mammal Hearing Groups (NMFS, 2024)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 36 kHz
High-frequency (HF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
Very High-frequency (VHF) cetaceans (true porpoises, <i>Kogia</i> , river dolphins, Cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	200 Hz to 165 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	40 Hz to 90 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 68 kHz
*Represents the generalized hearing range for the entire group as a composite (<i>i.e.</i> , all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on ~65 dB threshold from composite audiogram, previous analysis in NMFS (2018), and/or data from Southall <i>et al.</i> (2007, 2019). Additionally, animals are able to detect very loud sounds above and below that “generalized” hearing range.	

For more detail concerning these groups and associated generalized hearing ranges, please see NMFS (2024) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section includes a summary and provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The **Estimated Take of Marine Mammals** 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 of Marine Mammals** 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 activities are expected to potentially occur from impact and vibratory pile removal and/or installation, and DTH. The effects of underwater noise from KDC's proposed activities have the potential to result in Level B harassment of marine mammals in the action area, and for some marine mammal species as a result of certain activities, Level A harassment.

Overall, the proposed activities include the removal and installation of old, temporary, and permanent piles in Ketchikan, Alaska. There are a variety of types and degrees of effects to marine mammals, prey species, and habitat that could occur as a result of the Project. Below we provide a brief description of the types of sound sources that would be generated by the project, the general impacts from these types of activities, and an analysis of the anticipated impacts on marine mammals from the project, with consideration of the proposed mitigation measures.

Description of Sound Sources for the Specified Activities

Activities associated with the proposed project that have the potential to incidentally take marine mammals through exposure to sound would include impact pile

driving for installation, vibratory pile driving for removal and installation, and DTH. Impact hammers typically operate by repeatedly dropping and/or pushing a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is impulsive, 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 substrate. Vibratory hammers typically produce less sound (*i.e.*, lower levels) 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; California Department of Transportation (CALTRANS), 2015, 2020). Sounds produced by vibratory hammers are non-impulsive; compared to sounds produced by impact hammers, the rise time is slower, reducing the probability and severity of injury, and the sound energy is distributed over more time (Nedwell and Edwards, 2002; Carlson *et al.*, 2005).

DTH systems use a combination of percussive and drilling mechanisms to advance a hole into the rock, with or without simultaneously advancing a pile/casing into that hole. Drill cuttings and debris at the rock face are removed by an air-lift exhaust through the inside of the pile (Guan and Miner, 2020). Unlike other pile installation methods, at least one sound source during DTH is found at the intersection of the drill tip and the substrate and is often more characteristically a point source rather than a linear source, as in impact and vibratory pile driving. A DTH system is essentially a drill bit that drills through the bedrock using a rotating function like a normal drill, in concert with a hammering mechanism integrated into the DTH hammer to increase speed of progress through the substrate (*i.e.*, it is similar to a “hammer drill” hand tool). DTH systems typically involve a single hammer (mono-hammer), but multi- or “cluster” hammer drills may also be used.

DTH systems include both DTH drilling and DTH driving techniques. During DTH pile drilling, the DTH hammer does not make direct contact with the pile; rather the hammer acts as a percussive drill to advance a hole through the substrate within a casing (casing is driven through overburden using impact or vibratory methods). After the hole is drilled to the desired depth, the casing is removed, and the production pile is placed inside the hole. Often, the production pile is then proofed with an impact hammer. If needed, a tension anchor can be drilled following these same methods within the production pile to add lateral support to the pile.

During DTH pile driving, the DTH hammer directly strikes a specially designed shoe located at the bottom of the pile, which has wings that have a slightly larger diameter than the pile (*i.e.*, the hammer directly strikes the production pile itself; no pile casing is used). The drill head locks into the bottom of the pile, and then the drill head and pile advance simultaneously into the substrate to the desired depth. Often, the production pile is then proofed with an impact hammer. If needed, a tension anchor can be drilled using DTH drilling methods within the production pile to add lateral support to the pile.

The sounds produced by the DTH methods simultaneously contain both a continuous non-impulsive component from the drilling action and an impulsive component from the hammering effect. Therefore, for purposes of evaluating Level A and Level B harassment under the MMPA, NMFS treats DTH systems as both impulsive (Level A harassment thresholds) and continuous, non-impulsive (Level B harassment thresholds) sound source types simultaneously.

Typical activities for which DTH systems are used include rock socketing and tension or rock anchoring. Rock socketing involves using DTH techniques to create a hole in the bedrock inside which a pile is placed to give it lateral and longitudinal strength as described in DTH drilling, above. Rock sockets are made in bedrock when

overlying sediments are too shallow to adequately secure the bottom portion of a pile using other methods.

The purpose of a tension anchor is to secure a pile to the bedrock to withstand uplift forces. Tension anchors are installed within production piles that are installed into the substrate below the elevation of the pile tip after the pile has been driven through the sediment layer to refusal. Typically a small diameter casing (*e.g.*, 6-in to 8-in (15.24-cm to 20.32-cm)) steel pipe casing) is inserted into a larger diameter production pile. A rock drill is then inserted into the casing, and a small (*e.g.*, 6- to 10-in; 15.24- to 25.4-cm) diameter hole is drilled into bedrock with rotary and percussion drilling methods (using DTH drilling methods). The drilling activity is contained within the steel pile casing and the steel pipe pile. The typical depth of the drilled tension anchor hole varies, but 6–9 m (19.7–29.5 ft) depth is common. A steel rod is then grouted into the drilled hole and affixed to the top of the pile.

The likely or possible impacts of KDC's proposed activities on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, given there are no known pinniped haul-out sites in the vicinity of the project site, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Potential Effects of Underwater Sound on Marine Mammals

The introduction of anthropogenic noise into the aquatic environment from vibratory pile driving, impact pile driving, and DTH is the primary means by which marine mammals may be harassed from the KDC's specified activities. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life from none or minor to potentially severe responses depending on received levels, duration of exposure, behavioral context, and various other

factors. Broadly, underwater sound from active acoustic sources, such as those in the proposed project, can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al.*, 1995; Gordon *et al.*, 2003; Nowacek *et al.*, 2007; Southall *et al.*, 2007; Götz *et al.*, 2009).

We describe the more severe effects of certain non-auditory physical or physiological effects only briefly as we do not expect that the use of impact/vibratory hammers and DTH are reasonably likely to result in such effects (see below for further discussion). Potential effects from impulsive sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.*, 1973). Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (*e.g.*, change in dive profile as a result of an avoidance reaction) caused by exposure to sound include neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.*, 2006; Southall *et al.*, 2007; Zimmer and Tyack, 2007; Tal *et al.*, 2015). The Project activities considered here do not involve the use of devices such as explosives or mid-frequency tactical sonar that are associated with these types of effects.

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, 2019). Exposure to anthropogenic 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). It can also lead to non-observable physiological responses, such as 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 degree of effect of an acoustic exposure on marine mammals is dependent on several factors, including, but not limited to, sound type (*e.g.*, impulsive vs. non-impulsive), signal characteristics, the species, age and sex class (*e.g.*, adult male vs. mom with calf), duration of exposure, the distance between the noise source and the animal, received levels, behavioral state at time of exposure, and previous history with exposure (Wartzok *et al.*, 2004; Southall *et al.*, 2007). In general, sudden, high-intensity sounds can cause hearing loss, as can longer exposures to lower-intensity sounds. Moreover, any temporary or permanent loss of hearing, if it occurs at all, will occur almost exclusively for noise within an animal's hearing range. We describe below the specific manifestations of acoustic effects that may occur based on the activities proposed by KDC. Richardson *et al.* (1995) described zones of increasing intensity of effect that might be expected to occur in relation to distance from a source and assuming that the signal is within an animal's hearing range. First (at the greatest distance) is the area within which the acoustic signal would be audible (potentially perceived) to the animal but not strong enough to elicit any overt behavioral or physiological response. The next zone (closer to the receiving animal) corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. The third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e.*, when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

Below, we provide additional detail regarding potential impacts on marine mammals and their habitat from noise in general, starting with hearing impairment, as well as from the specific activities KDC plans to conduct, to the degree it is available.

Hearing Threshold Shifts – NMFS defines a noise-induced threshold shift 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, 2024). The amount of threshold shift is customarily expressed in dB. A threshold shift can be permanent or temporary. As described in NMFS (2018, 2024) there are numerous factors to consider when examining the consequence of threshold shift, 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 threshold shift, the magnitude of the threshold shift, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.*, spectral content), the hearing frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.*, how 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).

Auditory Injury (AUD INJ) – NMFS (2024) defines AUD INJ as damage to the inner ear that can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy (Houser, 2021; Finneran, 2024). AUD INJ may or may not result in a permanent threshold shift (PTS). PTS is subsequently defined 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, 2024). PTS does not generally affect more than a limited frequency range, and an animal that has incurred PTS has some level of hearing loss at the relevant frequencies; typically animals with PTS or other AUD INJ are not functionally deaf (Au

and Hastings, 2008; Finneran, 2016). Available data from humans and other terrestrial mammals indicate that a 40-dB threshold shift approximates AUD INJ onset (see Ward *et al.*, 1958, 1959; Ward, 1960; Kryter *et al.*, 1966; Miller, 1974; Ahroon *et al.*, 1996; Henderson *et al.*, 2008). AUD INJ levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (*Phoca vitulina*) (Kastak *et al.*, 2008), there are no empirical data measuring AUD INJ in marine mammals largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing AUD INJ are not typically pursued or authorized (NMFS, 2024).

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, 2024), and is not considered an AUD INJ. Based on data from marine mammal TTS measurements (see Southall *et al.*, 2007, 2019), 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 (Finneran *et al.*, 2000, 2002; Schlundt *et al.*, 2000). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with the 24-hour cumulative sound exposure level (SEL_{24}) in an accelerating fashion: at low exposures with lower SEL_{24} , the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{24} , the growth curves become steeper and approach linear relationships with the sound exposure level (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 more impactful (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 time when communication is critical for successful mother/calf interactions could have more severe 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). TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 2013). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. For cetaceans, published data on the onset of TTS are limited to captive bottlenose dolphin (*Tursiops truncatus*), beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*) (Southall *et al.*, 2019). For pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals, bearded seals (*Erignathus barbatus*) and California sea lions (*Zalophus californianus*) (Kastak *et al.*, 1999, 2007; Kastelein *et al.*, 2019b, 2019c, 2021, 2022a, 2022b; Reichmuth *et al.*, 2019; Sills *et al.*, 2020). TTS was not observed in spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to single airgun impulse sounds at levels matching previous predictions of TTS onset (Reichmuth *et al.*, 2016). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense or long-duration sound exposures. 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 below the region of best sensitivity for a species or hearing group are less hazardous than those 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, 2019c). Note that in general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). 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 (Mooney *et al.*, 2009; Finneran *et al.*, 2010; Kastelein *et al.*, 2014, 2015). This means that TTS predictions based on the total, SEL₂₄ will overestimate the amount of TTS from intermittent exposures, such as sonars and impulsive sources. Nachtigall *et al.* (2018) describe 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, 2024). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species.

Relationships between TTS and AUD INJ thresholds have not been studied in marine mammals, and there are no measured PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. AUD INJ typically occurs at exposure levels at least several dB above that inducing mild TTS (*e.g.*, a 40-dB threshold shift approximates AUD INJ onset (Kryter *et al.*, 1966; Miller, 1974), while a 6-dB threshold shift approximates TTS onset (Southall *et al.*, 2007, 2019). Based on data from terrestrial mammals, a precautionary assumption is that the AUD INJ thresholds for impulsive sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and AUD INJ cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.*, 2007, 2019). Given the higher level of sound or longer exposure duration necessary to cause AUD INJ as compared with TTS, it is considerably less likely that AUD INJ could occur.

Behavioral Effects – Exposure to noise also has the potential to behaviorally disturb marine mammals response – in other words, not every response qualifies as behavioral disturbance, and for responses that do, those of a higher level, or accrued across a longer duration, have the potential to affect foraging, reproduction, or survival. Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.*, minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses may include: changing durations of surfacing and dives, changing direction and/or speed; reducing/increasing vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); eliciting a visible startle

response or aggressive behavior (such as tail/fin slapping or jaw clapping); and avoidance of areas where sound sources are located. In addition, 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.*, 2004; Southall *et al.*, 2007, 2019; Weilgart, 2007; Archer *et al.*, 2010). 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 and C of Southall *et al.* (2007) and Gomez *et al.* (2016) for reviews of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.*, 2004). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a “progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,” rather than as, more generally, moderation in response to human disturbance (Bejder *et al.*, 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure.

As noted above, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.*, 1995; Wartzok *et al.*, 2004; National Research Council (NRC), 2005). Controlled experiments with captive marine mammals have shown pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.*, 1997; Finneran *et al.*, 2003). Observed responses of wild marine mammals to loud-pulsed sound sources (*e.g.*, seismic airguns) have been varied but often consist of avoidance behavior or other behavioral changes (Richardson *et al.*, 1995; Morton and Symonds, 2002; Nowacek *et al.*, 2007).

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 (*e.g.*, Erbe *et al.*, 2019). 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. 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; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Avoidance and displacement – Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.*, Frankel and Clark, 2000; Costa *et al.*, 2003; Ng and Leung, 2003; Nowacek *et al.*, 2004; Goldbogen *et al.*, 2013a, 2013b, Blair

et al., 2016). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.*, foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

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. Acoustic and movement bio-logging tools also have been used in some cases to infer responses to anthropogenic noise. For example, Blair *et al.* (2015) reported significant effects on humpback whale foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship noise. In addition, Wisniewska *et al.* (2018) reported that tagged harbor porpoises demonstrated fewer prey capture attempts when encountering occasional high-noise levels resulting from vessel noise as well as more vigorous fluking, interrupted foraging, and cessation of echolocation signals observed in response to some high-noise vessel passes. 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.

Respiration rates vary naturally with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other

behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.*, Kastelein *et al.*, 2001; 2005; 2006; Gailey *et al.*, 2007). For example, harbor porpoise respiration rates increased in response to pile driving sounds at and above a received broadband SPL of 136 dB (zero-peak SPL: 151 dB re 1 μ Pa (decibels referenced to 1 microPascal (μ Pa))); SEL of a single strike (SEL_{ss}): 127 dB re 1 μ Pa²-s) (Kastelein *et al.*, 2013).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.*, 1995). For example, gray whales (*Eschrichtius robustus*) are known to change direction – deflecting from customary migratory paths – in order to avoid noise from seismic surveys (Malme *et al.*, 1984). Harbor porpoises, Atlantic white-sided dolphins (*Lagenorhynchus actus*), and minke whales have demonstrated avoidance in response to vessels during line transect surveys (Palka and Hammond, 2001). In addition, beluga whales in the St. Lawrence Estuary in Canada have been reported to increase levels of avoidance with increased boat presence by way of increased dive durations and swim speeds, decreased surfacing intervals, and by bunching together into groups (Blane and Jaakson, 1994). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.*, Bowles *et al.*, 1994; Goold, 1996; Stone *et al.*, 2000; Morton and Symonds, 2002; Gailey *et al.*, 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if

habituation to the presence of the sound does not occur (*e.g.*, Blackwell *et al.*, 2004; Bejder *et al.*, 2006; Teilmann *et al.*, 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.*, directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996; Bowers *et al.*, 2018). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (England *et al.*, 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.*, when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fishes and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.*, Beauchamp and Livoreil, 1997; Fritz *et al.*, 2002; Purser and Radford, 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.*, decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.*, Harrington and Veitch, 1992; Daan *et al.*, 1996; Bradshaw *et al.*, 1998). However, Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a 5-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.*, 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.*, 2007). Note that there is a difference between multi-day substantive (*i.e.*, meaningful) behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

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 stress-related 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 would 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; Krausman *et al.*, 2004; Lankford *et al.*, 2005; Ayres *et al.*, 2012; Yang *et al.*, 2022). 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. In addition, Lemos *et al.* (2022) observed a correlation between higher levels of fecal glucocorticoid metabolite concentrations (indicative of a stress response) and vessel traffic in gray whales. Yang *et al.* (2022) studied behavioral and physiological responses in captive bottlenose dolphins exposed to playbacks of “pile-driving-like” impulsive sounds, finding significant changes in cortisol and other physiological indicators but only minor behavioral changes. These and other studies lead to a reasonable expectation that some marine mammals would 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, 2005); however, distress is an unlikely result of this project based on observations of marine mammals during previous, similar construction projects.

Vocalizations and Auditory Masking – Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack, 2008), noise from anthropogenic sound sources can interfere with these functions, but only if the noise spectrum overlaps with the hearing sensitivity of the receiving marine mammal (Southall *et al.*, 2007; Clark *et al.*, 2009; Hatch *et al.*, 2012). Chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.*, 2009). Acoustic masking is when other noises such as from human sources interfere 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; Erbe *et al.*, 2016). Therefore, under certain circumstances, marine mammals whose acoustical sensors or environments are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. 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 (Hotchkin and Parks, 2013).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization

behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.*, 2000; Fristrup *et al.*, 2003) or vocalizations (Foote *et al.*, 2004), respectively, while North Atlantic right whales (*Eubalaena glacialis*) have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.*, 2007). Fin whales (*Balaenoptera physalus*) have also been documented lowering the bandwidth, peak frequency, and center frequency of their vocalizations under increased levels of background noise from large vessels (Castellote *et al.*, 2012). Other alterations to communication signals have also been observed. For example, gray whales, in response to playback experiments exposing them to vessel noise, have been observed increasing their vocalization rate and producing louder signals at times of increased outboard engine noise (Dahlheim and Castellote, 2016). Alternatively, in some cases, animals may cease sound production during production of aversive signals (Bowles *et al.*, 1994, Wisniewska *et al.*, 2018).

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is human-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect (though not necessarily one that would be associated with harassment).

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.*, Clark *et al.*, 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.*, Miller *et al.*, 2000; Foote *et al.*, 2004; Parks *et al.*, 2007; Di Iorio and Clark, 2010; Holt *et al.*, 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.*, 1995), through amplitude modulation of the signal, or through other compensatory behaviors, including modifications of the acoustic properties of the signal or the signaling behavior (Hotchkin and Parks, 2013). Masking can be tested directly in captive species (*e.g.*, Erbe, 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.*, Branstetter *et al.*, 2013).

Masking occurs in the frequency band that the animals utilize, and is more likely to occur in the presence of broadband, relatively continuous noise sources such as vibratory pile driving. Energy distribution of vibratory pile driving sound covers a broad frequency spectrum, and is anticipated to be within the audible range of marine mammals present in the proposed action area. Since noises generated from the proposed construction activities are mostly concentrated at low frequencies (<2 kHz), these activities likely have less effect on mid-frequency echolocation sounds produced by odontocetes (toothed whales). However, lower frequency noises are more likely to affect detection of communication calls and other potentially important natural sounds such as

surf and prey noise. Low-frequency noise may also affect communication signals when they occur near the frequency band for noise and thus reduce the communication space of animals (*e.g.*, Clark *et al.*, 2009) and cause increased stress levels (*e.g.*, Holt *et al.*, 2009). Unlike threshold shift, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, in addition to individual levels. Masking affects both senders and receivers of the signals, and at higher levels for longer durations, could have long-term chronic effects on marine mammal species and populations. However, the noise generated by KDC's proposed activities will only occur intermittently, across an estimated 64 total days during the authorization period in a relatively small area focused around the proposed construction site. Thus, while KDC's proposed activities may mask some acoustic signals that are relevant to the daily behavior of marine mammals, the short-term duration and limited areas affected make it very unlikely that the fitness of individual marine mammals would be impacted.

While in some cases marine mammals have exhibited little to no obviously detectable response to certain common or routine industrialized activities (Cornick *et al.*, 2011; Horsley and Larson, 2023), it is possible some animals may at times be exposed to received levels of sound above the AUD INJ and Level B harassment thresholds during the proposed project. This potential exposure in combination with the nature of planned activity (*e.g.*, vibratory pile driving, impact pile driving, DTH) means it is possible that take by Level A and Level B harassment could occur over the total estimated period of activities; therefore, NMFS in response to the KDC's IHA application proposes to authorize take by Level A and Level B harassment from the KDC's proposed construction activities.

Airborne Acoustic Effects – Pinnipeds that occur near the project site could be exposed to airborne sounds associated with construction activities that have the potential

to cause behavioral harassment, depending on their distance from the specified activities. Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above airborne acoustic harassment criteria. 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 proximity between the proposed project area and the known haul out sites for Steller sea lions (*e.g.*, Grindall and West Rock) and for harbor seals (*e.g.*, to the south-southwest of the project site), are more than 30 km (18.6 mi) away and 7.55 km (4.69 mi) away, respectively, a significant distance outside of the predicted distances to the in-air noise disturbance thresholds (measured at approximately 22 m (72.2 ft) and 69 m (226.4 ft), respectively) (ADOT&PF, 2023; AFSC, 2024, 2025). Cetaceans are not expected to be exposed to airborne sounds that would result in harassment, as defined under the MMPA.

Any airborne noise would primarily be an issue for swimming or hauled-out pinnipeds near the project site, within the range of noise levels above the acoustic thresholds. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to flush from haul outs, temporarily abandon the area, and or move further from the source. However, these animals would previously have been ‘taken’ because of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Additionally, there are no haul outs near the project site. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Therefore,

we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Potential Effects on Marine Mammal Habitat Effects

KDC's proposed construction activities could have localized, temporary impacts on marine mammal habitat, including and their prey, by increasing in-water SPLs and slightly decreasing water quality. Increased noise levels may affect the acoustic habitat (see masking discussion above) and adversely affect marine mammal prey in the vicinity of near the project areas (see discussion below). During DTH, impact, and vibratory pile driving or removal, elevated underwater noise levels would ensonify the project areas where both fish and mammals occur and could affect foraging success. Additionally, marine mammals may avoid the area during the proposed construction activities; 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.

In-Water Construction Effects on Potential Foraging Habitat

As previously mentioned, the project area does not contain habitat of known importance other than being designated as a feeding BIA for humpback whales between May and September. While the entirety of southeast Alaska is considered a feeding BIA for humpback whales, Tongass Narrows represents only a tiny segment. Additionally, the project area is highly influenced by anthropogenic activities.

The total seafloor area likely impacted by KDC's activities is relatively small compared to the vast foraging area available habitat in southeast Alaska. At best, the impact area provides marginal foraging habitat for marine mammals and fish. Furthermore, pile driving and removal at the project site would not obstruct the movement or migration of marine mammals.

A temporary and localized increase in turbidity near the seafloor would occur in the immediate area due to 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. The sediments of the project site would settle out rapidly when disturbed. Cetaceans are not expected to be close enough to the pile-driving areas to experience the effects of turbidity, and any pinnipeds could avoid localized turbid areas. Depending on the tidal stage, local strong currents are anticipated to disburse any additional suspended sediments produced by project activities at moderate to rapid rates. Therefore, we expect the impact from increased noise is turbidity levels to be discountable to marine mammals and do not discuss it further.

The potential for prey (*i.e.*, fish) to temporarily avoid the immediate area is also possible. The duration of fish and marine mammal 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 or marine mammals of the in the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

The proposed project will occur within the same footprint as existing marine infrastructure. The nearshore and intertidal habitat where the proposed project will occur is an area of relatively high marine vessel traffic. Most marine mammals do not generally use the area within the footprint of the project area. Temporary, intermittent, and short-term habitat alteration may result from increased noise levels during the proposed construction activities. Effects on marine mammals will be limited to temporary displacement from pile installation and removal noise, and effects on prey species will be similarly limited in time and space.

Water quality – Temporary and localized reduction in water quality will occur as a result of in-water construction activities. Most of this effect would occur during the installation and removal of piles when bottom sediments are disturbed. The installation and removal of piles would disturb bottom sediments and may cause a temporary

increase in suspended sediment in the project area. During pile extraction, sediment attached to the pile moves vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish (marine mammal prey) suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton, 1993).

Impacts to water quality from DTH are expected to be similar to those described for pile driving. Impacts to water quality would be localized and temporary and would have negligible impacts on marine mammal habitat. Drilling would have negligible impacts on water quality from sediment resuspension because the system would operate within a casing set into the bedrock. The drill would collect excavated material inside of the apparatus where it would be lifted to the surface and placed onto a barge for subsequent disposal.

Effects to turbidity and sedimentation are expected to be short-term, minor, and localized. Since there may be currents that are strong in the area, following the completion of sediment-disturbing activities, suspended sediments in the water column should dissipate and quickly return to background levels in all construction scenarios. Turbidity within the water column has the potential to reduce the level of oxygen in the water and irritate the gills of prey fish species in the proposed project area. However, turbidity plumes associated with the project would be temporary and localized, and fish in the proposed project area would be able to move away from and avoid the areas where plumes may occur. Therefore, it is expected that the impacts on prey fish species from turbidity, and therefore on marine mammals, would be minimal and temporary. In general, the area likely impacted by the proposed construction activities is relatively small compared to the available marine mammal habitat in the east Tongass Narrows.

Potential Effects on Prey. In-Water Construction 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, and zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Studies. Here, we describe studies regarding the effects of noise on known marine mammal prey are described here.

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 *et al.*, 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fish 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 fish may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds that are especially strong and/or intermittent low-frequency sounds and behavioral responses such as flight or avoidance are the most likely effects. Sounds that are of short duration and sharp 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 the effects of pile driving on fish, although several are based on studies supporting 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 fish, 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.*, Peña *et al.*, 2013; Wardle *et al.*, 2001; Jorgenson and Gyselman, 2009; Cott *et al.*, 2012). More commonly, though, the impacts of noise on fishes are temporary.

SPLs of sufficient strength have been known to cause injury to fish and fish mortality (summarized in Popper *et al.*, 2014). However, in most fish species, hair cells in the ear continuously regenerate, and loss of auditory function is likely restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012a) showed that a TTS of 4 to 6 dB TTS 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, 2017).

Fish populations in the proposed project area that serve as marine mammal prey could be temporarily affected by noise from pile installation and removal. The frequency range in which fishes generally perceive underwater sounds is 50 to 2,000 Hz, with peak sensitivities below 800 Hz (Popper and Hastings, 2009). Fish behavior or distribution may change, especially with strong and/or intermittent sounds that could harm fishes. High underwater SPLs have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper, 2005).

Zooplankton is a food source for several marine mammal species, as well as a food source for fish that are then preyed upon by marine mammals. Population effects on zooplankton could have indirect effects on marine mammals. Data are limited on the

effects of underwater sound on zooplankton species, particularly sound from construction (Erbe *et al.*, 2019). Popper and Hastings (2009) reviewed information on the effects of human-generated sound and concluded that no substantive data are available on whether the sound levels from pile driving, seismic activity, or any human-made sound would have physiological effects on invertebrates. Any such effects would be limited to the area very near (1 to 5 m (3.3 to 16.4 ft)) the sound source and would result in no population effects because of the relatively small area affected at any one time and the reproductive strategy of most zooplankton species (short generation, high fecundity, and very high natural mortality). No adverse impact on zooplankton populations is expected to occur from the specified activity due in part to large reproductive capacities and naturally high levels of predation and mortality of these populations. Any mortalities or impacts that might occur would be negligible.

The greatest potential impact to marine mammal prey during construction would occur during impact pile driving, vibratory pile driving, and DTH. Impact pile driving, vibratory pile driving, and DTH could possibly elicit behavioral reactions from fishes such as temporary avoidance of the area but is unlikely to cause injuries to fishes or have persistent effects on local fish populations. Construction also would have minimal permanent and temporary impacts on benthic invertebrate species, a marine mammal prey source. In addition, it should be noted that the area in question is low-quality habitat since it is already highly developed and experiences a high level of anthropogenic noise from normal operations and other vessel traffic.

Essential Fish Habitat (EFH) has been designated in the east Tongass Narrows for all five species of salmon (*i.e.*, chum salmon, pink salmon, coho salmon, sockeye salmon, and Chinook salmon (NMFS, 2017; HDR, 2019)), which are common prey of marine mammals. Many creeks flowing into the Sukkwan Strait and other nearby areas are known to contain salmonids, including three primary creeks: Hydaburg River, Natzuhini

River, and Saltery Creek (Giefer and Graziano, 2022); however, adverse effects on EFH in this area are not expected as the proposed project location is approximately 84 km (52.2 mi) away and heavily truncated by several landmasses.

Potential Effects on Foraging Habitat

The proposed project is not expected to result in any habitat related effects that could cause significant or long-term negative consequences for individual marine mammals or their populations, since installation and removal of in-water piles would be temporary and intermittent. The total seafloor area affected by pile installation and removal is a very small area compared to the vast foraging area available to marine mammals outside this project area. Although Southeast Alaska in its entirety is listed as a BIA for humpback whales (Wild *et al.*, 2023), the proposed project area does not contain particularly high-value habitat and is not unusually important for this species or any of the other species potentially impacted by KDC's activities. The area impacted by the project is relatively small compared to the available habitat just outside the project area, and there are no areas of particular importance that would be impacted by this project. 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. As described in the preceding, the potential for KDC's construction to affect the availability of prey to marine mammals or to meaningfully impact the quality of physical or acoustic habitat is considered to be insignificant. Therefore, impacts of the project are not likely to have adverse effects on marine mammal foraging habitat in the proposed project area.

In summary, given the relatively small areas being affected, as well as the temporary and mostly transitory nature of the proposed construction activities, any adverse effects from KDC's activities on prey habitat or prey populations are expected to be minor and temporary. The most likely impact to fishes at the project site would be temporary avoidance of the area. The most likely impact on fish from DTH and pile

driving and removal activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance in this area after pile driving stops is unknown, but a rapid return to regular recruitment, distribution, and behavior is anticipated.

There are times of known seasonal marine mammal foraging in Tongass Narrows around fish processing/hatchery infrastructure or when fish are congregating, but the affected areas of Tongass Narrows are a small portion of the total foraging habitat available in the region. In general, effects on marine mammal prey species are expected to be minor and temporary due to the short timeframe of the project and the small project footprint.

Increased turbidity from construction activities can adversely affect forage fish and juvenile salmonid out-migratory routes in the project area. Both herring and salmon form a significant prey base for Steller sea lions, whereas herring is the primary prey species of humpback whales; both herring and salmon are components of the diet of many other marine mammal species that occur in the project area. Increased turbidity is expected to happen near construction activities. However, suspended sediments and particulates are expected to dissipate quickly within a single tidal cycle. Given the limited area affected and high tidal dilution rates, any effects on forage fish and salmon are expected to be minor or negligible. In addition, best management practices would be in effect, limiting the extent of turbidity to the immediate project area. Finally, exposure to turbid waters from construction activities is not expected to differ from the current exposure; fish of the disturbed area and marine mammals in the Tongass Narrows region are routinely exposed to substantial levels of suspended sediment from glacial sources.

In summary, given the temporary nature of the construction project and relatively small areas being affected, the DTH and pile driving installation and removal 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 in disturbed areas would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. Thus, we preliminarily conclude that the impacts of the specified activities 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 the adverse effects on their populations.

Estimated Take of Marine Mammals

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

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 source/s (*i.e.*, vibratory pile driving, impact pile driving, DTH) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for AUD INJ (Level A harassment) to result for low-frequency cetaceans (*i.e.*, mysticetes), high-frequency cetaceans (*i.e.*, odontocetes), very-high frequency cetaceans (*i.e.*, odontocetes), and pinnipeds (*i.e.*, phocids and otariids). 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 criteria above which NMFS believes there is some reasonable potential for marine mammals to be behaviorally harassed or incur some degree of AUD INJ; (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 Criteria

NMFS recommends the use of acoustic criteria 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 AUD INJ of some degree (equated to Level A harassment). We note that the criteria for AUD INJ, as well as the names of two hearing groups, have been recently updated (NMFS, 2024) as reflected below in the Level A harassment section.

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 μ Pa)) for continuous (*e.g.*, vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μ Pa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

KDC's proposed activities includes the use of continuous (vibratory pile driving and DTH) and impulsive (impact pile driving and DTH) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μ Pa are applicable.

Level A harassment – NMFS' Updated Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) (Updated Technical Guidance, 2024) identifies dual criteria to assess AUD INJ (Level A harassment) to five different underwater marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive

or non-impulsive). KDC's proposed activities includes the use of impulsive (impact pile driving and DTH) and non-impulsive (vibratory hammer and DTH) sources.

The 2024 Updated Technical Guidance criteria include both updated thresholds and updated weighting functions for each hearing group. The thresholds are provided in the table below (NMFS, 2024). The references, analysis, and methodology used in the development of the criteria are described in NMFS' 2024 Updated Technical Guidance, which may be accessed at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools>.

Table 4 – Thresholds Identifying the Onset of Auditory Injury

Hearing Group	AUD INJ Onset Acoustic Thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	<i>Cell 1</i> $L_{pk,flat}$: 222 dB $L_{E,LF,24h}$: 183 dB	<i>Cell 2</i> $L_{E,LF,24h}$: 197 dB
High-Frequency (HF) Cetaceans	<i>Cell 3</i> $L_{pk,flat}$: 230 dB $L_{E,HF,24h}$: 193 dB	<i>Cell 4</i> $L_{E,HF,24h}$: 201 dB
Very High-Frequency (VHF) Cetaceans	<i>Cell 5</i> $L_{pk,flat}$: 202 dB $L_{E,VHF,24h}$: 159 dB	<i>Cell 6</i> $L_{E,VHF,24h}$: 181 dB
Phocid Pinnipeds (PW) (Underwater)	<i>Cell 7</i> $L_{pk,flat}$: 223 dB $L_{E,PW,24h}$: 183 dB	<i>Cell 8</i> $L_{E,PW,24h}$: 195 dB
Otariid Pinnipeds (OW) (Underwater)	<i>Cell 9</i> $L_{pk,flat}$: 230 dB $L_{E,OW,24h}$: 185 dB	<i>Cell 10</i> $L_{E,OW,24h}$: 199 dB
<p>*Dual metric criteria for impulsive sounds: Use whichever criteria results in the larger isopleth for calculating AUD INJ onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level criteria associated with impulsive sounds, the PK SPL criteria are recommended for consideration for non-impulsive sources.</p> <p>Note: Peak sound pressure level ($L_{p,0-pk}$) has a reference value of 1 μPa, and weighted cumulative sound exposure level ($L_{E,p}$) has a reference value of 1 μPa²s. In this table, criteria are abbreviated to be more reflective of International Organization for Standardization standards (ISO, 2017). The subscript “flat” is being included to indicate peak sound pressure are flat weighted or unweighted within the generalized hearing range of marine mammals underwater (<i>i.e.</i>, 7 Hz to 165 kHz). The subscript associated with cumulative sound exposure level criteria indicates the designated marine mammal auditory weighting function (LF, HF, and VHF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The weighted cumulative sound exposure level criteria could be exceeded in a multitude of ways (<i>i.e.</i>, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these criteria will be exceeded.</p>		

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 DTH). The source levels assumed for both removal and installation activities is based on reviews of measurements of the same or similar types and dimensions of piles available in the scientific literature and from similar

coastal construction projects. The source level for the piles and activities (*i.e.*, installation or removal) are presented in table 5.

Table 5 – Ketchikan Berth IV Expansion Project Sound Proxy Sources

Pile Type	Sound Source Level at 10 m (32.8 ft)	Sound Proxy Source(s)
Vibratory Hammer		
24-in steel piles	163 dB	NMFS (2023)
30-in steel piles	166 dB	NMFS (2023)
36-in steel piles	166 dB	NMFS (2023)
48-in steel piles	171 dB	NMFS (2023)
Impact hammer		
36-in steel piles	dB rms: 193 dB dB SEL: 183 dB dB peak: 210 dB	Caltrans (2015), and Caltrans (2020)
48-in steel piles	dB rms: 192 dB dB SEL: 179 dB dB peak: 213 dB	Caltrans (2020)
DTH		
36-in steel piles	dB rms: 174 dB dB SEL: 164 dB dB peak: 194 dB	NMFS (2022a) Denes <i>et al.</i> (2019); Reyff & Heyvaert (2019); Reyff (2020)
48-in steel piles*	dB rms: 178 dB dB SEL: 168 dB dB peak: n/a	NMFS internal guidance

*A bubble curtain would be employed, reducing the SEL value by approximately 5 dB.

Level B harassment

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:

$$TL = B \times \text{Log}_{10}(R1/R2),$$

where:

TL = transmission loss in dB,

B = transmission loss coefficient,

$R1$ = the distance of the modeled SPL from the driven pile, and

$R2$ = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source depends on various factors, most notably the water bathymetry and the presence or absence of reflective or absorptive conditions, including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source ($20 \cdot \log[\text{range}]$). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source ($10 \cdot \log[\text{range}]$). A practical spreading value of 15 is often used under conditions where water increases with depth as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Absent site-specific acoustical monitoring with differing measured TL , practical spreading is used. Site-specific TL data for Ketchikan is not available; therefore, the default coefficient of 15 is used to determine the distances to the Level A harassment and Level B harassment thresholds.

Level A harassment

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 2024 Updated 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 (found on our website here: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools>).

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 vibratory pile driving, impact pile driving, and DTH, 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 AUD INJ. Inputs used in the optional User Spreadsheet tool, and the resulting estimated isopleths, are reported below in tables 6, 7, and 8.

Table 6 – User Spreadsheet Inputs for Vibratory Pile Driving (MMPA ITA Application – Appendix B)

Tab of Spreadsheet	User Spreadsheet variables						
Pile information	24-inch steel pile removal ^a	30-inch steel pile removal ^a	30-inch temporary steel pile installation ^a	30-inch temporary steel pile removal ^a	36-inch steel pile removal ^a	36-inch permanent steel pile installation ^a	48-inch permanent steel pile installation ^a
Sound Pressure Level (dB)	163 (unattenuated and attenuated)	166 (unattenuated and attenuated)	166 (unattenuated and attenuated)	166 (unattenuated and attenuated)	166 (unattenuated and attenuated)	166 (unattenuated and attenuated)	171 (unattenuated and attenuated)
Distance associated with sound pressure level (meters)	10	10	10	10	10	10	10
Transmission loss constant	15	15	15	15	15	15	15
Number of piles per day	2	4	4	4	4	1	2
Duration to drive pile (minutes)	15	15	30	10	15	60	60
Duration of sound production in a day (seconds)	1,800	3,600	7,200	2,400	3,600	3,600	7,200
Marine Mammal default WFA (kHz)	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Cumulative SEL at measured distance (dB)	195.55	201.56	204.57	199.80	201.56	201.56	209.57

a – Proxy source PR1 2023 Calculations Proxy Recommendations for Southeast Alaska (July 19, 2023).

Table 7 – User Spreadsheet Inputs for Impact Pile Driving (MMPA ITA Application – Appendix B)

Tab of Spreadsheet	User Spreadsheet variables	
Pile information	36-inch impact installation ^a	48-inch impact installation ^b
Peak (dB)	210 (unattenuated and attenuated)	213 (unattenuated and attenuated)
SEL _{ss} (dB)	183 (unattenuated and attenuated)	179 (unattenuated and attenuated)
RMS (dB)	193 (unattenuated and attenuated)	193 (unattenuated and attenuated)
Distance associated with sound pressure level (meters)	10	10
Transmission loss constant	15	15

Number of piles per day	2	3
Number of strikes per pile	200	200
Number of strikes per day (seconds)	400	600
Attenuation assumed	0	0
Cumulative SEL at measured distance	209	207

a – 36-inch impact install Source: NMFS 2023 Proxy Recommendations for Southeast Alaska.

b – Proxy Email correspondence between Tony Lewkowski, Solstice Alaska Consulting, Inc., and Cara Hotchkin, NMFS, on April 14, 2025.

Table 8 – User Spreadsheet Inputs for Down-The-Hole (DTH) Stationary Source (Impulsive, Intermittent) (MMPA ITA Application – Appendix B)

Tab of Spreadsheet	User Spreadsheet Variables	
	36-inch DTH source ^a	48-inch steel pile DTH source installation (with bubble curtain) ^b
Level A harassment (SEL _{CUM})		
Weighting Factor Adjustment (kHz)	2	2
Unweighted SEL _{CUM}	220.4	217.6
Single Strike SEL _{SS}	164	163
Strike rate (average strikes per second)	10	10
Duration to drive pile/drill hole (minutes)	360	480
Number of piles/holes per day	2	1
Transmission loss coefficient	15	15
Distance of single strike SEL _{SS}	10	10
Total number of strikes in a 24-hour period	432,000	288,000
Level A harassment (Peak (PK))		
L _{p,0-pk} specified at "x" meters	194	178
Distance of L _{p,0-pk} measurement (meters)	10	10

$L_{p,0-pk}$ Source level	209.0	193.0
Level B Harassment (SPL)		
SPL (RMS)	174	178
Distance	10	10
Transmission loss coefficient	15LogR (practical spreading)	15LogR (practical spreading)

a – Proxy National Marine Fisheries Services: Acoustic Guidance for Assessment of Down-the- Hole (DTH) Systems November 2022.

b – Proxy Email correspondence between Tony Lewkowski, Solstice Alaska Consulting, Inc., and Cara Hotchkin, NMFS, on April 14, 2025.

Using the practical spreading model, NMFS determined that the underwater noise would yield the following calculated distances to the Level A harassment and Level B harassment thresholds for marine mammals (see table 9).

Table 9 – Ketchikan Berth IV Expansion Project Calculated Distances to the Level A Harassment and Level B Harassment Acoustic Thresholds

Activity	Method	Calculated distance (m) and (area (km ²)) of Level A harassment and Level B harassment thresholds					
		Level A harassment					Level B harassment
		LFC	HFC	VHFC	PW	OW	
Barge movements, pile positioning, etc.	–	10 (0.007)	10 (0.007)	10 (0.007)	10 (0.007)	10 (0.007)	10 (0.007)
Vibratory pile driving							
24-in steel pile	Removal	7.9 (0.006)	3.0 (0.002)	6.5 (0.004)	10.2 (0.007)	3.4 (0.002)	7,356.4 (7.321)
30-in steel pile	Removal	19.9 (0.014)	7.6 (0.005)	16.2 (0.012)	25.6 (0.019)	8.6 (0.006)	11,659.1 (11.577)
36-in steel pile	Removal	19.9 (0.014)	7.6 (0.005)	16.2 (0.012)	25.6 (0.019)	8.6 (0.006)	11,659.1 (11.577)
30-in steel temporary pile	Installation	31.5 (0.023)	12.1 (0.009)	25.8 (0.019)	40.6 (0.030)	13.7 (0.010)	11,659.1 (11.577)
30-in steel temporary pile	Removal	15.2 (0.011)	5.8 (0.004)	12.4 (0.009)	19.5 (0.014)	6.6 (0.005)	11,659.1 (11.577)
36-in steel permanent pile	Installation	19.9 (0.014)	7.6 (0.005)	16.2 (0.012)	25.6 (0.019)	8.6 (0.006)	11,659.1 (11.577)
48-in steel permanent	Installation	68.0 (0.053)	26.1 (0.019)	55.5 (0.043)	87.5 (0.069)	29.4 (0.022)	25,118.9 (22.769)
Impact pile driving							
36-in steel permanent pile	Installation	540.2 (0.740)	68.9 (0.054)	835.9 (1.46)	479.9 (0.619)	178.9 (0.159)	1,584.9 (3.557)
48-in steel permanent pile	Installation	383.1 (0.446)	48.9 (0.037)	592.8 (0.855)	340.3 (0.376)	126.8 (0.104)	1,359.4 (2.864)
Down the Hole (DTH) Drilling							
36-in steel permanent	Installation	3,077.1 (5.086)	392.6 (0.462)	4,761.9 (5.788)	2,733.6 (4.931)	1,019.0 (1.929)	39,811 (39.918)
48-in steel permanent pile*	Installation	2,014.1 (4.351)	257.0 (0.2555)	3,116.9 (5.102)	1,789.3 (4.054)	667.0 (1.028)	34,145.0 (32.164)

Note: LFC = low-frequency cetaceans; HFC = high-frequency cetaceans; VHFC = very high-frequency cetaceans; PW = phocid pinnipeds (in-water); OW = otariids pinnipeds (in-water).

*Includes a bubble curtain.

It should be noted that, based on the geography of Tongass Narrows and the surrounding islands, the sound would not reach the entire distance of the Level B harassment isopleths. Landmasses would truncate the largest Level B Harassment isopleths. Constraining landmasses include Revillagigedo Island, Gravina Island, Pennock Island, Annette Island, and Bold Island.

Marine Mammal Occurrence and Take Estimation

In this section, we provide information about the occurrence of marine mammals, including density or other relevant information, which will inform the take calculations. Next, we describe how all of the information described above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization.

In their application, KDC explained that the animal occurrence data was collated based upon protected species monitoring data collected during the Alaska Department of Transportation & Public Facilities' (ADOT&PF) Ferry Berth Improvements projects located in Tongass Narrows, conducted between 2020 – 2023. These projects and the available monitoring reports can be found on NMFS' website

(<https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities>). Additionally, KDC consulted with local sources (*i.e.*, Allen Marine Tours, a tour boat operator based in Ketchikan; Sampson Tug and Barge, a tug and barge crew based in Ketchikan; and Barbara Morgan, a faculty member at the University of Alaska Southeast, Ketchikan) for anecdotal information to support the sighting data. All species that could potentially occur in the project area were classified as “*common*”, “*frequent*”, “*infrequent*”, “*rare*”, or “*very rare*” (see table 6 in the ITA application). For the three species/stocks who were determined to have “*rare*” or “*very rare*” occurrence in the project area (*i.e.*, gray whales, fin whales (*Balaenoptera physalus*), and Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), no take was

requested and these were not carried forward. The only exception to this is the Mexico-North Pacific stock of humpback whales. While that stock is considered “*Rare*” since they only make up two percent of the humpback whales in southeast Alaska, Protected Species Observers (PSOs) likely will not be able to differentiate between that stock and the “*Common*” Hawaii DPS. Therefore, both stocks have been requested. These assumptions and information for the calculations are shown below in table 10.

Table 10 – Occurrence Information and Assumptions That Were Considered When Determining the Proposed Take

Marine Mammal Species	Species Occurrence Information and Assumptions For Take Calculations	Occurrence Status
Minke whale	Infrequent throughout Southeast Alaska inland waters, could occur each month	<i>Infrequent</i>
	Seasonality not determined but have been observed in spring, summer, and fall	
	Usually sighted alone rather than in groups, estimate 1 whale per group	
	Conservatively assume one group per month	
	Level A harassment take estimates one group per month during the 34 days of DTH and anchoring when the Level A isopleth exceeds 1,000 m (3,280 ft)	
Humpback whale	Common visitors to Tongass Narrows, could occur each day	<i>Rare</i> (Mexico-North Pacific DPS) ^a <i>Common</i> (Hawaii DPS)
	More frequent in the summer months, but year-round presence is increasing in Southeast Alaska	
	Usually sighted in groups of one to four; estimate 2 whales per group	
	Level A harassment take estimates one whale per day during the 34 days of DTH and anchoring	
	Level B harassment take estimated one group per day during the 64 days of the project	
Killer whale	Often observed in Southeast Alaska inland waterways	<i>Frequent</i>
	Frequent visitors to Tongass Narrows, could occur each month	
	More frequently seen in summer and fall but may be present year-round	
	Groups of 2-7 spotted during ADOT&PF project in Tongass Narrows (ADOT&PF, 2023); estimate 7 whales per group	
	1-2 groups spotted per month; 2 groups per month used for estimates	
	Level B harassment take estimates four groups per month during the 64 days of the project	
Dall's porpoise	Infrequently observed within Tongass Narrows, could occur each month	<i>Infrequent</i>
	Groups range from 3 to 6 animals; estimate 6 porpoises per group	
	Level A harassment take estimates 1 group per month during the 41 days of impact driving, DTH, and anchoring when Level A isopleth exceeded 200 m (656 ft)	
	Level B harassment take estimates 1 group per month during the 64 days of the project	
Harbor porpoise	Frequently observed near the project area, could occur month	<i>Frequent</i>
	Groups range from 3 to 5 animals; estimate 5 porpoises per group	
	Level A harassment take estimates 4 group per month during the 41 days of impact pile driving, DTH, and anchoring when Level A isopleth exceeds 200 m (656 ft)	
	Level B harassment take estimates 4 group per month during the 64 days of the project	
Harbor seal	Common in Tongass Narrows, could occur each day	<i>Common</i>
	Group sizes of 1-3 most common in Tongass Narrows (ADOT&PF, 2023); estimate 3 harbor seals per group	
	Per consultation with local tour operators, species common in Tongass Narrows; conservative estimates of 2 groups per day used in take estimates	
	Level A harassment take estimates 2 groups per day during the 41 day of impact pile driving, DTH, and anchoring when Level A isopleth exceeds 200 m (656 ft)	
	Level B harassment take estimates 2 groups per day during 64 days of the project	
Northern elephant seal	Infrequent in Tongass Narrows, Revillagigedo Channel and Nichols Passage, but sightings increasing, could occur each month	<i>Infrequent</i>
	Estimate 1 northern elephant seal per group	
	Level A harassment take estimates 1 group per month during the 41 day of impact pile driving, DTH, and anchoring when the Level A isopleth exceeds 200 m (656 ft)	

	Level B harassment take estimates 1 group per month during 64 days of the project	
Steller sea lion	Steller sea lions are commonly seen in the project area, could occur each day	<i>Common</i>
	Highly social animals, gathering in large groups on and near rookeries and major haul outs	
	Closest documented haul out is Grindall, 32.19 km (20 mi) away from the project area	
	Group sizes of 1-2 most common in Tongass Narrows (ADOT&PF, 2023); estimate 2 Steller sea lions per group	
	Level A harassment take estimates 1 group per day during the 34 days of DTH and anchoring when the Level A isopleth exceeds 200 m (656 ft)	
	Level B harassment take estimates 1 group per day during the 64 days of the project	

a – The Mexico-North Pacific DPS is considered “*Rare*” since they only make up two percent of the humpback whales in southeast Alaska; however, PSOs likely will not be able to differentiate between that stock and the “*Common*” Hawaii DPS. Therefore, both stocks have been requested.

To calculate the estimated take that is expected to occur from KDC’s proposed activities, species-specific expected occurrence, which is based on group size data and the estimated frequency of appearance expected for each species (table 11), was multiplied by the total number of days that each type of pile driving (*i.e.*, impact, vibratory, DTH) would be needed. These were calculated either daily or monthly, depending on the occurrence information available for each species:

$$\text{Estimated take (daily)} = \text{Group size} \times \text{Groups per day} \times \text{Days of pile driving}; \text{ and}$$

$$\text{Estimated take (monthly)} = \text{Group size} \times \text{Groups per month (i.e., 30-day period)} \times \text{Months of pile driving activity (i.e., Number of days of pile driving activity/30 days)}$$

The equation for daily estimated take was used for species whose occurrence was “common” and therefore had a daily occurrence estimate. The equation for monthly estimated take was used for all other species.

While KDC primarily expects take by Level B harassment to occur, a small amount of take by Level A harassment is expected for all low-frequency cetaceans, very high-frequency cetaceans, phocids, and otariids. Table 11 shows if the estimated takes for each species were calculated on a monthly or daily basis, based on the observation and sighting data available. The proposed takes are shown in table 12.

Table 11 – Daily or Monthly Occurrence of Each Marine Mammal Species

Species	Occurrence metric	Level A harassment				Level B harassment		
		Number of animals per group	Number of animals per day ^a	Number of groups per month	Number of pile driving days ^b	Number of animals per group	Number of groups per month	Number of pile driving days ^b
Humpback whale	Daily	–	1	–	34	2	1	64
Minke whale	Monthly	1	–	1	34	1	1	64
Killer whale	Monthly	–	–	–	–	7	4	64
Dall’s porpoise	Monthly	6	–	1	41	6	1	64
Harbor porpoise	Monthly	5	–	4	41	5	4	64
Steller sea lion	Daily	2	–	1	34	2	1	64

Harbor seal	Daily	3	–	2	41	3	2	64
Northern elephant seal	Monthly	1	–	1	41	1	1	64

a – For the calculation for take by Level A harassment of humpback whales, the number of whales per days rather than individuals per group was chosen as the more appropriate metric.

b – Only for species where data was derived “*monthly*”, the number of pile driving days was divided by 30 days.

Table 12 – Take Calculation and Summary of the Proposed Take for the Ketchikan Berth IV Expansion Project

Common Name	Stock ^a	NMFS Stock Abundance	Take Proposed For Authorization			Percentage of Total Stock Proposed for Authorization ^b
			Level A harassment	Level B harassment	Total	
Humpback whale	Hawai'i DPS	11,278	34	128	162	1.44
	Mexico-North Pacific DPS	918				17.65
Minke whale	Alaska	N/A	2	3	5	n/a
Killer whale	West Coast Transient	349	0	60	60	17.19
	Eastern North Pacific Northern Resident (British Columbia)	302				19.87
	Eastern North Pacific Alaska Resident	1,920				3.13
Dall's porpoise	Alaska	13,110	9	12	21	0.16
Harbor porpoise	Southern Southeast Alaska – Inland waters	890	28	43	71	7.98
Steller sea lion	Eastern	36,308 ^c	68	128	196	0.54
Harbor seal	Clarence Strait	27,659	246	384	630	2.28
Northern elephant seal	California breeding	187,386	2	3	5	<0.01

a – Stock estimates from the most recent NMFS stock assessment reports, unless otherwise noted.

b – Percent of stock refers to combined take by both Level B harassment and Level A harassment (where requested) If there is more than one stock of a species, the percent of stock is calculated as if all takes went to a single stock.

c – Steller sea lion takes represent multiple takes of the same individuals that frequent the project area; however, for purposes of percent of stock calculation, take totals assume separate individuals of the species.

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 (latter not applicable for this action). 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.

The mitigation requirements described in the following were proposed by KDC in its adequate and complete application or are the result of subsequent coordination between NMFS and KDC. KDC has agreed that all of the mitigation measures are

practicable. NMFS has fully reviewed the specified activities and the mitigation measures to determine if the mitigation measures would result in the least practicable adverse impact on marine mammals and their habitat, as required by the MMPA, and has determined the proposed measures are appropriate. NMFS describes these below as proposed mitigation requirements, and has included them in the proposed IHA.

In addition to the measures described later in this section, KDC would follow these general mitigation measures:

- Takes proposed for authorization, by Level A and Level B harassment only, would be limited to the species and numbers listed in table 12. Construction activities would be required to be halted upon observation of either a species for which incidental take was not authorized or for a species for which incidental take has been authorized but the number of takes has been met, entering or is within the harassment zone, if the IHA is issued.

- The taking by serious injury or death of any of the species listed in table 12 or any taking of any other species of marine mammal would be prohibited and would result in the modification, suspension, or revocation of the IHA, if issued. Any taking exceeding the authorized amounts listed in table 12 would be prohibited and would result in the modification, suspension, or revocation of the IHA, if issued;

- Ensure that construction supervisors and crews, the marine mammal monitoring team, and relevant KDC staff are trained prior to the start of all construction activities, so that responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work;

- KDC, construction supervisors and crews, PSOs, and relevant KDC staff must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m (32.8 ft) of such activity, operations must cease and

vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction;

- Employ PSOs and establish monitoring locations as described in the Protected Species Monitoring and Mitigation Plan (PSMMP) (see NMFS’ website). KDC must monitor the project area to the maximum extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions;

- KDC also would abide by the reasonable and prudent measures and terms and conditions of a Biological Opinion and Incidental Take Statement, if issued by NMFS, pursuant to Section 7 of the ESA.

Additionally, the following mitigation measures apply to KDC’s in-water construction activities.

Pre- and Post-Activity Monitoring

KDC would be required to establish pre- and post-monitoring zones with radial distances (based on the distances to the Level B harassment threshold), as identified in table 13, for all construction activities.

Table 13 – Proposed Monitoring Zones During Project Activities

Activity	Distance (m) to the Level B harassment thresholds ^a
	All hearing groups
Barge movements, pile positioning, etc.	10
Vibratory pile driving/removal	
24-inch steel pile removal	7,360
30-inch steel pile removal	11,660
36-inch steel pile removal	11,660
30-inch temporary pile installation	11,660
30-inch temporary pile removal	11,660
36-inch permanent pile installation	11,660
48-inch permanent pile installation	25,120
In-air (all piles)	PW: 50 ^b OW: 15 ^b
Impact pile driving	
36-inch permanent pile installation	1,585
48-inch permanent pile installation	1,360
In-air (all piles)	PW: 65 ^b OW: 20 ^b
Down-the-Hole (DTH) Drilling	
36-inch permanent pile installation	39,815 ^c
48-inch permanent pile installation	34,145

Note: PW = phocid pinnipeds (in-water); OW = otariids pinnipeds (in-water).

- a – Distances, in meters, refer to the maximum radius of the zone and are rounded.
- b – As described in the **Effects** section, NMFS does not expect cetaceans to be affected by in-air noise. These distances are precautionary.
- c – Monitoring zone DTH drilling the 36-inch piles is larger than the monitoring zone for the 48-inch piles due to use of a bubble curtain for the 48-inch piles.

Monitoring would take place from 30 minutes prior to initiation of any pile driving activity (*i.e.*, pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity. In addition, monitoring for 30 minutes would take place whenever a break in the specified activity (*i.e.*, impact pile driving, vibratory pile driving, DTH) of 30 minutes or longer occurs. Pre-start clearance monitoring would be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones (indicated further below) are clear of marine mammals. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals.

Soft-start

KDC would 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 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. Soft-start procedures are used to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity.

Establishment of Shutdown Zones

KDC would establish shutdown zones with radial distances as identified in table 14 for all construction 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 vary based on the activity type and marine mammal hearing group. If a marine

mammal is observed entering or within the shutdown zones indicated in table 14, pile driving and DTH activities 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 zones or a specific time period has passed without re-detection of the animal (*i.e.*, 30 minutes for cetaceans, 15 minutes for pinnipeds). If a marine mammal comes within or approaches the shutdown zone indicated in table 14, such operations must cease.

Table 14 – Proposed Shutdown Zones During Project Activities

Activity	Distance (m) to Level A Harassment Thresholds				
	LFC	HFC	VHFC	PW	OW
Barge movements, pile positioning, <i>etc.</i>	10	10	10	10	10
Vibratory pile driving/removal					
24-inch steel pile removal	10	10	10	15	10
30-inch steel pile removal	20	10	20	30	10
36-inch steel pile removal	20	10	20	30	10
30-inch temporary pile installation	35	15	30	45	15
30-inch temporary pile removal	20	10	15	20	10
36-inch permanent pile installation	20	10	20	30	10
48-inch permanent pile installation	70	30	60	90	30
In-air (all piles)	–	–	–	–	–
Impact pile driving					
36-inch permanent pile installation	545	70	200	200	180
48-inch permanent pile installation	385	50	200	200	130
In-air (all piles)	–	–	–	–	–
Down-the-Hole (DTH) Drilling					
36-inch permanent pile installation	1,000	395	200	200	200
48-inch permanent pile installation	1,000	260	200	200	200

Note: LFC = low-frequency cetaceans; HFC = high-frequency cetaceans; VHFC = very high-frequency cetaceans; PW = phocid pinnipeds (in-water); OW = otariids pinnipeds (in-water).

Bubble Curtain

KDC would use a bubble curtain during impact pile driving. The bubble curtain would be operated as necessary to achieve optimal performance. At a minimum, the bubble curtain would distribute air bubbles around 100 percent of the piling circumference for the full depth of the water column, the lowest bubble ring would be in contact with the substrate for the full circumference of the ring, and the weights attached to the bottom ring would ensure 100 percent substrate contact. No parts of the ring or

other objects would prevent full substrate contact. In addition, airflow to the bubblers would be balanced around the circumference of the pile.

Based on our evaluation of the applicant's proposed measures, NMFS has preliminarily determined that the proposed mitigation measures provide the means of 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 activity; 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.

The monitoring and reporting requirements described in the following were proposed by KDC in its adequate and complete application and PSMMP, or are the result of subsequent coordination between NMFS and KDC following receipt of the application. KDC has agreed that all of the mitigation measures are appropriate. NMFS describes these below as proposed requirements, and has included them in the proposed IHA.

Proposed Monitoring

Visual Monitoring

All PSOs must be NMFS-approved. PSOs would be independent of the activity contractor (for example, employed by a subcontractor) and have no other assigned tasks during monitoring periods. At least one PSO would have prior experience performing the duties of a PSO during an activity pursuant to a NMFS-issued Incidental Take Authorization (ITA). Other PSOs may substitute other relevant experience (including relevant Alaska Native traditional knowledge), education (degree in biological science or related field), or training for prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.

Additionally, PSOs would be required to meet the following qualifications:

- The 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:

- (1) Number and species of marine mammals observed;

- (2) Dates and times when in-water construction activities were conducted;

- (3) Dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and

- (4) Marine mammal behavior.

- The 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.

Where a team of three or more PSOs is required, a lead observer or monitoring coordinator would be designated. The lead observer must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued ITA or Letter of Concurrence.

KDC must establish monitoring locations as described in PSMMP (see NMFS' website). For all pile driving activities, a minimum of one PSO must be assigned to each active pile driving and DTH location to monitor the applicable shutdown zones. The specific locations of the PSOs will be based on project activities and are as follows (in alignment with the PSMMP (see figure 2)):

- *Station 1*: Boardwalk adjacent to the Oyster Shack and Berth IV;

- *Station 2*: Ketchikan Berth I;

- *Station 3*: Rotary Beach Park Buggy Beach;
- *Station 4*: Mountain Point, shoreline near the boat launch.

As described in the PSMMP, the number and locations of monitors will be based on the following in-water work scenarios:

- *Scenario #1*: In-water construction not involving pile driving (*e.g.*, barge movements, *etc.*) – one location (Station 1);
- *Scenario #2*: Vibratory pile driving for removal/installation of all pile sizes and impact pile driving for installation of all pile sizes – two locations (Station 1 and Station 2);
- *Scenario #3*: DTH drilling – three locations (Station 1, Station 3, and Station 4).

At all locations, all PSOs, to the extent practicable, must use an elevator platform at observation points to enhance observation ability. PSOs would be required to record all observations of marine mammals, regardless of distance from the pile being driven, as well as the additional data indicated below and in section 6 of the IHA, if issued.

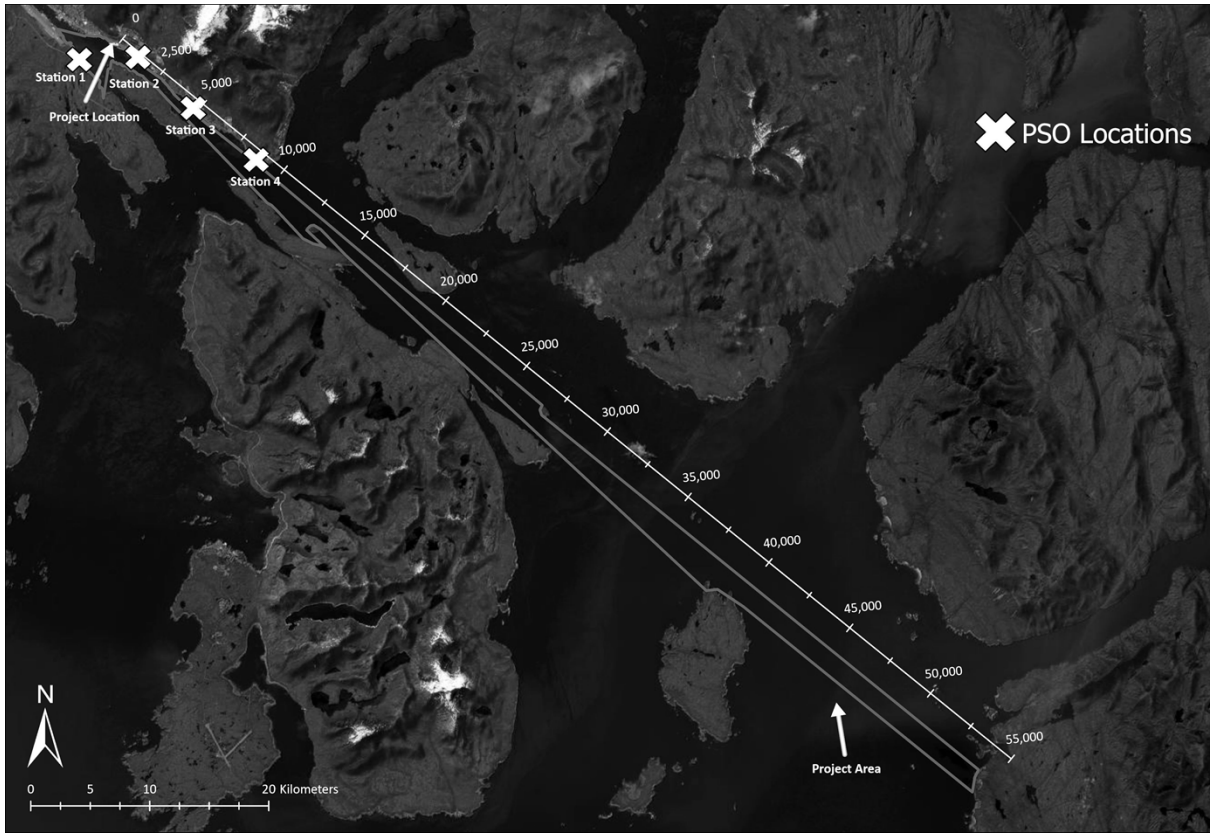


Figure 2 – Proposed Protected Species Observer (PSO) Locations for the Ketchikan Berth IV Expansion Project

Proposed Reporting

KDC would be required to submit an annual draft summary report on all construction activities and marine mammal monitoring results to NMFS within 90 days following the end of construction or 60 calendar days prior to the requested issuance of any subsequent IHA for similar activity at the same location, whichever comes first. The draft summary report would include an overall description of construction work completed, a narrative regarding marine mammal sightings, and associated raw PSO data sheets (in electronic spreadsheet format). 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: (a) how many and what type of piles were driven or removed and the method (*i.e.*, impact, vibratory, DTH); and (b) the total duration of time for each pile (vibratory driving) or number of strikes for each pile (impact driving);
- PSO locations during marine mammal monitoring; and
- 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 must be reported:

- Name of PSO who sighted the animal(s) and PSO location and activity at the time of the sighting;
- Time of the sighting;
- Identification of the animal(s) (*e.g.*, genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

- Distance and bearing of each observed marine mammal relative to the pile being driven or removed for each sighting;
- Estimated number of animals (min/max/best estimate);
- Estimated number of animals by cohort (*e.g.*, adults, juveniles, neonates, group composition, *etc.*);
- Animal's closest point of approach and estimated time spent within the estimated harassment zone(s);
- 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 estimated harassment zones, by species; and
- Detailed information about implementation of any mitigation (*e.g.*, shutdowns and delays), a description of specified actions that ensured, and resulting changes in behavior of the animal(s), if any.

If no comments are received from NMFS within 30 days after the submission of the draft summary report, the draft report would constitute the final report. If KDC received comments from NMFS, a final summary report addressing NMFS' comments would be submitted within 30 days after receipt of comments.

Reporting Injured or Dead Marine Mammals

In the event that personnel involved in KDC's activities discover an injured or dead marine mammal, KDC would report the incident to the NMFS Office of Protected Resources (OPR) (*PR.ITP.MonitoringReports@noaa.gov*, *ITP.Potlock@noaa.gov*) and to the Alaska Regional Stranding Coordinator (877-925-7773) as soon as feasible. If the death or injury was clearly caused by the specified activity, KDC would 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 IHA. KDC would not resume their activities until notified by NMFS. The report would include the following information:

- Description of the incident;
- Environmental conditions (*e.g.*, Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Photographs or video footage of the animal(s) (if equipment is available).
- 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; 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, the discussion of our analysis applies to all the species listed in table 12, given that the anticipated effects of this activity on these different marine mammal stocks are expected to be similar. There is little information about the nature or severity of the impacts, or the size, status, or structure of any of these species or stocks that would lead to a different analysis for this activity.

Pile driving for installation and removal, and DTH activities associated with the proposed 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 A harassment and/or Level B harassment from underwater sounds generated from pile driving installation and removal. Potential takes could occur if individuals of these species are present in zones ensounded above the thresholds for Level A harassment or Level B harassment identified above when these activities are underway.

Given the nature of the proposed activities, NMFS does not anticipate serious injury or mortality due to KDC's proposed project, even in the absence of required mitigation. The Level A harassment zones identified in table 14 are based upon an animal exposed to vibratory pile driving, impact pile driving, and DTH pile installation for periods ranging from up to 15 minutes for impact driving per day, up to 120 minutes for vibratory driving/removal per day), and up to 960 minutes for DTH per day. Exposures of

this length are, however, unlikely for vibratory driving/removal and DTH pile installation scenarios, given marine mammal movement throughout the area. Even during impact driving scenarios, an animal exposed to the accumulated sound energy would likely only experience limited AUD INJ at the lower frequencies where pile driving energy is concentrated.

As stated in the **Proposed Mitigation** section, KDC would implement shutdown zones that equal or exceed many of the Level A harassment isopleths shown in table 14. Take by Level A harassment is proposed for seven marine mammal species (eight stocks). This is precautionary to account for the potential that an animal could enter and remain within the area between a Level A harassment zone and the shutdown zone for long enough to be taken by Level A harassment. Additionally, in some cases, this precaution would account for the possibility that an animal could enter a shutdown zone without detection, given the various obstructions along the shoreline, and remain in the Level A harassment zone for a duration long enough to be taken by Level A harassment before being observed and a shutdown occurring. That said, any take by Level A harassment is expected to arise from, at most, a small degree of AUD INJ because animals would need to be exposed to higher levels and/or longer duration than are expected to occur here to incur any more than a small degree of AUD INJ. Additionally, and as noted previously, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. Because of the small degree anticipated, any AUD INJ or TTS potentially incurred here is not expected to adversely affect an animal's individual fitness, let alone annual rates of recruitment or survival.

For all species and stocks, take is expected to occur within a limited, confined area (adjacent to the project site) of the stock's range. The intensity and duration of take by Level A harassment and Level B harassment would be expected to be minimized

through the proposed mitigation measures described herein. Furthermore, the amount of take proposed for authorization is small compared to the relative stock's abundance, even assuming that every take for any particular species could wholly occur to individuals of an individual stock.

Behavioral responses of marine mammals to pile driving, pile removal, and DTH at the project site, if any, are expected to be mild, short-term, and temporary. Given that the installation of 18 permanent piles and 20 temporary piles would occur over 14 days in total (9 for permanent piles, 5 for temporary piles), and that the removal of 12 existing piles and 20 temporary piles would occur over 4 and 5 days, respectively, (all of which may not necessarily be consecutive), any harassment is expected to be temporary and intermittent. 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. Additionally, many of the species present in region would only be present temporarily based on seasonal patterns or during active transit between other habitats. Most likely, during pile driving, individuals would be expected to move away from the sound source and be temporarily displaced from the areas of pile driving. However, this reaction has been observed primarily associated with impact pile driving. While vibratory driving associated with the proposed project may produce sound at distances of many kilometers from the project site, thus overlapping with some likely less-disturbed habitat, the project site itself is located in a busy harbor, and the majority of sound fields produced by the specified activities are close to the harbor. Animals disturbed by project sounds would be expected to avoid the area and use nearby higher-quality habitats. Pinnipeds in the area would have the ability to haul-out to avoid the activities (noting that the known haul-outs are located much further away from the project area) and no in-air harassment is anticipated from the construction activities.

The potential for harassment is minimized by implementing the proposed mitigation measures. During all impact driving, implementation of soft-start procedures and monitoring of established shutdown zones by trained and qualified PSOs shall be required, significantly reducing any possibility of injury. Given sufficient notice through soft-start (for impact driving), marine mammals are expected to move away from an irritating sound source before it becomes potentially injurious.

Any impacts on marine mammal prey that would occur during KDC's proposed activities would have, at most, short-term effects on foraging of individual marine mammals, and likely no effect on the populations of marine mammals as a whole. Indirect effects on marine mammal prey during the construction are expected to be minor, and these effects are unlikely to cause substantial effects on marine mammals at the individual level, with no expected effect on annual rates of recruitment or survival.

The area likely impacted by the project is relatively small compared to the available habitat in the surrounding waters of Southeast Alaska and Tongass Narrows. Although Tongass Narrows is part of an identified BIA for feeding humpback whales (NOAA, 2023; Wild *et al.*, 2023), the timing of the BIA (May through September) may only minimally overlap with the proposed timing of the in-water construction (January through May), depending on when activities end (*i.e.*, early May, late May). Additionally, humpback foraging efforts within Tongass Narrows are likely comparatively low due to the lower value of the habitat in the immediate area (Wild *et al.*, 2023), as evidenced by the typically low occurrence of humpback whales in the area. Finally, there is no ESA-designated critical habitat in the area for humpback whales.

In addition, it is unlikely that minor noise effects in a small, localized area of habitat would have any effect on the reproduction or survival of any individuals, much less the stocks' annual rates of recruitment or survival. 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 would have only minor, short-term effects on individuals. As already said, the specified activities are not expected to impact rates of recruitment or survival; therefore, these effects would not be expected to 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 any of the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or proposed for authorization;
- Any Level A harassment exposures are anticipated to result in slight AUD INJ (*i.e.*, of a few decibels) within the lower frequencies associated with pile driving;
- The anticipated incidents of Level B harassment would consist of, at worst, temporary modifications in behavior that would not result in fitness impacts to individuals;
- The area affected by the specified activity is very small relative to the overall habitat ranges of all species, does not include any rookeries, does not include ESA-designated critical habitat, and only temporally overlaps with the southeast Alaska humpback whale feeding BIA for a minimal amount of time in May, depending on when the activities are expected to be completed (*i.e.*, early May, late May);
- 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;
- Although Steller sea lions and harbor seals are known to haul-out, these haul-out locations are located over 7.55 km (4.69 mi) to 30 km (18.6 mi) away from the proposed project site (depending on the species), which is outside of the ensonified zone;

- The project area is located in an industrialized and commercial marina; and
- The proposed mitigation measures, such as employing vibratory driving to the maximum extent practicable, soft-starts, and shutdowns, are expected to reduce the effects of the specified activity to the least practicable adverse impact level.

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 take of small numbers of marine mammals 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 (see 86 FR 5322, January 19, 2021). Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

NMFS is proposing to authorize incidental take by Level A harassment (in some cases) and/or Level B harassment of eight species (consisting of 11 stocks) of marine mammals. No mortality or serious injury has been requested, nor is it anticipated to occur from the activities described herein. The maximum number of instances of takes by Level A harassment and Level B harassment proposed, relative to the best available population

abundance, is less than one-third for all species and stocks potentially impacted (see table 12).

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 would 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.

Alaska Natives have historically hunted sea lions and harbor seals in Southeast Alaska for thousands of years. Since surveys of harbor seals and sea lion subsistence hunting in Alaska began in 1992, there has been a noticeable decline in the number of households, which undertake hunting and harvesting of harbor seals, while the number of households undertaking hunting and harvesting activities on sea lions has remained at consistently low levels (Wolfe *et al.*, 2013). Specifically in the Clarence Strait, harvest data indicates that the average annual harvest in the years 2004-2008 of 164 harbor seals and an average annual harvest in the years 2011-2012 of 40 harbor seals (summarized in Muto *et al.*, 2016 from Wolfe *et al.*, 2013). In 2012, the last recorded marine mammal

harvest, the community of Ketchikan had an estimated subsistence take of 22 harbor seals and 0 Steller sea lions (Wolfe *et al.*, 2013).

Given all of this information, NMFS agrees with KDC's preliminary determination that the proposed project is not likely to adversely affect the availability of any marine mammal species/stocks that would traditionally be used for subsistence purposes, or would affect any subsistence harvest in the region because of the following reasons:

- The proposed construction activities are spatially localized within a discrete area that has been previously developed (*i.e.*, the Ketchikan Berth IV dock site);
- The proposed activities are expected to be temporary in nature;
- KDC would be required to implement mitigation measures that minimize any disturbance to marine mammals in the action area, including traditionally harvested species;
- NMFS expects that most of the effects on marine mammals would not rise above behavioral impacts (*i.e.*, Level B harassment) and would be temporary in nature and any impacts that would rise to the threshold to cause PTS (*i.e.*, Level A harassment) would occur on a small group of animals (refer back to table 12); and
- No serious injury or mortality is expected to result from the project activities, therefore, the project would not result in a significant change to the 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 KDC's proposed activities.

Endangered Species Act

Section 7(a)(2) of the ESA of 1973 (16 U.S.C. 1531 *et seq.*) requires that each Federal agency ensures 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 NMFS Alaska Regional Office (AKRO).

NMFS is proposing to authorize the take of the Mexico-North Pacific stock of humpback whales, which are listed as threatened under the ESA. The NMFS Office of Protected Resources has requested the initiation of ESA section 7 consultation with AKRO for the issuance of this IHA. NMFS would conclude the ESA consultation before reaching a determination regarding the proposed authorization issuance.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to KDC for conducting the Ketchikan Berth IV Expansion Project in Ketchikan, Alaska in the East Tongass Narrows, 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>.

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 Ketchikan Berth IV Expansion Project. 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 Activity** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activity** 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 1 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: September 24, 2025.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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