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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XG106

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Ketchikan Berth IV Expansion Project

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

ACTION: Notice; Issuance of an Incidental Harassment Authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to the Ketchikan Dock Company (KDC) to incidentally harass, by Level A and B harassment, marine mammals during construction activities associated with the Ketchikan Berth IV Expansion project in Ketchikan, AK.

DATES: This Authorization is applicable from October 1, 2018 through August 31, 2019.

FOR FURTHER INFORMATION CONTACT: Jonathan Molineaux, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities>. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

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 issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined “negligible impact” in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term “take” means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

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

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

Summary of Request

On February 13, 2018, NMFS received a request from the KDC for an IHA to take marine mammals incidental to construction activities associated with the Ketchikan Berth IV Expansion Project. The IHA application was determined adequate and complete on March 28, 2018. The KDC's request is for take of eight species of marine mammals by Level B harassment and Level A harassment of a small number of harbor porpoises and harbor seals. Neither the KDC nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Activity

The KDC will expand Berth IV, its dock adjacent to downtown Ketchikan, Alaska, located in East Tongass Narrows, in order to accommodate a new fleet of large cruise ships that are expected to reach Alaska in the summer of 2019.

The expansion will include the removal of some existing piles and structures and the installation of new piles and structures. All pile driving and removal will take place at the existing dock facility and is expected to occur over the course of 29 days (not necessarily consecutive). The project will occur in marine waters that support several marine mammal species. The pile driving, pile removal, and drilling activities associated with the project may result in behavioral harassment (Level B harassment and small numbers of Level A harassment) of marine mammal species.

The purpose of this project is to reconfigure Berth IV so that it can accommodate larger cruise ships. This project is needed because the existing Berth IV cannot support the modern

fleet of larger cruise ships. Once the project is constructed Berth IV will be able to accommodate these large cruise ships.

Construction activities associated with impact pile driving, vibratory pile driving/removal, and drilling are expected to take three to four months beginning in Fall 2018. The project is likely to begin in October of 2018 and complete in January of 2019, depending on the start date, construction could extend into March of 2019. Regardless of start date, construction will occur within a four-month (maximum) work window. The total number of days for pile removal, pile installation and drilling is expected to occur over 29 days (not necessarily consecutive days). The total construction duration accounts for the time required to mobilize materials and resources and construct the project. The duration also accounts for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals. Please see Table 1 below for the specific amount of time required to install and remove piles.

Table 1 Pile Driving Construction Summary.

Description	Project Component					
	Existing Pile Removal	Temporary Pile Installation	Temporary Pile Removal	Permanent Pile Installation	Permanent Pile Installation	Max Installation/Removal per Day
Pile Diameter and Type	24, 30, and 36-inch steel	30-inch steel	30-inch steel	30-inch steel	48-inch steel	--
# of Piles	2, 6, and 4 respectively; 12 total	16	16	1	17	--
Vibratory Pile Driving						
Max # of Piles Vibrated Per Day	4	4	4	1	2	4 temporary or 2 permanent
Vibratory Time Per Pile	15 minutes	30 minutes	10 minutes	1 hour	1 hour	--
Vibratory Time per day	1 hour	2 hours	40 minutes	1 hour	2 hours	2 hours

Vibratory Time Total	3 hours	8 hours	2 hours 40 minutes	1 hour	17 hours	--
Impact Pile Driving						
Max # of Piles Impacted Per Day	0	0	0	0	3	3
# of Strikes Per Pile	0	0	0	0	50 strikes	150 strikes
Impact Time Per Pile	0	0	0	0	5 minutes	--
Impact Time per Day	0	0	0	0	15 minutes	15 minutes
Impact Time Total	0	0	0	0	1 hour 25 minutes	--
Socketing Pile Installation(Drilling)						
Max # of Piles Socketed per Day	0	0	0	1	0	1
Socket Time Per Pile	0	0	0	3 hours	0	--
Socket Time per Day	0	0	0	3 hours	0	3 hours
Socket Time Total	0	0	0	3 hours	0	--
Anchor Drilling						
Max # of Piles drilled per Day	0	0	0	3	0	3
Drilling Time Per Pile	0	0	0	2.5 hours	0	--
Drilling Time per Day	0	0	0	7.5 hours	0	7.5 hours
Anchor Time Total	0	0	0	42.5 hours	0	--

A detailed description of the planned activities is provided in the proposed IHA for this action found in the following **Federal Register** notice (83 FR 22009, May 11, 2018). Since that time, the only alteration that has been made to the planned activities is the activity duration for impact piling of the 48-inch piles. The number of strikes per pile will be no more than 50 strikes per pile (See Table 1). As a result of this change in duration, the Level A zone for the activity and take numbers were also modified. In addition, take will now be authorized for anchor drilling. The new Level A zones for impact piling of 48-inch piles, the modeled zones for anchor drilling, and the revised take numbers are presented and discussed further in the Estimated Take Section. Due to only slight changes in the activity duration for impact piling, a

detailed description of the action is not provided here. Please refer to the **Federal Register** notice (83 FR 22009, May 11, 2018) for the proposed IHA for the description of the specific activity.

Comments and Responses

A notice of NMFS's proposal to issue an IHA was published in the **Federal Register** on May 11, 2018 (83 FR 22009). During the 30-day public comment period, the Marine Mammal Commission (Commission) submitted a letter on April 2, 2018. The Commission recommended that NMFS issue the IHA, subject to inclusion of the mitigation, monitoring, and reporting measures.

Comment 1: The Commission recommends that NMFS review more thoroughly both the applications prior to deeming them complete and its notices prior to submitting them for publication in the **Federal Register**. For example, the Commission stated that NMFS incorrectly assumed a pile casing would inhibit sound transmission during drilling of 30-in anchors into bedrock, which underestimated the numbers of Level B harassment takes for harbor seals and Steller sea lions.

Response: NMFS thanks the Commission for pointing out the errors in the **Federal Register** notice for the proposed authorization. NMFS has addressed those errors in this notice of issuance of the authorization. NMFS makes every effort to read notices thoroughly prior to publication and will continue this effort to publish the best possible product for public comment. In addition, NMFS notes that recent drilling techniques which have not been authorized in the past require further review due to the novelty of such actions. Due to this, NMFS continues to welcome suggestions from the Commission on how to approach new drilling techniques until acoustic monitoring data is available for such actions.

Comment 2: The Commission recommends that NMFS refrain from implementing its proposed renewal process and instead use abbreviated **Federal Register** notices and reference existing documents to streamline the incidental harassment authorization process. The Commission also suggested that NMFS should discuss the possibility of renewals through a more general route, such as a rulemaking, instead of notice in a specific authorization. The Commission further recommended that if NMFS did not pursue a more general route, that the agency provide the Commission and the public with a legal analysis supporting our conclusion that this process is consistent with the requirements of section 101(a)(5)(D) of the MMPA.

Response: The process of issuing a renewal IHA does not bypass the public notice and comment requirements of the MMPA. The notice of the proposed IHA expressly notifies the public that under certain, limited conditions an applicant could seek a renewal IHA for an additional year. The notice describes the conditions under which such a renewal request could be considered and expressly seeks public comment in the event such a renewal is sought. Additional reference to this solicitation of public comment has recently been added at the beginning of FR notices that consider renewals. NMFS appreciates the streamlining achieved by the use of abbreviated FR notices and intends to continue using them for proposed IHAs that include minor changes from previously issued IHAs, but which do not satisfy the renewal requirements. We believe our proposed method for issuing renewals meets statutory requirements and maximizes efficiency. Importantly, such renewals would be limited to circumstances where: the activities are identical or nearly identical to those analyzed in the proposed IHA; monitoring does not indicate impacts that were not previously analyzed and authorized; and, the mitigation and monitoring requirements remain the same, all of which allow the public to comment on the appropriateness and effects of a renewal at the same time the public provides comments on the

initial IHA. NMFS has, however, modified the language for future proposed IHAs to clarify that all IHAs, including renewal IHAs, are valid for no more than one year and that the agency would consider only one renewal for a project at this time. In addition, notice of issuance or denial of a renewal IHA would be published in the **Federal Register**, as they are for all IHAs. Last, NMFS will publish on our website a description of the renewal process before any renewal is issued utilizing the new process.

Description of Marine Mammals in the Area of Specified Activities

A detailed description of the of the species likely to be affected by the construction project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (83 FR 22009, May 11, 2018); since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also refer to NMFS’ website (<https://www.fisheries.noaa.gov/topic/population-assessments/marine-mammals>) for generalized species accounts. All species that could potentially occur in the planned survey area are included in Table 2.

Table 2. Marine mammals that could occur in the project area during the specified activity.

Common name	Scientific name	MMPA Stock	ESA/MMPA status; Strategic (Y/N) ¹	Stock abundance Nbest, (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
Humpback whale	<i>Megaptera novaeangliae</i>	Central North Pacific	E, D,Y	10,103 (0.3; 7,890; 2006)	83	21
Minke whale	<i>Balaenoptera acutorostrata</i>	Alaska	-, N	N.A.	N.A.	N.A.
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						

Killer whale	<i>Orcinus orca</i>	Alaska Resident	-, N	2,347 (N.A.; 2,347; 2012) ⁴	23.4	1
		West Coast Transient	-, N	243 (N.A, 243, 2009) ⁴	2.4	1
		Northern Resident	-, N	290 (N.A.; 290; 2014) ⁶	1.96	0
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	North Pacific	-/-; N	26,880 (N.A.; N.A.; 1990)	N.A.	0
Family Phocoenidae						
Harbor porpoise	<i>Phocoena phocoena</i>	Southeast Alaska	-, Y	975 (0.10; 896; 2012) ⁵	8.9 ⁵	34 ⁵
Dall's porpoise	<i>Phocoenoides dalli</i>	Alaska	-, N	83,400	N.A.	38
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller sea lion	<i>Eumatopia jubatus</i>	Eastern U.S.	-, N	41,638 (N/A; 41,638; 2015)	2,498	108
Family Phocidae (earless seals)						
Harbor seal	<i>Phoca vitulina richardii</i>	Clarence Strait	-, N	31,634 (N.A.; 29,093; 2011)	1,222	41

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

²NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable (N/A).

³These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike).

⁴N is based on counts of individual animals identified from photo-identification catalogs.

⁵In the SAR for harbor porpoise (NMFS 2017), NMFS identified population estimates and PBR for porpoises within inland Southeast Alaska waters (these abundance estimates have not been corrected for g(0); therefore, they are likely conservative). The calculated PBR is considered unreliable for the entire stock because it is based on estimates from surveys of only a portion (the inside waters of Southeast Alaska) of the range of this stock as currently designated. The Annual M/SI is for the entire stock, including coastal waters.

⁶Abundance estimates obtained from Towers *et al.*, 2015.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The effects of underwater noise from pile driving/removal and drilling activities for the Ketchikan Berth IV Expansion project have the potential to result in Level A and Level B harassment of marine mammals in the vicinity of the action area. The **Federal Register** notice for the proposed IHA (83 FR 22009, May 11, 2018) included a discussion of the effects of anthropogenic noise on marine mammals and their habitat in the action area, therefore that information is not repeated here; please refer to the **Federal Register** notice (83 FR 22009, May 11, 2018) for that information.

Estimated Take

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

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 impact pile driving, vibratory pile driving/removal, and drilling has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for harbor seals and harbor porpoises due to larger predicted auditory injury zones. Auditory injury is unlikely to occur for other species. The mitigation and monitoring measures are expected to minimize the severity of such taking to the extent practicable.

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

Described in the most basic way, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of hearing impairment; 2) the area or volume of

water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed or experience TTS (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – 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 (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μ Pa rms for continuous (*e.g.* vibratory pile-driving, drilling) and above 160 dB re 1 μ Pa rms for non-explosive impulsive (*e.g.*, impact pile driving) or intermittent (*e.g.*, scientific sonar) sources.

KDC's construction activity includes the use of continuous (vibratory pile driving and drilling) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μ Pa rms thresholds for Level B behavioral harassment are applicable.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Technical Guidance, 2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). KDC's activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving and drilling) sources.

These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>.

Table 3. Thresholds identifying the onset of Permanent Threshold Shift.

Hearing Group	PTS Onset Acoustic Thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	Cell 1 $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	Cell 2 $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	Cell 3 $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	Cell 4 $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	Cell 5 $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	Cell 6 $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	Cell 7 $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	Cell 8 $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	Cell 9 $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	Cell 10 $L_{E,OW,24h}$: 219 dB
<p>* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.</p> <p><u>Note:</u> Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1 $\mu\text{Pa}^2\text{s}$. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.</p>		

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds.

Reference sound levels used by KDC for all vibratory and impact piling activities were derived from source level data from construction projects at the Port of Anchorage (Austin *et al.*, 2016) and Ketchikan Ferry Terminal (Denes *et al.*, 2016). To determine the ensonified areas for

both the Level A and Level B zones for vibratory piling of 48-inch/36-inch steel piles and 30-inch/24-inch steel piles, KDC used Sound Pressure Levels (SPLs) of 168.2 dB re 1 μ Pa rms and 161.9 dB re 1 μ Pa rms respectively. These were derived from vibratory pile driving data (of the same pile sizes) during the Port of Anchorage test pile project (Austin *et al.*, 2016, Tables 9 and 16) and the Ketchikan Ferry Terminal (Denes *et al.* 2016, Table 72).

For impact pile driving, KDC used both SPLs and Sound Exposure Levels (SEL) derived from SSV studies conducted on 48-inch steel piles during the Port of Anchorage test pile project. To determine Level A ensonified zones from impact piling, KDC utilized an SEL of 186.7 dB. When determining Level A zones, SELs are more accurate than SPLs, as they incorporate the pulse duration explicitly rather than assuming a proxy pulse duration and they provide a more refined estimation of impacts. However, to determine the Level B zone for impact piling, an SPL of 198.6 dB re 1 μ Pa rms was used. In addition, for drilling(socket and anchor pile installation), KDC used a reference sound level of 167.7 dB re 1 μ Pa rms from SSV studies conducted during drilling activities at the Kodiak Ferry Terminal to calculate both the Level A and Level B ensonified zones for the Berth IV Expansion project. More information on the source levels used are presented in Table 4 below.

Table 4. Project Source Levels.

Activity	Source Level at 10 meters (dB)
Vibratory Pile Driving/Removal	
24-inch steel removal (2 piles) (~1 hour on 1 day) ¹	161.9 SPL ²
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	161.9 SPL ²
36-inch steel removal (4 piles) (~1 hour on 1 day)	168.2 SPL ²
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	161.9 SPL ²

30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	161.9 SPL ²
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	168.2 SPL ²
Impact Pile Driving	
48-inch steel permanent installation (17 piles) (~15 minutes per day on 6 days)	186.7 SEL/ 198.6 SPL ³
Socketing Installation(Drilling)	
30-inch steel permanent installation (1 pile) (~3 hours on 1 day)	167.7 SPL ⁴
Anchoring Installation(Drilling)	
30-inch steel permanent installation (17 piles) (~2.5 hours per day)	167.7 SPL ⁴

¹ This project will only remove two 24-inch diameter steel piles total for a maximum of 30 minutes of removal in one day. However, because a maximum of 4 pile could be removed each day, we used 1 hour (the time it would take to remove four piles) of removal time instead of 30 minutes to calculate the distance threshold.

² The 36-inch and 48-inch diameter pile source levels are proxy from median measured source levels from pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin *et al.* 2016, Tables 9 and 16). The 24-inch and 30-inch diameter source levels are proxy from median measured sources levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes *et al.* 2016, Table 72).

³ Sound pressure level root-mean-square (SPL rms) values were used to calculate distance to Level B harassment isopleths for impact pile driving. The source level of 186.7 SEL is the median measured from the Port of Anchorage test pile project for 48-inch piles (Austin *et al.* 2016, Table 9). We calculated the distances to Level A thresholds assuming 50 strikes per pile at 3 piles per day.

⁴ The 30-inch diameter socketing and anchor source levels are derived from rom mean measured source levels from drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes *et al.* 2016, Table 72). The mean was chosen as a proxy due to it being more conservative than the median source level.

Level B Zones

The practical spreading model was used by KDC to generate the Level B harassment zones for all piling and drilling activities. Practical Spreading, a form of transmission loss, is described in full detail below.

Pile driving and drilling generates underwater noise that can potentially result in disturbance to marine mammals in the project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth,

water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$$TL = B * \log_{10}(R1/R2), \text{ where}$$

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 is dependent on a variety of factors, most notably the water bathymetry and 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 ($20 * \log[\text{range}]$).

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 ($10 * \log[\text{range}]$). 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.

Utilizing the practical spreading loss model, KDC determined underwater noise will fall below the behavioral effects threshold of 120 dB rms for marine mammals at a max radial distance of 16,343 meters and 15,136 meters for vibratory piling and drilling, respectively¹. With these radial distances, and due to the occurrence of landforms (See Figure 5 of IHA Application),

¹ These distances represent calculated distances based on the practical spreading model; however, landforms will block sound transmission at closer distances. The farthest distance that sound will transmit from the source is 13,755 m before transmission is stopped by Annette Island.

the largest Level B zone calculated for vibratory piling and drilling equaled 10.3 km². For calculating the Level B zone for impact driving, the practical spreading loss model was used with a behavioral threshold of 160 dB rms. The maximum radial distance of the Level B ensonified zone for impact piling equaled 3,744 meters. At this radial distance, the entire Level B zone for impact piling equaled 4.9 km². Table 5 below provides all Level B radial distances and their corresponding areas for each activity during KDC's Berth IV Expansion project.

Table 5. Level B Zones Calculated Using the Practical Spreading Model.

Source	Level B Zones (meters)	Level B Zone (square kilometers)
Vibratory Pile Driving		
24-inch steel removal (2 piles) (~1 hour on 1 day ³)	6,215	5.9
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	6,215	5.9
36-inch steel removal (4 piles) (~1 hour on 1 day)	16,343*	10.3
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	6,215	5.9
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	6,215	5.9
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	16,343*	10.3
Impact Pile Driving		
48-inch steel (17 piles) (~15 minutes per day on 6 days)	3,745	4.9
Socketing Pile Installation(Drilling)		
30-inch steel (1 pile) (~3 hours on 1 day)	15,136*	10.3

* These distances represent calculated distances based on the practical spreading model; however, landforms will block sound transmission at closer distances. The farthest distance that sound will transmit from the source is 13,755 m before transmission is stopped by Annette Island.

Level A Zones

When NMFS's Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or

occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which will result in some degree of overestimate of Level A take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources (*i.e.*, pile driving and drilling), NMFS's User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. Inputs used in the User Spreadsheet, and the resulting Level A isopleths are reported below.

Table 6. NMFS’s Optional User Spreadsheet Inputs.

	USER SPREADSHEET INPUT						
Equipment Type	Socket Drill	Anchor Drill	Vibratory Pile Driver (Removal of 30-inch and 24-inch steel piles)	Vibratory Pile Driver (Installation of 30-inch steel piles)	Vibratory Pile Driver (Installation of 36-inch steel piles)	Vibratory Pile Driver (Installation of 48-inch steel piles)	Impact Pile Driver
Spreadsheet Tab Used	Non-impulsive, continuous	Non-impulsive, continuous	Non-impulsive, continuous	Non-impulsive, continuous	Non-impulsive, continuous	Non-impulsive, continuous	Impulsive, Non-continuous
Source Level	167.7 SPL	167.7 SPL	161.9 SPL	161.9 SPL	168.2 SPL	168.2 SPL	186.7 SEL
Weighting Factor Adjustment (kHz)	2	2	2.5	2.5	2.5	2.5	2
(a) Activity duration within 24 hours (b) Number of strikes per pile (c) Number of piles per day	(a)3	(a)7.5	(a)1	(a)2	(a)1	(a) 2	(b) 150 (c) 3
Propagation (xLogR)	15	15	15	15	15	15	15
Distance of source level measurement (meters) [†]	10	10	10	10	10	10	10

Table 7. NMFS Optional User Spreadsheet Outputs.

USER SPREADSHEET OUTPUT					
	PTS Isopleth (meters)				
Source Type	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
Socket Drilling	40	2.3	35	21.4	1.6
Anchor Drilling	73.6	4.1	64.5	39.4	2.9
Vibratory Pile Driver (Removal of 30-inch and 24-inch steel piles)	7.8	0.7	11.6	4.8	0.3
Vibratory Pile Driver (Installation of 30-inch steel piles)	12.4	1.1	18.4	7.6	0.5
Vibratory Pile Driver (Installation of 36-inch steel piles)	20.6	1.8	30.5	12.5	0.9
Vibratory Pile Driver (Installation of 48-inch steel piles)	32.7	2.9	48.4	19.9	1.4
Impact Pile Driver	497.5	17.7	592.6	266.2	19.4
Daily ensoufied area (km²)					
Socket Drilling	0.003	0.000008	0.002	0.00078	0.000004
Anchor Drilling	0.02	0.00005	0.01	0.005	0.00003
Vibratory Pile Driver (Removal of 30-inch and 24-inch steel piles)	0.0001	0.0000008	0.0002	0.00004	0.0000001
Vibratory Pile Driver (Installation of 30-inch steel piles)	0.0002	0.000002	0.0005	0.00009	0.0000004
Vibratory Pile Driver (Installation of 36-inch steel piles)	0.001	0.00001	0.003	0.0005	0.000003
Vibratory Pile Driver (Installation of 48-inch steel piles)	0.003	0.00003	0.007	0.001	0.000006
Impact Pile Driver	0.8	0.001	1.1	0.22	0.0019

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. Potential exposures to impact pile driving, vibratory pile driving/removal and drilling noises for each acoustic threshold were estimated using group size estimates and local observational data. As previously stated, Level B

take as well as small numbers of Level A take will be will be considered for this action. Level B and Level A take are calculated differently for some species based on monthly and daily sightings data based on Freitag (2017) and average group sizes within the action area. Below gives a description of estimated habitat use and group sizes for the eight species of marine mammals known to occur within the action area.

Humpback Whale

Humpback whales frequent the action area and could be encountered during any given day of dock construction. In the project vicinity, humpback whales typically occur in groups of 1-2 animals, with an estimated maximum group size of four animals. Humpback whales can pass through the action area 0-3 times a month (Freitag 2017).

Minke Whale

Minke whales are rare in the action area, but they could be encountered during any given day of dock construction. These whales are usually sighted individually or in small groups of 2-3, but there are reports of loose aggregations of hundreds of animals (NMFS 2018). Freitag (2017) estimates that a group of three whales may occur near or within the action over the four-month period.

Killer Whales

Killer whales pass through the action area and could be encountered during any given day of dock construction. In the project vicinity, typical killer whale pod size varies from between 1-2 and 7-10 individuals, with an estimated maximum group size of 10 animals. Killer whales are estimated to pass through the action area one time a month (Freitag 2017).

Pacific White-Sided Dolphin

Pacific white-sided dolphins are rare in the action area, but they could be encountered during any given day of dock construction (Freitag 2017). Pacific-white sided dolphins have been observed in Alaska waters in groups ranging from 20 to 164 animals (Muto *et al* 2016a).

Dall's Porpoise

Dall's porpoises are seen infrequently in the action area (Freitag 2017), but they could be encountered during any given day of dock construction. In the project vicinity, Dall's porpoises typically occur in groups of 10-15 animals, with an estimated maximum group size of 20 animals. Dall's porpoises have been observed passing through the action area 0-1 times a month (Freitag 2017).

Harbor Porpoise

Harbor porpoises are seen infrequently in the action area, but they could be encountered during any given day of dock construction. In the project vicinity, harbor porpoises typically occur in groups of one to five animals, with an estimated maximum group size of eight animals. Harbor porpoises have been observed passing through the action area 0-1 times a month (Freitag 2017).

Harbor Seals

Harbor seals are common in the action area and are expected to be encountered in low numbers during dock construction. In the action area harbor seals typically occur in groups of one to three animals, with an estimated maximum group size of three animals. Harbor seals can occur every day of the month in the project area (Freitag 2017).

Steller Sea Lions

Steller sea lions are common in the action area and are expected to be encountered in low numbers during dock construction. In the project vicinity Steller sea lions typically occur in

groups of 1-10 animals (Freitag 2017), with an estimated maximum group size of 80 animals (HDR 2003). Steller sea lions can occur every day of the month in the project area (Freitag 2017).

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate. Table 8 below shows take as a percentage of population for each of the species.

Humpback Whale

Based on observational and group data it is estimated that a group of 2 humpback whales may occur within the Level B harassment zone three times each month over the four-month construction window during active pile driving (2 animals in a group \times 3 groups each month \times 4 months = 24 animals). Therefore, NMFS authorizes 24 Level B takes of humpback whales.

Minke Whale

Based on local sighting information (Freitag 2017), it is estimated that a group of three whales may occur within the Level B harassment zone once over the four-month construction window during active pile driving (three animals in a group \times one group in four months = 3 animals). Therefore, NMFS authorizes three Level B takes of minke whale.

Killer Whales

Based on observational and group data it is estimated that a group of 10 killer whales may occur within the Level B harassment zone one time each month over the four-month construction window during active pile driving (10 animals in a group \times 1 group each month \times 4 months = 40 animals). Therefore, NMFS authorizes 40 Level B takes of killer whales. (To clarify, this request is for 40 takes from all stocks combined, not 40 takes from each stock).

Pacific White-Sided Dolphin

Based on observational and group data it is estimated that a group of 92 (median between 20 and 164) Pacific-white sided dolphins may occur within the Level B harassment zone once over the four-month construction window during active pile driving (92 animals in a group x one group in four months = 92 animals). Therefore, NMFS authorizes 92 Level B takes of Pacific white-sided dolphins.

Dall's Porpoise

Based on observational and group data it is estimated that a group of 15 Dall's porpoises may occur within the Level B harassment zone one time each month over the four-month construction window during active pile driving (15 animals in a group x one group each month x four months = 60 animals). Therefore, NMFS authorizes 60 Level B takes of Dall's porpoise.

Harbor Porpoise

Based on observational and group data it is conservatively estimated that a group of 5 harbor porpoise may occur within the Level B harassment zone once time each month over the four-month construction window during active pile driving (five animals in a group x one group each month x four months = 20 animals). In addition, NMFS authorizes Level A take for two groups of harbor porpoises to safeguard against the possibility of PSOs not being able detect a group of harbor porpoises within their largest corresponding shutdown (see table 9). Therefore, NMFS authorizes 20 Level B takes and 10 Level A takes of harbor porpoises.

Harbor Seals

Based on observational and group data it is conservatively estimated that two groups of three harbor seals may occur within the Level B harassment zone every day that pile driving may occur, and pile driving is estimated to occur on 29 days during the four-month long construction

duration (three animals in a group x two groups per day x 29 days = 174 animals). In addition, NMFS authorizes Level A take for six groups of harbor seals to safeguard against the possibility of PSOs not being able to detect a group of harbor seals within their largest corresponding shutdown zone (see Table 9). Therefore, NMFS authorizes 174 Level B takes and 18 Level A takes of harbor seals.

Steller Sea Lions

Based on observational and group data it is estimated that a group of 10 Steller sea lions may occur within the Level B harassment zone every day that pile driving may occur, and pile driving is estimated to occur on 29 days during the 4-month long construction duration (10 animals in a group x 29 days = 290 animals). Therefore, NMFS authorizes 290 Level B takes of Steller sea lions.

Table 8. Take Estimates as a Percentage of Stock Abundance.

Species	Stock (NEST) ^a	Level A	Level B	Percent of Stock
Humpback Whale	Hawaii DPS (11,398) ^b	0	22 ^b	0.20
	Mexico DPS (3,264) ^b		2	0.03
Minke Whale	Alaska (N/A)	0	3	N/A
Killer Whale	Alaska Resident (2,347)	0	40	1.70
	Northern Resident (261)			15.33
	West Coast Transient (243)			16.46 ^d
Pacific White-Sided Dolphin	North Pacific (26,880)	0	92	0.34
Dall's Porpoise	Alaska (83,400)	0	60	0.07
Harbor Porpoise	Southeast Alaska (975) ^c	10	20	3.07
Harbor Seal	Clarence Strait (31,634)	18	174	0.61
Steller Sea Lion	Eastern U.S (49,497)	0	290	0.59

^a Stock estimate from Muto, M. M. *et al.* 2016. Appendix 2. Stock Summary Table (last revised 12.30.16).NOAA-TM-AFSC-355Muto,M.M.,*et al.*

http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_sars_appendix_2.pdf unless otherwise noted.

^b Under the MMPA humpback whales are considered a single stock (Central North Pacific); however, we have divided them here to account for DPSs listed under the ESA. Based on calculations in Wade *et al.* 2016, 93.9 percent of the humpback whales in Southeast Alaska are expected to be from the Hawaii DPS and 61 percent are expected to be from the Mexico DPS.

^c In the SAR for harbor porpoise (NMFS 2017), NMFS identified population estimates and PBR for porpoises within inland Southeast Alaska waters (these abundance estimates have not been corrected for g(0); therefore, they are likely conservative

^d These percentages assume all 40 takes come from each individual stock, thus the percentage should be inflated if multiple stocks are actually impacted.

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 such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (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 such 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, we carefully consider 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. 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, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The following mitigation measures are in the IHA:

Timing Restrictions

All work shall be conducted during daylight hours. If poor environmental conditions restrict visibility full visibility of the shutdown zone, pile installation would be delayed.

Sound Attenuation

To minimize noise during vibratory and impact pile driving, pile caps (pile softening material) shall be used. KDC shall use high-density polyethylene (HDPE) or ultra-high-molecular-weight polyethylene (UHMW) softening material on all templates to eliminate steel on steel noise generation.

Shutdown Zone for in-water Heavy Machinery Work

For in-water heavy machinery work (using, *e.g.*, standard barges, tug boats, barge-mounted excavators, or clamshell equipment used to place or remove material), a minimum 10 meter shutdown zone shall be implemented. If a marine mammal comes within 10 meters of such operations, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include (but is not limited to) the following activities: (1) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (*i.e.*, stabbing the pile); or (3) removal of the pile from the water column/substrate via a crane (*i.e.*, deadpull).

Additional Shutdown Zones

For all pile driving/removal and drilling activities, KDC shall establish a shutdown zone for a marine mammal species that is greater than its corresponding Level A zone. 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). The shutdown zones for each of the pile driving and drilling activities are listed below in Table 9.

Table 9. Shutdown Zones.

Source	Shutdown Zones (meters)				
	Low-Frequency Cetaceans (humpback whale, minke whale)	Mid-Frequency Cetaceans (killer whale, Pacific-white sided dolphin)	High-Frequency Cetaceans (Dall's porpoise, harbor porpoise)	Phocid (harbor seal)	Otariid (sea lion)
In-Water Construction Activities*					
In Water Heavy Construction(<i>i.e.</i> , Barge movements, pile positioning, deadpulling, and sound attenuation)	10	10	10	10	10
Vibratory Pile Driving					
24-inch steel removal (2 piles) (~1 hour on 1 day)	25	25	25	25	25
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	25	25	25	25	25
36-inch steel removal (4 piles) (~1 hour on 1 day)	25	25	50	25	25
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	25	25	25	25	25
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	25	25	25	25	25
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	50	25	50	25	25
Impact Pile Driving					
48-inch steel permanent installation (17 piles) (~15 minutes per day on 6 days)	500	25	600	270	25
Socketing Pile Installation(Drilling)					

30-inch steel permanent installation (1 pile) (3 hours per day on 1 day)	50	25	50	25	25
Anchor Pile Installation (Drilling)					
30-inch steel permanent installation (7.5 hours per day)	80	25	80	50	25

Monitoring Zones

KDC shall establish and observe a monitoring zone. The monitoring zones for this project are areas where SPLs are equal to or exceed 120 dB rms (for vibratory pile driving and drilling) and 160 dB rms (for impact driving). These areas are equal to Level B harassment zones and are presented in Table 10 below. These zones provide utility for monitoring conducted for mitigation purposes (*i.e.*, shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area, but outside the shutdown zone, and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting instances of Level B harassment; disturbance zone monitoring is discussed in detail later (see Monitoring and Reporting).

Table 10. Monitoring Zones.

Source	Level B Zones (meters)	Level B Zone (square kilometers)
Vibratory Pile Driving		
24-inch steel removal (2 piles) (~1 hour on 1 day)	6,215	5.9
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	6,215	5.9
36-inch steel removal (4 piles) (~1 hour on 1 day)	13,755	10.3
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	6,215	5.9
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	6,215	5.9
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	13,755	10.3
Impact Pile Driving		
48-inch steel (17 piles) (~15 minutes per day on 6 days)	3,745	4.9

Socketing Pile Installation(Drilling)		
30-inch steel (1 pile) (~3 hours on 1 day)	13,755	10.3
Anchor Pile Installation(Drilling)		
30-inch steel (17 piles) (~7.5 hours on 1 day)	13,755	10.3

Non-authorized Take Prohibited

If a species enters or approaches the Level B zone and that species is either not authorized for take or its authorized takes are met, pile driving, pile removal, and drilling activities must shut down immediately using delay and shut-down procedures. Activities must not resume until the animal has been confirmed to have left the area or an observation time period of 15 minutes has elapsed.

Soft Start

The use of a soft-start procedure are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the impact hammer operating at full capacity. For impact pile driving, contractors shall be required to provide an initial set of strikes from the hammer at 40 percent energy, each strike followed by no less than a 30-second waiting period. This procedure shall be conducted a total of three times before impact pile driving begins. Soft Start is not required during vibratory pile driving/removal or drilling activities.

Pre-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving or drilling of 30 minutes or longer occurs, the observer shall observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone shall be cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone

or has not been observed for 15 minutes. If the Monitoring zone has been observed for 30 minutes and non-permitted species are not present within the zone, soft start procedures can commence and work can continue even if visibility becomes impaired within the Monitoring zone. When a marine mammal permitted for Level B take is present in the Monitoring zone, pile driving, pile removal, and drilling activities may begin and Level B take shall be recorded. As stated above, if the entire Level B zone is not visible at the start of construction, piling or drilling activities can begin. As shown, the largest Level B zone is equal to 78.9 km², making it impossible for the PSOs to view the entire harassment area. Due to this, Level B exposures shall be recorded and extrapolated based upon the number of observed take and the percentage of the Level B zone that was not visible. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Monitoring zone and shutdown zone shall commence.

Based on our evaluation of the applicant's measures, as well as other measures considered by NMFS, NMFS has determined that the mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

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 shall result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area.

Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

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

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

Visual Monitoring

Monitoring would be conducted 30 minutes before, during, and 30 minutes after all pile driving/removal and drilling activities. In addition, observers shall record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral

reactions in concert with distance from piles being driven, removed, or pile holes being drilled. Pile driving and drilling activities include the time to install, remove, or drill a hole for a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than thirty minutes.

Monitoring shall be conducted by NMFS approved Protected Species Observers (PSOs). The number of PSOs shall vary from two to four, depending on the type of pile driving/drilling and size of pile, which determines the size of the harassment zones. Two land-based PSOs shall monitor during all impact pile driving activity, three land-based PSOs shall monitor during vibratory pile driving/removal of 24 and 30-inch piles, and four land-based PSOs shall monitor during vibratory pile driving/removal of 36-inch and 48-inch diameter piles and during all socket and anchor drilling.

One PSO shall be stationed at Berth IV and shall be able to view across Tongass Narrows south and west to Gravina Island. The second and third PSOs shall be located in increments along the road systems at locations that provide the best vantage points for viewing Tongass Narrows west and east of Berth IV. These locations shall vary depending on type of pile driving. The fourth PSO shall be located on the road system near Mountain Point and shall be able to view Tongass Narrows to the northwest and Revillagigedo Channel to the southeast.

PSOs shall scan the waters using binoculars, and/or spotting scopes, and shall use a handheld GPS or range-finder device to verify the distance to each sighting from the project site. All PSOs shall be trained in marine mammal identification and behaviors and are required to have no other project-related tasks while conducting monitoring. In addition, monitoring shall be conducted by qualified observers, who shall be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by

calling for the shutdown to the hammer operator. Qualified observers are trained and/or experienced professionals, with the following minimum qualifications:

- At least one PSO must have prior experience working as a marine mammal observer during construction activities;
- Independent observers (*i.e.*, not construction personnel);
- Other PSOs may substitute education (degree in biological science or related field) or training for experience;
- Where a team of three or more PSOs are required, a lead observer or monitoring coordinator shall be designated. The lead observer must have prior experience working as a marine mammal observer during construction;
- KDC shall submit PSO CVs for approval by NMFS;

KDC shall ensure that observers have the following additional qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water

construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior;

- 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; and
- Sufficient training, orientation, or experience with the construction operations to provide for personal safety during observations.

KDC shall submit a draft report to NMFS not later than 90 days following the end of construction activities. KDC shall provide a final report within 30 days following resolution of NMFS' comments on the draft report. Reports shall contain, at minimum, the following:

- Date and time that monitored activity begins and ends for each day conducted (monitoring period);
- Construction activities occurring during each daily observation period, including how many and what type of piles driven;
- Deviation from initial proposal in pile numbers, pile types, average driving times, etc.;
- Weather parameters in each monitoring period (*e.g.*, wind speed, percent cloud cover, visibility);
- Water conditions in each monitoring period (*e.g.*, sea state, tide state);
- For each marine mammal sighting:
 - Species, numbers, and, if possible, sex and age class of marine mammals;
 - Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;

- Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Estimated amount of time that the animals remained in the Level B zone;
- Description of implementation of mitigation measures within each monitoring period (*e.g.*, shutdown or delay);
- Other human activity in the area within each monitoring period; and
- A summary of the following:
 - Total number of individuals of each species detected within the Level B Zone, and estimated as taken if correction factor appropriate;
 - Total number of individuals of each species detected within the Level A Zone and the average amount of time that they remained in that zone; and
 - Daily average number of individuals of each species (differentiated by month as appropriate) detected within the Level B Zone, and estimated as taken, if appropriate.

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 responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), 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's 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 environmental 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).

As stated in the mitigation section, shutdown zones, greater than Level A harassment zones, shall be implemented. Level A take is only authorized as a precautionary measure for two species (harbor seals and harbor porpoises) in case PSOs are unable to detect them within their larger shutdown zones while impact piling 48-inch steel piles. Exposures to elevated sound levels produced during pile driving activities may cause behavioral responses by an animal, but they are expected to be mild and temporary. Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff, 2006; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. These reactions and behavioral changes are expected to subside quickly when the exposures cease.

To minimize noise during vibratory and impact pile driving, KDC shall use pile caps (pile softening material). Much of the noise generated during pile installation comes from contact between the pile being driven and the steel template used to hold the pile in place. The contractor

shall use high-density polyethylene (HDPE) or ultra-high-molecular-weight polyethylene (UHMW) softening material on all templates to eliminate steel on steel noise generation.

During all impact driving, implementation of soft start procedures and monitoring of established shutdown zones shall be required, significantly reducing any possibility of injury. Given sufficient notice through use of soft start (for impact driving), marine mammals are expected to move away from an irritating sound source prior to it becoming potentially injurious. In addition, PSOs shall be stationed within the action area whenever pile driving and drilling operations are underway. Depending on the activity, KDC shall employ the use of two to four PSOs to ensure all monitoring and shutdown zones are properly observed.

Although the expansion of Berth IV's facilities would have some permanent removal of habitat available to marine mammals, the area lost would be negligible. Most of the project footprint would be within previously disturbed areas adjacent to existing Berth IV structures and within an active marine commercial and industrial area. There are no known pinniped haulouts near the action area.

In addition, impacts to marine mammal prey species are expected to be minor and temporary. Overall, the area impacted by the project is very small compared to the available habitat around Ketchikan. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During pile driving and drilling, it is expected that fish and marine mammals would temporarily move to nearby locations and return to the area following cessation of in-water construction activities. Therefore, indirect effects on marine mammal prey during the construction are not expected to be substantial.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- Mortality is neither anticipated nor authorized for the project;
- The impacts to marine mammal habitat that are anticipated are minimal;
- The action area is located in an industrial and commercial marina;
- The project area does not include any rookeries, or known areas or features of special significance for foraging or reproduction in the project area;
- The anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; and
- The required mitigation measures (*i.e.* shutdown zones and pile caps) are anticipated to be effective in reducing the impacts of the specified activity.

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

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(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. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Take of eight of the ten marine mammal stocks authorized for take is approximately three percent or less of the stock abundance. For northern resident and west coast transient killer whales, we acknowledge that 15.33 percent and 16.46 percent of the stocks are to be taken by Level B harassment, respectively. However, since three stocks of killer whales could occur in the action area, the 40 total killer whale takes are likely split among the three stocks. Nonetheless, since NMFS does not have a good way to predict exactly how take will be split, NMFS analyzed at the most conservative scenario, which is that all 40 takes could potentially occur to each of the three stocks. This is a highly unlikely scenario to occur and the percentages of each stock taken are predicted to be significantly lower than values presented in Table 8 for killer whales.

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

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not

likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with NMFS' Alaska Regional Office, whenever we propose to authorize take for endangered or threatened species.

NMFS's Alaska Region issued a Biological Opinion on July 26, 2018 to NMFS's Office of Protected Resources which concluded that the Ketchikan Berth IV Expansion project is not likely to jeopardize the continued existence of Mexico DPS humpback whales or adversely modify critical habitat because none exists within the action area.

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 action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment. This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has determined that the issuance of the IHA qualifies to be categorically excluded from further NEPA review.

Authorization

As a result of these determinations, we have issued an IHA to ADOT&PF for conducting the described construction activities related to city dock and ferry terminal improvements from

June 1, 2019 through May 31, 2020 provided the previously described mitigation, monitoring, and reporting requirements are incorporated.

Dated: July 27, 2018.

Elaine T. Saiz,
Acting Deputy Director,
Office of Protected Resources,
National Marine Fisheries Service.

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